AGGENEYS 2 PHOTOVOLTAIC FACILITY AND ASSOCIATED INFRASTRUCTURE

TRAFFIC AND TRANSPORTATION ASSESSMENT

MARCH 2019

Knight Piésold CONSULTING

P O Box 381
Century City
7441
Tel. +27 21 555 0400

Rev	Description	Date
0	Issued in Draft	March 2019

This report was prepared and reviewed by the undersigned.

Prepared:

Amory Le Roux-Arries
Civil Engineer

Reviewed:

Andrew Cleghorn,
Principal Civil Engineer

SPECIALIST EXPERTISE

ANDREW CLEGHORN

Profession:	Civil Engineer
Position in Firm:	Regional Head – Western Cape, Shareholder, Principal Civil Engineer
Qualifications:	PrEng 20030171, MEng (Civil)
Years of Experience:	17 years

Summary of Experience: Andrew Cleghorn has more than 17 years engineering experience. Andrew obtained his Master of Engineering degree in 2016 from the University of Stellenbosch. Andrew was recently promoted to the position of Regional Head of the Western Cape Transport and Infrastructure branch. Andrew has technical and professional skills in pavement engineering, non-motorised transport planning, design and development of transport systems, project planning and management and construction monitoring.

Specialist Experience:

2017- Current	**Project:**	**N2 Wildcoast Highway, Section 20 from Miskaba River Bridge to the Mtentu River Bridge**
	Position:	Project Leader, Lead Designer
	Description:	Design and Construction supervision of 18km of Greenfields portion of the N2
	Activities Performed:	Project Leader and Design Specialist
	Project Value:	R 1 bn
2011-2016	**Project:**	**N2 Upgrades Myddleton near Caledon**
	Position:	Project Leader and Lead Designer
	Description:	Road Rehabilitation and Improvements
	Activities Performed:	Project Management and Lead Designer, Pavement Engineering
	Project Value:	R 40 000 000.00 (Construction)
2011-2016	**Project:**	**Cape Town Northern Areas Road Rehabilitation**
	Position:	Project Leader and Lead Designer
	Description:	Road Rehabilitation and Improvements
	Activities Performed:	Project Management and Lead Designer, Pavement Engineering
	Project Value:	R 110 000 000.00 (Construction cost)
2011-2012	**Project:**	**Phillipi Plaza Shopping Complex**
	Position:	Project Leader and Lead Designer
	Description:	Parking and roads to new shopping complex
	Project Value:	R 12 000 000.00 (Construction)
2008-2011	**Project:**	**Bredasdorp Main Road Rehabilitation**
	Position:	Project Leader and Lead Designer
	Description:	Road Rehabilitation and Improvements

	Activities Performed:	Project Management and Lead Designer, Pavement Engineering
2007-2018	**Project:**	**Muizenberg Main Road Phase 1 2 3**
	Position:	Lead Designer
	Description:	Road Rehabilitation and Civil Engineering Services
	Activities Performed:	Lead Designer
	Project Value:	R 600 000 000.00 (Construction)

SPECIALIST DECLARATION

I, **Andrew Cleghorn**, as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favorable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing – any decision to be taken with respect to the application by the competent authority; and – the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable on terms of section 24F of the Act.

Signature of Specialist:

Name of Specialist: Andrew Cleghorn

Date:

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1. INTRODUCTION

Knight Piésold Consulting was appointed by ABO Wind Aggeneys 2 PV (Pty) Ltd (further herein referred to as the applicant) to undertake a Transport Study and Traffic Impact Assessment for the proposal of a photovoltaic (PV) energy facility and associated infrastructure.

Remaining extent of Farm Bloemhoek 61 has been identified by the applicant as the preferred site, which is suitable for the development of a commercial PV facility that can generate 100MW. The total assessed area of the project site is approximately 12 379ha.

1.1 Objectives of the Study

The objectives of this traffic and transportation study are to:

a. Review the study area and describe the baseline traffic conditions;
b. Determine the suitability of access to and egress from the site;
c. Evaluate the safety of the proposed accesses;
d. Address the impact of traffic generated by the proposed development, with specific reference to traffic safety, operations and road condition;
e. Propose mitigation measures for any identified significant risks or impacts and enhance positive risks or impacts of the project.

1.2 Study Area

The site is situated approximately 7km south-east of Aggeneys, 116km south-east of Springbok and 57km south-west of Pofadder in the Northern Cape Province of South Africa. It falls within the Namakwa District and the Khâi-Ma Local municipality.

1.3 Locality

The full extent of the property (12 379ha) was assessed for the proposed project. An approximate area of 250ha is required for the development of the proposed 100MW Aggeneys 2. The PV structures will occupy approximately 233ha, while the supporting infrastructure such as internal roads (10ha), temporary laydown area (5ha), auxiliary buildings (1ha), and an onsite substation (0.625ha) will occupy the remainder. The locality plan is illustrated in Figure 1.1 below.

