Douglas Solar Energy Plant Grid Connection Project

Draft Motivational Report in support of a Part 2 Environmental Amendment Application

DEFF Ref Nr: 12/12/20/2512

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Applicant

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CHAPTER 1: PROJECT INFORMATION

1.1 Background and Locality

An Environmental Authorisation (EA) was issued for the construction of the **100MW Douglas Solar Energy Plant and associated infrastructure** on the farms

- Portion 1 of the Farm Roode Kop No 5
- Remainder of the Farm Marktsdrift No 3
- Farm Nottingham 153 (the Ovaal Pump Substation)
- Erf Nrs 270, 271 and 272 of Bucklands Nedersetting Agricultural Holding (to the direct east of the Orange River)

The project site lies approximately 14km south-southwest from the town of Douglas in the Siyancuma Local Municipality, Northern Cape province.

The EA was issued on 7 May 2015 with reference number 12/12/20/2512. The EA was subsequently amended on 25 May 2015 with reference number 12/12/20/2512/AM1 and again on 20 April 2018 with reference number 12/12/20/2512AM2. The EA is valid until 7 May 2021.

The Douglas Solar Energy Plant will be connected to the Eskom grid via a 132kV power line to the Ovaal Pump Substation which is located approximately 2km east of the eastern border of the Solar PV site. Three route alternatives for the grid connection were investigated during the original EIA process. The authorised route alternative is however no longer viable and it is therefore required to use one of the other alternatives which were also investigated as part of the EIA process at that time. The site does not fall in any REDZ or Strategic Transmission Corridor.

This application is for a **Part 2 EA Amendment** and the Motivational Report is in support of the EA Amendment Application Form.

The Department of Environment, Forestry & Fisheries (DEFF) was the Competent Authority (CA) which issued the above-mentioned EA and is therefore also the CA for this application.

The position of the power line routes in relation to each other and the town of Douglas can be seen on the map below (both route alternatives as discussed in this report cross the Orange River).

The map below is also included under Appendix A.

Figure 1: Locality Map

1.2 Legal requirement

1.2.1 National Environmental Management Act (Act 107 of 1998)

This application is done in terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations published in Government Notice No R982, December 2014, as amended.

Part 1 or Part 2 EA amendment application

Applicable to this EA Amendment application is Section 31 of NEMA, which states that an Environmental Authorisation may be amended if the amendment will result in a change to the scope of a valid environmental authorisation where such change will result in *an increased level or change in the nature of impact* where such level or change in nature of impact was not

(a) assessed and included in the initial application for environmental authorisation; or

(b) taken into consideration in the initial environmental authorisation;

and the change does not, on its own, constitute a listed or specified activity.

A Part 2 (and not Part 1) amendment application is being made due to the following reasons:

- In the assessment of the power line route alternatives in the original Environmental Impact Report, the EAP concluded in *Section A, Paragraph 3: Project Alternatives* that "*There is to this date no preferred option regarding the electrical connections and final decision will be based on preliminary assessment and recommendations from ESKOM".* The impact

assessment tables however clearly indicated a preference for the short 500m Loop power line (labelled as Alternative 1 in the EIA Report), which has been put forward as a mitigatory measures for most of the identified impacts. It is also this route that was authorised in the Environmental Authorisation. In addition, the updated botanical report (dated January 2021) specifically states that what is now referred to as Alternative 1 in this EA Amendment Application (previous referred to in the Final EIR as Route Alternative 3) is definitely not preferred and/or feasible.

- The crossing of the Orange River was not assessed in the Freshwater Impact Assessment.
- Mitigation for the crossing of the Orange River as per the assessment table compiled by the EAP in the 2014 EIA Report only recommends that
    - Bird flappers should be used, and
    - Use the 500m alternative or the route alternative adjacent to the road

  It is clear that the impact of the crossing was not properly assessed and that additional mitigation measures are required.
- Because crossing of the river was not recommended for approval, the EMPr has to be amended accordingly and needs to be referred to key stakeholders such as the directly affected landowners and the DWS for an opportunity to comment.

The crossing of the Orange River, and associated impact, did not form part of the Environmental Authorisation, because it was not the preferred option neither the recommended option for Environmental Authorisation.

It is therefore concluded that a Part 2 EA amendment application be undertaken because

- the preferred alternative of the EA will be changed
- there will be an increase in impact due to the fact that the power line will cross the Orange River.