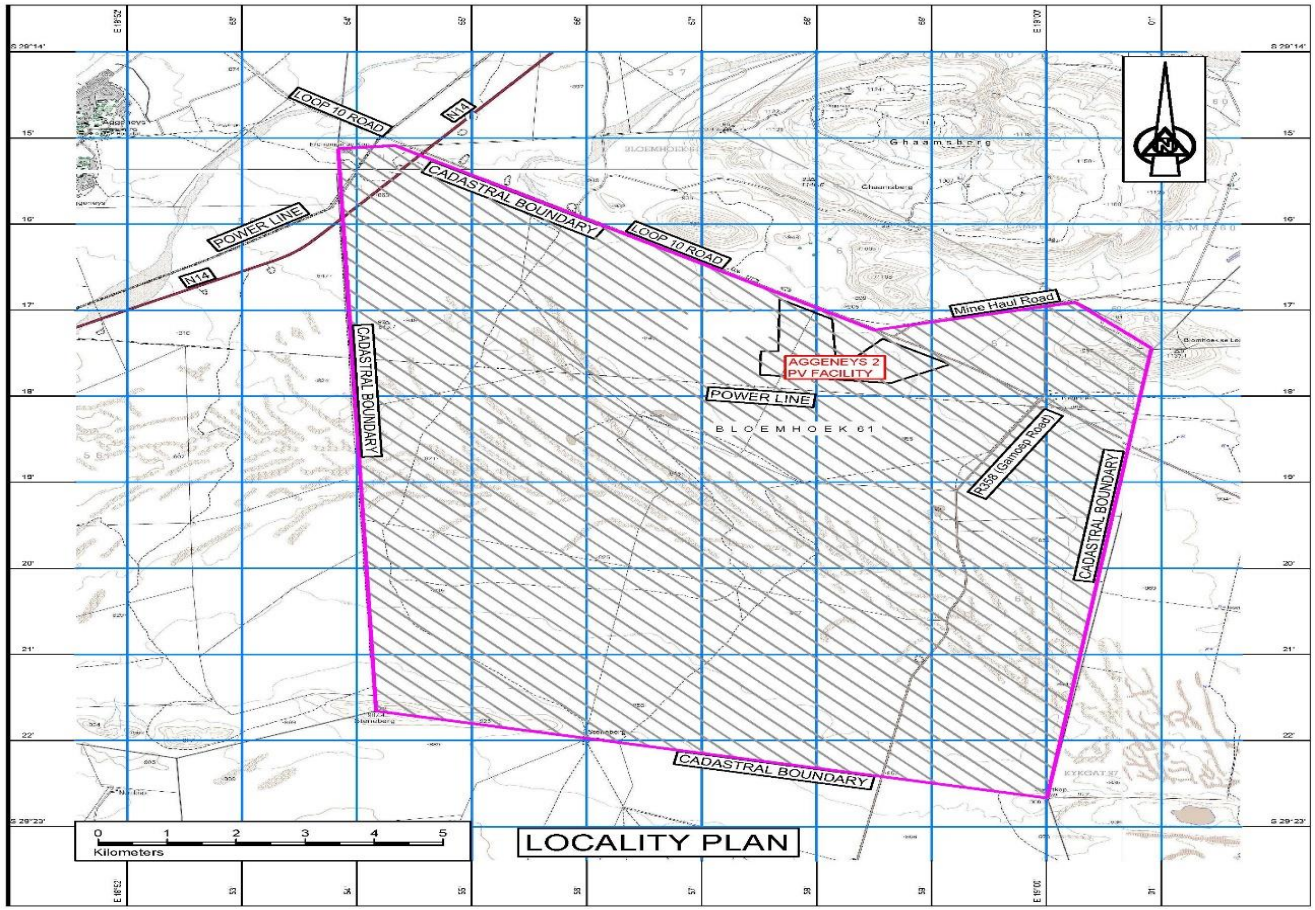


Figure 1-1: Locality Plan

1.4 Approach and Methodology

The purpose of this study is to assess the possible impacts that the development might have on the surrounding road/traffic network. The following tasks were undertaken to complete this study:

Site Visit and Project Initiation:

- The site visit took place from the 21st to 23rd of January 2019, during the day with sunny and hot weather conditions;
- An overview of the project information was obtained, which included location maps, component specifications and the surrounding road network information;
- Available documentation and information relevant to the proposed solar farm was reviewed.

Traffic and Route Assessment:

- Trip generation and potential traffic impacts were determined;
- Possible haul routes between port of entry and sites in terms of:
    - National routes;
    - Local routes;
    - Site access roads (internal roads); and
    - Road limitations due to abnormal loads, were identified
- Construction and Operation vehicle trips i.e.
    - Generated vehicle trips;
    - Abnormal load trips; and
    - Access requirements were determined;
- The impacts of the development were investigated.

Access Assessment:

- Feasibility of the location of access points were assessed;
- Motorised and non-motorised access requirements were determined;
- Queuing analysis was compiled;
- Access geometry was investigated; and
- Site distances and spacing requirements were determined.

Report:

- A TIA report was compiled, for comments.

1.5 Assumptions Made

The following assumptions were made:

- Maximum vertical clearances along the haul route is 5.2m for abnormal loads
- The imported elements will be transported from the most feasible port viz. Saldanha Bay Port.
- All haulage will occur on either surfaced national and provincial routes or existing gravel roads
- Construction materials will be sources locally first, as far as possible.

2 THE DEVELOPMENT

2.1. Current and Proposed Land Use Rights

To enable commercial use of this property, rezoning will be required. The proposed site layout is illustrated in *Figure 2.1* below.

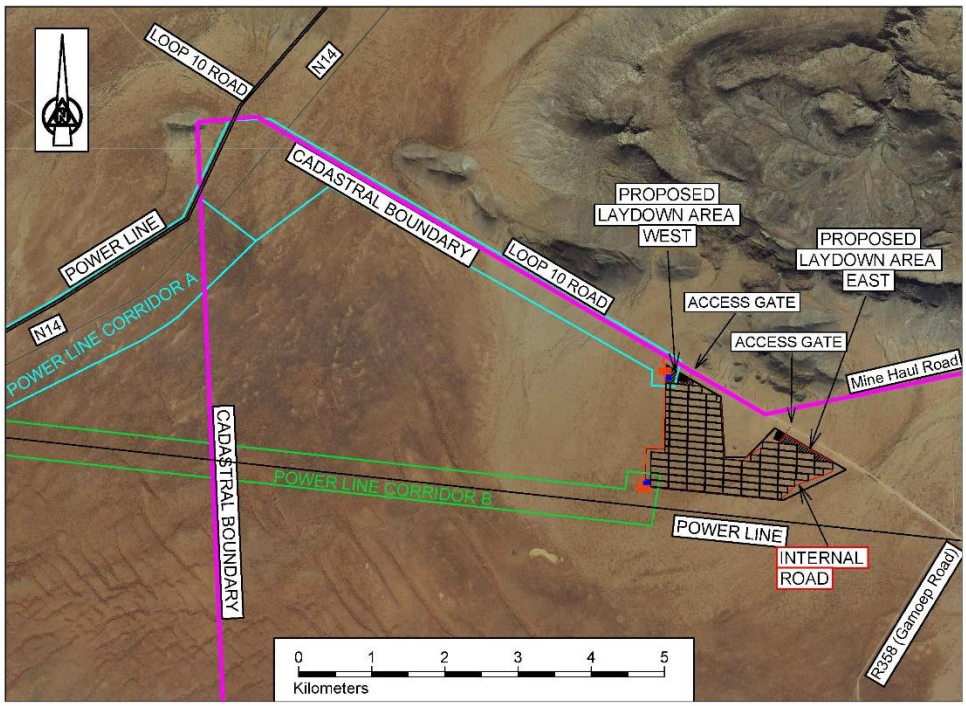


Figure 2-1: Conceptual layout of PV panels and associated infrastructure

3 ROAD NETWORK ASSESSMENT

The national, regional, secondary and proposed internal access roads will be used to transport all components and equipment required during the construction phase of the solar facility. Some of the components (e.g. substation transformer) may be defined as abnormal loads in terms of the National Road Traffic Act (No.93 of 1996), by virtue of the dimensional limitations.

The routes leading to the site, from both the preferred and alternative ports, are Provincial and National Roads.

3.1. Current Legislation on Road Freight

The current general limitations on road freight transport are:

a. Axle load limitation of 7.7 ton on front axle and 9.0 ton on single rear axles;
b. Axle unit limitations of 18t for dual axle unit and 24t for 3 axle unit
c. The bridge formula requirements to limit load concentration and to regulate load distribution on the vehicle is as follows:
   - Permissible mass = (L * 2 100) + 18 000 kilogram
   - With L = the distance from the first axle of any axle or axle unit to the last axle of any consecutive axle or axle unit (in meters).
d. Gross vehicle mass limited to 56t. This equates to a typical payload of approximately 30t;
e. Maximum vehicle length of 22m for interlinks; 18.5m for horse and trailer and 13.5m for a single unit;
f. Width limit of 2.6m; and
g. A height limit of 4.3m.

Abnormal permits are required for vehicles exceeding any of the above limits. If, for any one of the above reasons, the equipment cannot be delivered along the preferred route, the alternate route should be considered.

3.2. Authority and Permit Requirements

For authority and permit requirements, the following should be noted:

a. Toll fees are payable on routes from the port. Toll fees for heavy vehicles with five or more axles are estimated to be R850 per trip, on the alternative route from Durban.

b. A separate abnormal load permit will be required for each Provincial Authority that the abnormal load passes through. The estimated fee of these permits' ranges between R10 000 and R 17 500 per trip. The application process for these permits takes approximately four weeks to complete.

4 TRAFFIC GENERATION

4.1. Existing Traffic

The proposed site is located on the Loop 10 Road which is a gravel road that also provides access to an existing mine. The mine maintains the road by grading it regularly and this would need to be maintained once construction starts. The resultant traffic from the mine is on average 14 heavy vehicle trips per day.

Photograph 4.1: Loop 10 Road during site inspection

4.2. Construction Phase

Imported elements are shipped to, and transported from, the nearest and most practical South African port to site. The largest potential load will be a single 100MVA transformer, with a payload of approximately 90 tons. Freight will be transported predominantly on surfaced National and Provincial roads.

Typical civil engineering construction plant, as well as other specialist equipment, will be required for site preparation, construction of the substation and mounting of the PV support structures. A temporary laydown area, approximately 5ha in extent will be required during construction. Storage areas will be required for typical construction equipment, see Figure *4.1.*

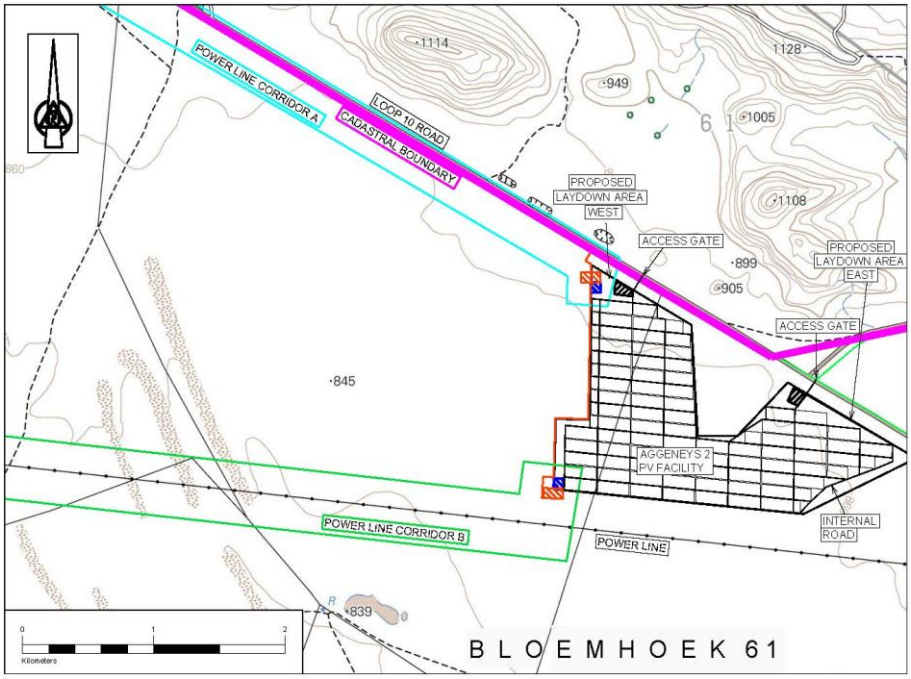


Figure 4-1: Site Areas during Construction

4.3. Traffic Statement

It is estimated that the total number of heavy vehicle trips for a 100MW installation would vary between 4 500 and 6 000. These trips would be made over an estimated construction period of between 12 and 18 months. In the worst case, the calculated number of trips would be between 15 and 25 daily trips. The impact of this on the road network would however be negligible, as the additional peak hourly traffic would at most be 2 trips. This low construction and post construction traffic would have no significant impact on the existing traffic service levels.