NEMA Listed Activities

An EA can only be amended if the proposed development does not trigger any new listed activities, in other words if all applicable NEMA listed activities have been appropriately assessed.

In the case of this project, the following applies:

The EIA commenced under the 2010 Environmental Impact Assessment Regulations but the EA was issued in 2015, in other words after the Regulations were amended in 2014. The following listed activities were authorised:

2010 EIA REGULATIONS

Government Notice R544: Listing Notice 1

- Activity 10: Construction of infrastructure for the distribution of electricity with a capacity of 33kV and less than 275kV
- Activity 11: Construction of infrastructure within 32m from a watercourse
- Activity 18: The infilling, depositing or removal of more than $5m^3$ from a watercourse
- Activity 22: Construction of roads wider than 8m

Government Notice R545: Listing Notice 2

- Activity 1: The construction of infrastructure for the generation of electricity where the electricity output is 20MW or more
- Activity 8: Construction of infrastructure for the distribution of electricity with a capacity of 275kV and more
- Activity 15: Physical alternation of vacant land of 20 hectares of more

Government Notice R546: Listing Notice 3

- Activity 2: The construction of reservoirs for bulk water supply of more than $250m^3$
- Activity 4: The construction of a road wider than 4m outside urban areas
- Activity 14: Clearance of 5 hectares or more vegetation where 75% or more of vegetation constitutes indigenous vegetation outside urban areas
- Activity 16: Construction of infrastructure of $10m^2$ or more within 32m from a watercourse outside urban areas and within CBAs
- Activity 19: Widening of a road with more than 4m and the lengthening of a road with more than 1km

2014 EIA REGULATIONS

Similar listed activities under the 2014 Regulations that could have been applicable to the proposed **132kV power line** amendment development are as follows:

Government Notice R983: Listing Notice 1

- Activity 11: Construction of infrastructure for the distribution of electricity with a capacity of 33kV and less than 275kV
- Activity 12: Development of infrastructure within 32m from a watercourse
- Activity 19: The infilling, depositing or removal of more than $5m^3$ from a watercourse
- Activity 27: The clearance of 1 hectare or more of indigenous vegetation
- Activity 28: Industrial developments where the land was used for agricultural purposes

Government Notice R984: Listing Notice 2

- None

Government Notice R985: Listing Notice 3

- Activity 12: Clearance of 300m^2 or more of indigenous vegetation within a CBA.
- Activity 14: Development of infrastructure of more than of more than 10m^2 within 32m from a watercourse

2014 EIA REGULATIONS, AS AMENDED IN APRIL 2017

The 2014 EIA Regulations were amended in April 2017, which is now the current EIA Regulations and the following activities could possibly be applicable to the proposed **132kV power line** amendment development:

Government Notice R327: Listing Notice 1

- Activity 11: Construction of infrastructure for the distribution of electricity with a capacity of 33kV and less than 275kV
- Activity 12: Development of infrastructure within 32m from a watercourse
- Activity 19: The infilling, depositing or removal of more than 10m^3 from a watercourse
- Activity 27: The clearance of 1 hectare or more of indigenous vegetation
- Activity 28: Industrial developments where the land was used for agricultural purposes

Government Notice R325: Listing Notice 2

- None

Government Notice R324: Listing Notice 3

- Activity 12: Clearance of 300m^2 or more of indigenous vegetation within a CBA.
- Activity 14: Development of infrastructure of more than of more than 10m^2 within 32m from a watercourse

Considering that all listed activities have been assessed during the original EIA studies and authorised by the EA and no new activities will be triggered under the 2014 Regulations, as amended, an amendment application to the existing EA can be made.

1.2.1 National Water Act (Act 36 of 1998)

The purpose of the National Water Act, 1998 (NWA) is to provide a framework for the equitable allocation and sustainable management of water resources. The Act aims to regulate the use of water and activities (as defined in Part 4, Section 21 of the NWA), which may impact on water resources through the categorisation of 'listed water uses' where the Department of Water & Sanitation (DWS) is the administering body in this regard. The proposed power line works within and adjacent to the Orange River is deemed to be changing the characteristics of the associated aquatic ecosystems as well as impeding flow in the watercourses and therefore require authorisation.

Defined water use activities require the approval of DWS in the form of a General Authorisation (GA) or Water Use License (WUL) authorisation. There are restrictions on the extent and scale of listed activities for which GAs apply. The GAs for Section 21 (c) and (i) water uses (impeding or diverting flow or changing the bed, banks or characteristics of a watercourse) as defined under the NWA were last revised in 2016 (Government Notice R509 of 2016). Determining if a water use license is required for these water uses is now associated with the risk of degrading the ecological status of a watercourse. A low risk of impact could be authorised in terms of a GA.

A risk assessment has been carried out to inform the water use authorisation process for the proposed works. The risk associated with the shorter-term construction and longer-term maintenance related activities would be deemed to be low provided that the mitigation measures as recommended in the aquatic specialist report are implemented. The proposed activities would therefore fall within the ambit of the General Authorisations for Section 21 (c) and (i) water use.

Application for a GA would have to be made and authorised before construction may commence. This stipulation was also added to the updated EMPr.

1.3 Project Description

PROJECT COMPONENTS

- 132kV power line
- Substation
- Operations & Maintenance Buildings (O&M Buildings)

The map below is also included under Appendix A.

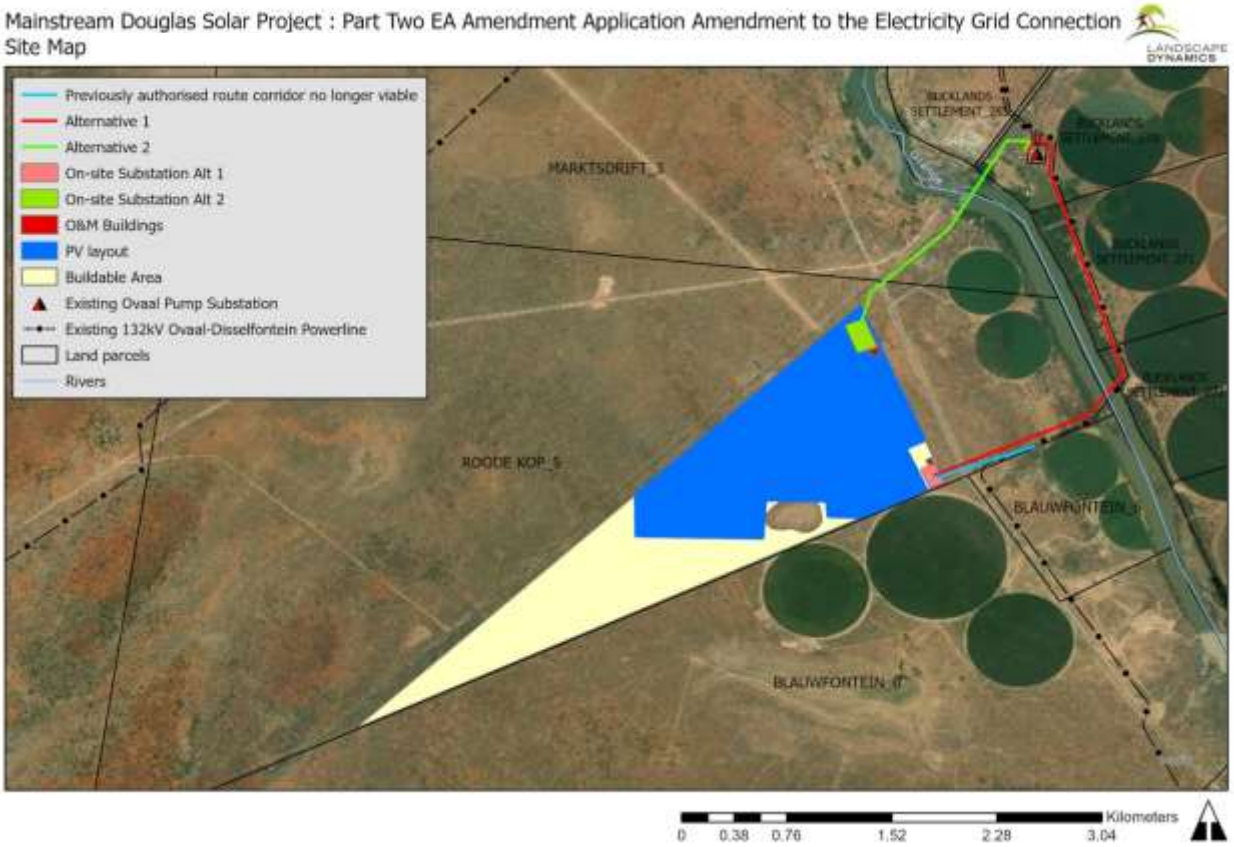

Figure 2: Map of project components

132kV Power Line

The three route alternatives as described below were assessed in the original EIA process. The original EIA Report however stated the following: "*There is to this date no preferred alternative; hence all alternatives will be equally considered for the Environmental Authorisation.*"

- Previously authorised route: blue route (±500m)
    - Loop-In connection into the existing 132kV Eskom Ovaal-Disselfontein power line that feeds into the Ovaal Pump Substation located approximately 2km east of the site and on the other side of the Orange River.
- Alternative 1: red route (±3km)
    - This alternative is for the construction of a new 132kV line running parallel to the existing Ovaal-Disselfontein power line with an on-site substation located at the south-eastern corner of the propose Douglas Solar Energy Plant. This route crosses the Orange River before it connects to the Ovaal Substation.