During the peak of the construction phase, it is estimated that approximately 400 employees would be employed on the project site. These employees will live in either of the nearest towns of Pofadder (57.5km) or Springbok (116km) and will be transported from the towns to site by bus or taxi. This would equate to 5 - 7 additional trips during the peak hours, if transported by 60-seater busses, or 20-27 additional trips if 15-seater minibus taxis are used.

4.4. Operational Phase

The proposed solar facility is expected to operate for a minimum period of 20 years and will operate 7 days a week, during daylight hours. The Operation and Maintenance plan includes monitoring and reporting on the performance of the solar facility. It is assumed that once the plant is fully operational, it will employ a staff compliment of approximately 60 full time workers. It is also assumed that the managers, supervisors and key staff will constitute 30% of the permanent

workforce. This workforce will travel to work by private vehicles. Assuming vehicle occupancy of 1.2 persons per vehicle, the total trips generated will be as calculated below:

Vehicles per hour = (60 employees x 30%) / 1.2 persons per vehicle = 15 vehicles per hour

The unskilled employees will therefore constitute 70% of the total workforce. These employees will travel to work by bus or minibus taxi. Assuming vehicle occupancy of 15 persons per taxi, then the total trips generated will be calculated as follows:

Vehicles per hour = (60 employees x 70%) / 15 persons per vehicle = 3 vehicles per hour

The total number of trips generated by the permanent workforce during the operational phase during the AM and PM peak period is therefore 18 vehicles per hour. Combined with the expected existing trips of 1-2 vehicles per hour to be generated during the operation period, the additional traffic is not considered to have a significant effect on the internal roads or the access roads and surrounding road network.

4.5. Impact and Risk Rating

The traffic impact significance rating has been determined according to criteria for impact assessment which is detailed below.

The first stage of impact assessment is the identification of activities, traffic aspects and impacts as well as the likelihood of that impact i.e. probability.

The significance is assessed as low, medium or high based on the combination of the characteristics of extent of the risk, duration of the risk, magnitude and probability of occurrence.

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

S=(E+D+M) x P

S = Significance weighting;
E = Extent;
D = Duration;
M =Magnitude; and
P = Probability.

For Aggeneys 2, see *Table 4.1* for the impact levels during the Construction Phase and *Table 4-2* for impacts during the Operational Phase.

Tables 4-3 and *4-4* summarises the impacts for the Construction and Operational Phase respectively for the cumulative impact of constructing more than one solar farm in the same vicinity at the same time.

4.5.1. Construction Phase

A summary of the impact of the construction of only Aggeneys 2, in isolation, is summarised in *Table 4.1* below:

Table 4-1: Construction Phase Impacts (In isolation)

Nature: Construction Phase Impacts		
	Without Mitigation	**With Mitigation**
Extent	Local (3)	Local (2)
Duration	Short-term (2)	Short-term (2)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (2)	Probable (2)
Significance	Low (14)	Low (12)
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation/Enhancement: - Stagger infrastructure delivery to site - Staff and general trips should occur outside of peak traffic periods - Construction materials to be sourced from local suppliers as much as possible to limit the impact on the regional network.		
Residual impacts: Impact on local traffic will remain low		

4.5.2. Operational Phase

A summary of the impact of the operation of only Aggeneys 2, in isolation, is summarised in *Table 4.*2 below.

Table 4-2: Operational Phase Impacts (In isolation)

Nature: Operational Phase Impacts		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (3)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (24)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation/Enhancement: - Staff and general trips should occur outside of peak traffic periods		
Residual impacts: None		

4.5.3. Cumulative Impact

The cumulative impact is based on Aggeneys 2 being constructed concurrently with any of the proposed or approved developments in the surrounding area, as defined in Section 5.6 below.

Table 4-3: Construction Phase Impacts (cumulative effect for Bloemhoek 61)

Nature: Construction Phase Impacts		
	Without Mitigation	**With Mitigation**
Extent	Regional (3)	Regional (3)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (4)	Minor (3)
Probability	Very likely (3)	Very likely (3)
Significance	**Low (27)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation/Enhancement: - Delivery of abnormal components should be staggered for each of the developments under construction - Construction programmes for each of the developments approved for construction should be staggered - Staff and general trips should occur outside of peak traffic periods		
Residual impacts: The impact on the local and regional traffic will be moderate		

Table 4-4: Operation Phase Impacts (Cumulative Effect for Blomhoek 61)

Nature: Operational Phase Impacts		
	Without Mitigation	**With Mitigation**
Extent	Regional (2)	Regional (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (4)	Low (3)
Probability	Very likely (3)	Very likely (3)
Significance	**Low (30)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation/Enhancement: - Vehicle trips to be staggered outside peak periods		
Residual impacts: The impact on the local and regional traffic will be low		

The cumulative impact is based on Aggeneys 2 being constructed concurrently with any of the proposed or approved developments in the surrounding area, as defined in Section 5.7 below.

Table 4-5: Construction Phase Impacts (Cumulative Effect for Aggeneys and surrounds)

Nature: Construction Phase Impacts		
	Without Mitigation	**With Mitigation**
Extent	Regional (3)	Regional (3)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Moderate (6)	Moderate (6)
Probability	Very likely (4)	Very likely (3)
Significance	**Medium (48)**	**Medium (36)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation/Enhancement: - Delivery of abnormal components should be staggered for each of the developments under construction - Construction programmes for each of the developments approved for construction should be staggered - Staff and general trips should occur outside of peak traffic periods		
Residual impacts: The impact on the local and regional traffic will be moderate to high		

Table 4-6: Operation Phase Impacts (Cumulative Effect for Aggeneys and surrounds)

Nature: Operational Phase Impacts		
	Without Mitigation	**With Mitigation**
Extent	Regional (4)	Regional (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (4)	Moderate (3)
Probability	Very likely (3)	Very likely (3)
Significance	**Medium (36)**	**Low (30)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation/Enhancement: - Vehicle trips to be staggered outside peak periods		
Residual impacts: The impact on the local and regional traffic will be moderate		

5 TRANSPORT STUDY

5.1. Proposed Access

A formal gravel access road currently provides access, from the national road (N14), to the property. This gravel road leads to the access gates to Aggeneys 2 project site, see *Figure 5.1*. The gravel access road, intersecting the N14, will ultimately be the main access road to Aggeneys 2. Two accesses are proposed to Aggeneys 2 to accommodate the proposed layout. This access point 1 and access point 2 illustrated in *Photograph 5.3 and Photograph 5.4* is approximately 1,5km apart.

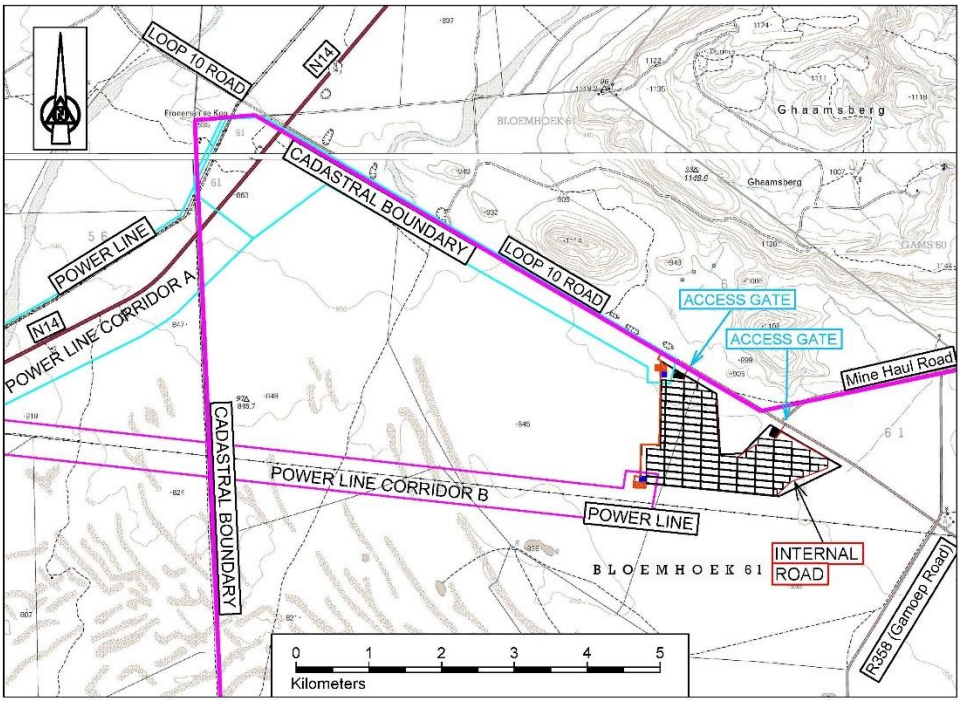


Figure 5-1: Site Access

During construction the project site will be accessed via the existing roads which will subsequently be utilised for maintenance purposes during operation. The final site layout will determine the exact extent of the internal roads.

The access road intersection, off the N14, as illustrated in *Photograph 5.1*, is fully tarred, and has recently been upgraded through the maintenance contract on the N14. This access road is currently 8m wide, see *Photographs 5.1 and 5.2*. The access road from the intersection towards the accesses is gravel graded road with drainage provisions.

The proposed access point for Aggeneys 2 is illustrated in *Photograph 5.3.* The soil conditions are soft sand and with stabilisation should be adequate to carry the low volume daily loads, with regular maintenance during the construction period. The minimum vertical clearances according to *SANS 10280/NRS 041-1:2008 Overhead Power Lines for Conditions Prevailing in South Africa*

is 6.3m for a 132kV power line whether outside or inside townships. This needs to be noted and investigated for the internal road design, because there are powerlines on the property under investigation and in the surrounding area. A minimum of 6.3m vertical clearance is to be considered for the internal project design.

Photograph 5.1: Access off N14

Photograph 5.2: Gravel Access road

Photograph 5.3: Access point 1 to Aggeneys 2

Photograph 5.4: Access point 2 to Aggeneys 2

5.2. Internal Roads

Permanent access roads will be constructed between the solar panels as follows, depending on the final layout design:

a. The first 200m to 400m from the Access gates into the site area will be stabilised gravel depending on the detailed design;
b. Internal access road(s) approximately 5m wide, to be gravel;
c. Internal gravel access roads in between solar panels of approximately 10ha, depending on final layout design.

5.3. Route from Preferred Port

The route for the transportation of imported equipment is either from Saldanha, Port Elizabeth or Coega. The preferred delivery route for abnormal loads is from Port of Saldanha to site as is shown in *Figure 5.2.* This route is 582km in length, illustrated in *Table 5.1* below.