- Alternative 2: green route (±1.5km)
    - This alternative is for the construction of a new 132kV line running parallel to the R357 road (adjacent the existing bridge) with an on-site substation located at the north-eastern corner of the proposed Douglas Solar Energy Plant. This route crosses the Orange River before it connects to the Ovaal Substation.

Project Substation and O&M (Operations and Maintenance) Buildings

The project substation and O&M buildings' position were determined during the original EIA process based on the then preferred route alternative. The infrastructure was proposed in the south-eastern corner of the site (red block on the map above) and was thus at the start of the authorised route. Should Route Alternative 1 be authorised (not recommended) the infrastructure would remain as authorised. Should Route Alternative 2 be authorised (recommended), the infrastructure will move to the north-eastern corner of the site (green block on the map above). This alternative site for the infrastructure falls within the existing authorised PV solar site.

1.4 Reasons why the authorised route was the preferred route

As stated above, the following applies:

In the assessment of the power line route alternatives in the original Environmental Impact Report, the EAP concluded in *Section A, Paragraph 3: Project Alternatives* that "*There is to this date no preferred option regarding the electrical connections and final decision will be based on preliminary assessment and recommendations from ESKOM".* The impact assessment tables however clearly indicated a preference for the short 500m Loop-In power line (labelled as Alternative 1 in the EIA Report), which was put forward as a mitigatory measures for most of the identified impacts.

The Environmental Authorisation didn't provide any reasons as to why this specific route, and not one of the other alternatives, were authorised. It can be assumed that the following would have been applicable when the decision between the route alternatives was taken:

- It is the shortest route with obvious cost advantages
- It didn't cross the Orange River so there will be no impact on this watercourse
- It made use of existing infrastructure by looping into the existing Ovaal-Disselfontein power line

It is important to note that the other two route alternatives were not identified as being unacceptable according to the previous Environmental Impact Report, or that the impact could not be mitigated. Comparisons were made between the three routes and the shortest route, with advantages as described above, were the obvious preferred alternative even though the other two alternatives were also acceptable after mitigation has been applied. There are thus no fatal flaws in the other two route alternatives that are now being put forward for environmental authorisation.

1.5 Reasons why the previously authorised route is not viable

A recent grid study advised that the Douglas 100MW Energy Plant should connect directly to the substation and should not feed into the Disselfontein/Ovaal 1 132kV Overhead Line due to limited capacity on the line.

CHAPTER 2: NEED AND DESIRABILITY

2.1 Need and Desirability

The following tables address issues as highlighted in the DEFF Need & Desirability Guidelines (2014).

Is this project part of a **national programme** to address an issue of national concern or importance?
Electricity provision is of national importance and the generation and supply thereof by means of renewable resources into the Eskom grid is of national importance.
Do location factors favour this land use (associated with the development proposal) at this place? (This relates to the contextualisation of the proposed land use on the proposed site within its broader context.)
The proposed power line is perfectly situated because • *It is directly adjacent to the area where the electricity will be generated and* • *It is only a relatively short distance to connect to the Eskom Ovaal Substation* • *The two route alternatives were thoroughly assessed by the specialists and the route with the smallest impact is recommended as the preferred route.*
Will the development proposal or the land use associated with the development proposal applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?
The power line route alternatives were assessed by the following specialists: • *Ecologist (fauna)* • *Aquatic specialist* • *Ornithologist* • *Heritage consultant* *It is confirmed in the original EIA that the different power line routes will have no to little effect on the socio-economic attributes of the area, the visual impact will be acceptable within the context of the receiving environment and no impact on agriculture was identified.*

It was concluded that all impacts can be mitigated to acceptable levels and that the project could go ahead on condition that the Environmental Management Programme (EMPr) (attached as Appendix E) should be implemented at all times.