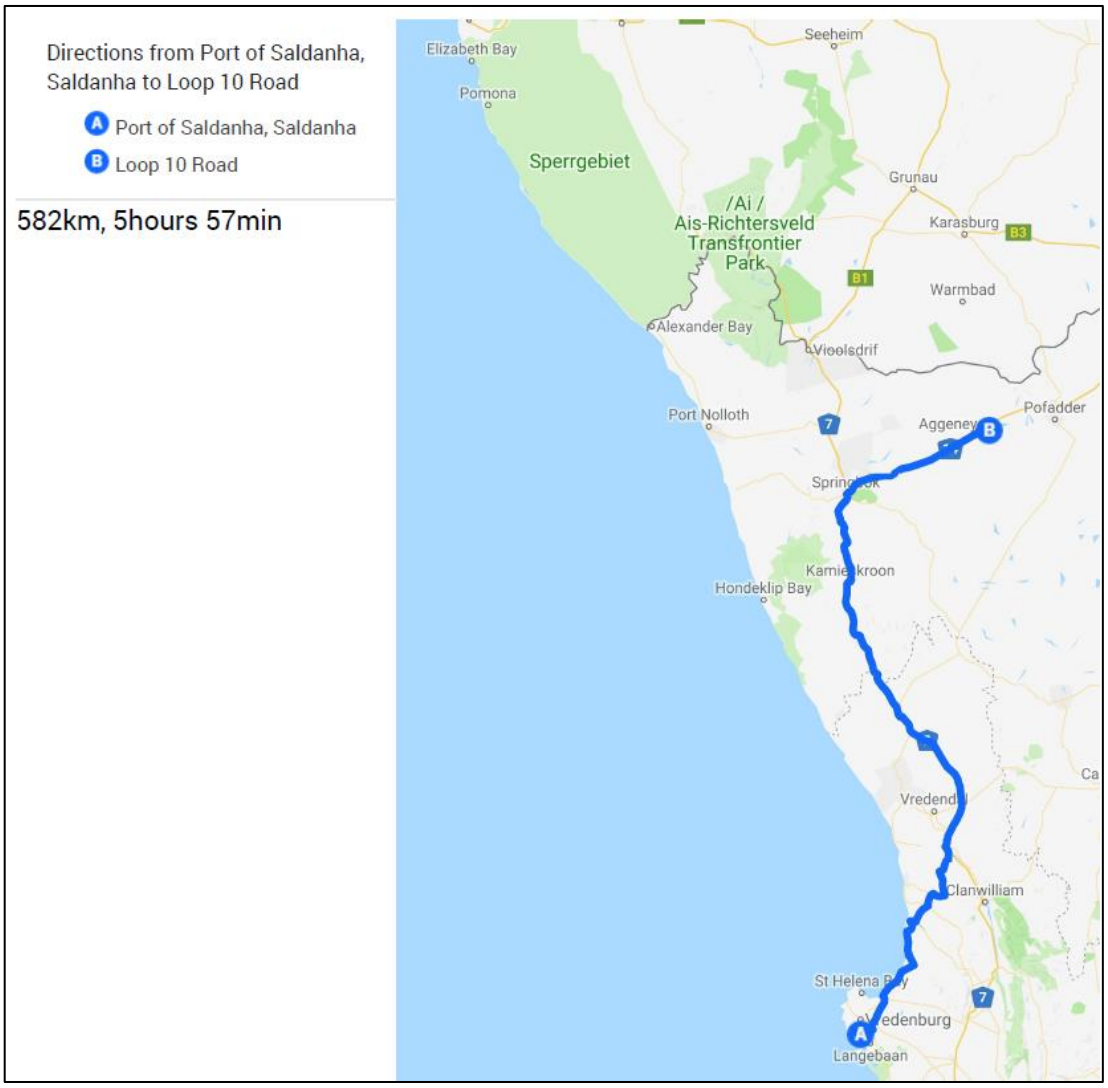


Figure 5-2: Preferred route from Saldanha Port

Table 5-1: Preferred Route Assessment

Section	Route Name	From	To	Distance (km)	Type
1	R27	Port	Graafwater	139	Surfaced Regional Road
				The R27 is a dual carriageway two lane road leaving the port with surfaced shoulders	
2	N7	Graafwater	Springbok	320	Surfaced National Road
				The N27 is a dual carriageway two lane road with gravel shoulders for the most part	
3	N14	Springbok	Aggeneys	116	Surfaced National Road
				The N14 is a dual carriageway two lane road with gravel shoulders for the most part	

Section	Route Name	From	To	Distance (km)	Type
4	Loop 10	N14 Intersection	Site Access	7	Servitude
				Loop 10 road is a single carriageway two lane gravel graded road with gravel shoulders	

5.4. Route from Alternative Port

The alternative port to have equipment delivered is either Port Elizabeth or Coega, which is a distance of 1 159km from site, via the N10 as shown in *Figure 5.3.* The existing road elements are illustrated in *Table 5.2* below:

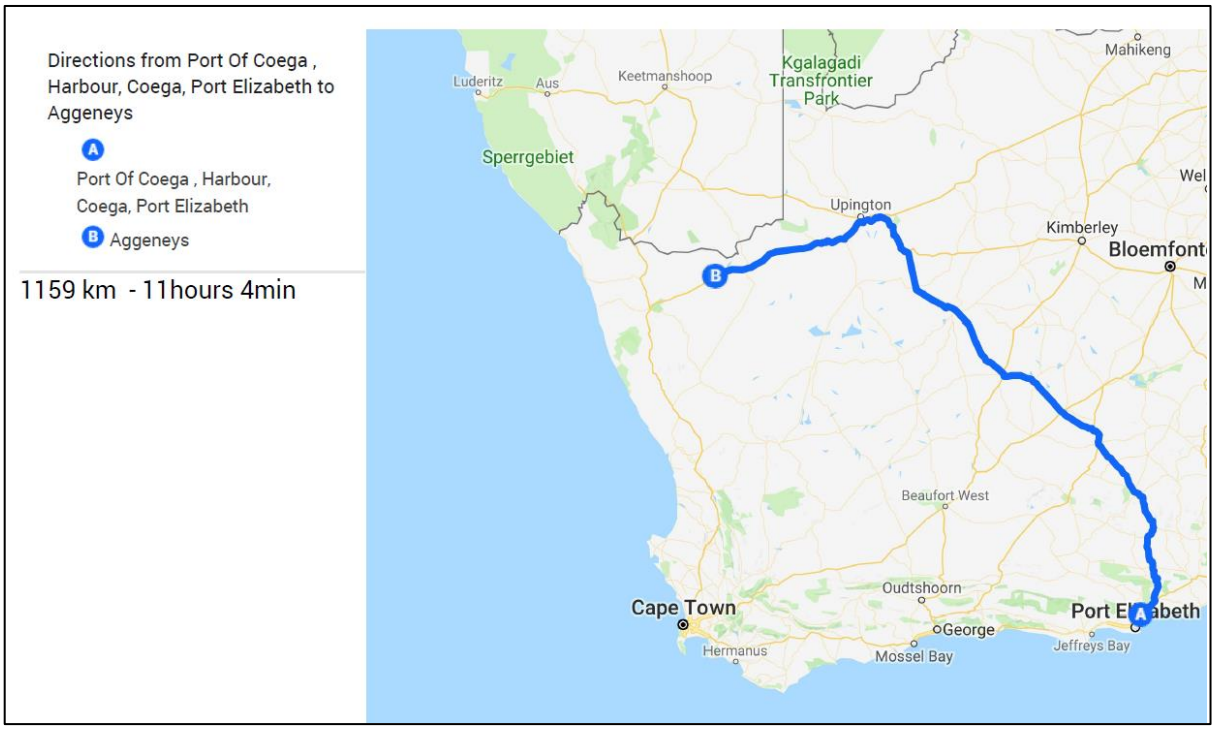


Figure 5-3: Route from alternative port

Table 5-2 Route Elements from Alternative Port

Section	Route Name	From	To	Distance (km)	Type
1	N10	Port Elizabeth	Upington	909	Surfaced National Road
				The N10 is a single carriageway with surfaced shoulders for some parts, but gravel shoulders for the most part.	
2	N14	Upington	Aggeneys	266	Surfaced National Road
				The N14 is a single carriageway two lane road with gravel shoulders	
3	Loop 10 road	N14 intersection	Site	7	Servitude
				Loop 10 road is a single carriageway two lane gravel graded road with gravel shoulders	

5.5. Access during Construction (Route for Construction Materials)

The materials required for road construction are available in the vicinity of the site and will be transported from nearby towns. All materials can be transported from here and surrounding towns, to site, on any of the National and Provincial roads. If any materials are not locally available, they would have to be sourced and transported from major centres such as Kimberley or Cape Town. These materials can be transported from any of the major cities on the National and Provincial roads, with no limitations imposed on normal freight.

5.6. Other Renewable Energy Independent Power Producer Procurement Programme (REIPPP) projects identified on the same property

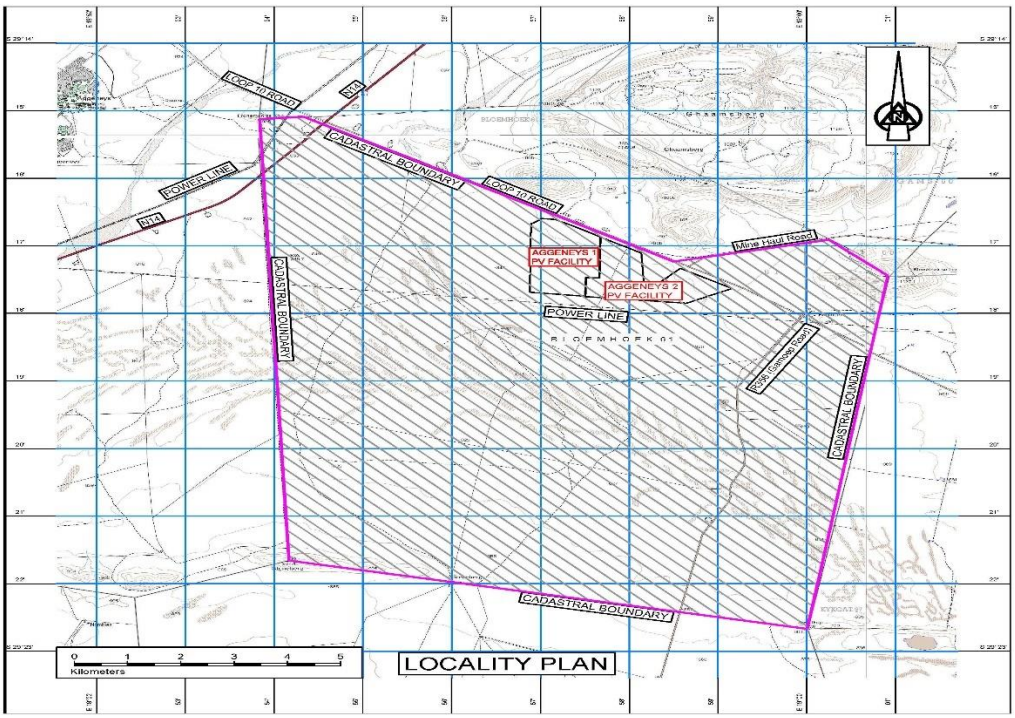


Figure 5-4: Cumulative layout map

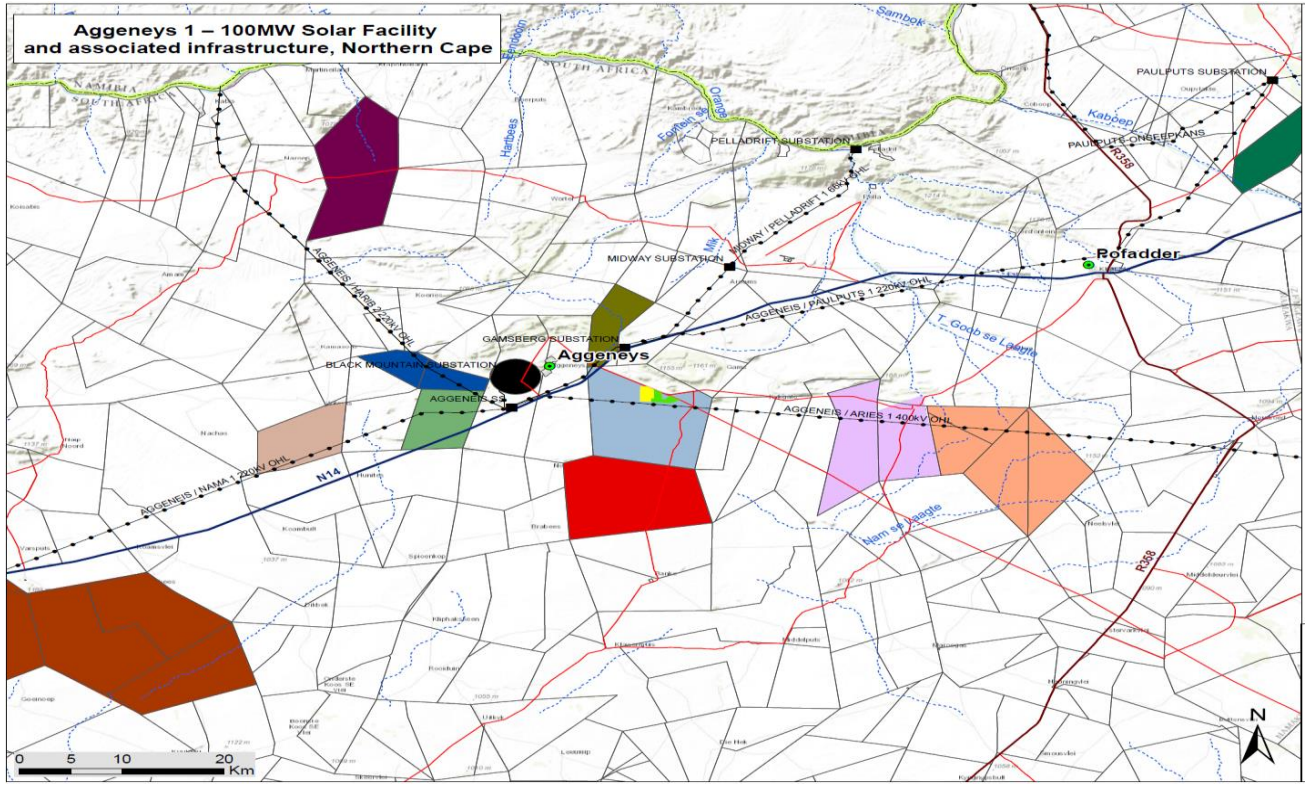
Table 5-3: Other solar energy projects on Farm Bloemhoek 61

Proposed Development	DEA Reference Number	Current Status of EIA	Applicant	Proposed Capacity
Aggeneys 1		Scoping phase	ABO Wind Aggeneys 1 PV (Pty) Ltd	100MW

5.7. Cumulative Impact Assessment for Aggeneys and surrounding area

Various IPPs are proposed for the Northern Cape region by different applicants as illustrated in Figure 5.5 below and described in Table 5-4. Even though the capacity of the applications on the list is extensive, not all of the proposed projects on the list will be approved in the next round of approval; these will thus be limited to an acceptable capacity for the vicinity and will thus not exclude this project from being considered due to capacity constraints.

Figure 5.5 below illustrates all the REIPPPP projects in the vicinity of Aggeneys 1 which are currently in development.

6. 

7. **Figure 5-5: Cumulative Map of Aggeneys area**

Table 5-4: List of proposed REIPPPs in the vicinity

FARMNAME	DEA Project Reference	Project Name	Applicant	Capacity (MW)
Aggeneys 1		Proposed Aggeneys solar project on portion of Blomhoek 61, Northern Cape Province	ABO Wind Aggeneys 1 PV (Pty) Ltd	100
Aggeneys 2		Proposed Aggeneys solar project on portion of Blomhoek 61, Northern Cape Province	ABO Wind Aggeneys 2 PV (Pty) Ltd	100
ZUURWATER	12/12/20/2602	Proposed aggenys solar project on portion 6, a portion of portion 6, Zuurwater (within portions 2 & 3 of farm 62),Northerm Cape Province	Anjubex (Pty) Ltd	3 * 75
SCUIT-KLIP	12/12/20/1832	Proposed establishment of the Pofadder Solar Thermal Plant, NC	Kaxu Solar One RF (Pty) Ltd	100
SCUIT-KLIP	12/12/20/2098/1	Proposed Konkoonsies Solar Park	Limarco 77 (Pty) Ltd	10
SCUIT-KLIP	12/12/20/2601	Proposed Solar energy project on portion 4 of the farm scuitklip 92 ,Northerm Cape Province	Rubivista (Pty) Ltd -2011/119952/07	0
ZUURWATER	12/12/20/2334/7	Proposed Sato Energy Holdings Photovoltaic Project, Khai Ma Local municipality, Northern cape	Sato Energy Holdings (pty) Ltd	2 * 50
ZUURWATER	12/12/20/2334/6	Proposed Sato Energy Holdings Photovoltaic Project, Khai Ma Local municipality, Northern cape	Sato Energy Holdings (pty) Ltd	75
BLOEMHOEK	12/12/20/2050	Proposed solar energy facility and associated infrastructure on site South East of Aggeneys, Northern Cape Province	Solar Capital (Pty) Ltd	14*75
Farm Ou Taaisbosmond	14/12/16/3/3/2/871	Farm Ou Taaisbosmond	Sol Invictus 4	150
Kangnas	14/12/16/3/3/2/348	Mainstream Kangnas	Mainstream Kangnas	1 x wind, 1 x PV
Konkoosies	14/12/16/3/3/1/514	Konkoosies	Biotherm	10
Konkoosies II	12/12/20/2098/1	Konkoosies II	Limarco 77	10
Black Mountain Mine		Black Mountain Mine Solar	Aurora Power Solution	75

6 CONCLUSIONS

It was observed during the site visit that the road network within the study area is operating at an acceptable level of service. No congestion problems, queue delays and delays were evident on the surrounding network. The surrounding network has the capacity to accommodate the additional volumes of 2 trips per hour for the construction vehicles, as well 5 to 7 bus trips required to transport workers during peak hours. If minibus taxis are used for the transportation of workers instead of buses, the additional trips generated will then increase to between 20 and 27 during the peak period, but the surrounding network should still have sufficient capacity to accommodate this. During the operational phase the additional 18 trips per hour during the AM and PM peak period can also be accommodated.