Will the development impact on people's health and well-being (*e.g.,* in terms of noise, odours, visual character and 'sense of place'*, etc.*)?

Dust and noise will be created during the construction phase but mitigation measures are in place to minimise these temporary impacts. The development is situated on rural farm land which lowers the significance of impact associated with noise and dust.

The proposed power line development will alter the visual character and sense of place in a negative way to some extent, but when seen in context with the, directly adjacent, authorised 100MW PV plant as well as the other electrical infrastructure within the immediate environment, the addition of the power line will be acceptable in terms of visual impact.

Is the development the best practicable environmental option for this land/site?

The, 'environment' should be seen as the sum total of one's surroundings, which include the natural, social and economic environments. Taking all constraints into account, the development as proposed underlines the principles as advocated by the term 'triple bottom line' (people, planet, profit) and this development proposal is in support of the goals of economic, social and ecological integration and sustainability.

What will the benefits be to society in general and to the local communities?

The Douglas Solar PV plant and associated grid connection will contribute to, amongst others, energy security and blackout relief, benefiting the entire South Africa. Temporary and permanent employment opportunities will be created and the work force will as far as possible be sourced from the local communities.

Will the benefits of the proposed land use/development outweigh the negative impacts of it?

Negative impacts associated with the proposed development could be mitigated to levels that will be acceptable within the receiving environment. The positive impact of energy security, blackout relief, increase capacity, reduction in the need to use diesel and other fossil fuels for peaking and baseload power far outweighs the negative impact that this project could have.

Describe how the **general objectives of Integrated Environmental Management** as set out in Section 23 of the NEMA have been taken into account:

Current procedures and/or organisational structures are not necessarily achieving integrated decision-making and/or co-operative governance and, as a result, there is a failure to properly achieve the objectives of IEM as set out in Section 23 of NEMA. EIA's however often focus on the immediate harm a project will cause rather than any benefits it might create in the long term to sustainable development.

The stated objectives of Section 23 are to ensure integrated decision-making and co-operative governance so that NEMA's principles and the general objectives for integrated environmental management of activities can be achieved. The goals are to

a) *promote the integration of the principles of environmental management set out in section 2 into the making of all decisions which may have a significant effect on the environment;*
b) *identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in section 2;*
c) *ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;*
d) *ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment;*
e) *ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment; and*
f) *identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.*

For this project the following actions were taken to reach the general objectives of Integrated Environmental Management as set out in Section 23 of NEMA:

a) *Applicable environmental, economic and social aspects have been assessed, thereby ensuring an integrated approach in order to balance the needs of all whom would be affected by this development.*
b) *Mitigation measures have been supplied in the EMPr in order to ensure that all identified impacts are mitigated to acceptable levels.*
c) *The EA amendment proposal has to be evaluated and approved by DEFF and no construction may commence prior to the issuing of the Environmental Authorisation.*
d) *The procedures which are followed during the public participation programme are based on the NEMA EIA Regulations 2014, as amended.*

e) *DEFF will take all information as represented in this report into consideration and may request further information should they feel that further studies/information is required before an informed decision can be made.*
f) *The project team (inclusive of the specialists) is confident that the mitigation measures as supplied in the EMPr are reasonable and will be the best way to manage anticipated impacts.*

Describe how the principles of environmental management as set out in Section 2 of the NEMA have been taken into account

Chapter 2 of NEMA provides a number of principles that decision-makers have to consider when making decisions that may affect the environment, therefore, when a Competent Authority considers granting or refusing environmental authorisation based on an Environmental Impact Assessment, these principles must be taken into account.

The NEMA principles with which this application conforms are described as follows —

1. *Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.*
2. *Development must be socially, environmentally and economically sustainable.*
3. *Sustainable development requires the consideration of all relevant factors.*

The social, economic and environmental impacts of activities, including disadvantages and benefits, were considered, assessed and evaluated, and informed decision-making by the authority is hereby made possible.

CHAPTER 3: SPECIALIST INPUT

3.1 Specialist studies

In the Final EIR of 2014 the route alternatives are discussed under *Section A, Paragraph 3: Project Alternatives*. From the summary in this report, it was clear that no further input would be required in terms of the following:

- Palaeontology
  - An exemption letter has already been obtained in 2014

- Soil & Agriculture
  - No impact associated with the three route alternatives was identified

- Visual
  - Relevant information is available (summarised below) and will not change with this EA Amendment Application

- Socio-Economic
  - Relevant information is available (and summarised below) and will not change with this EA Amendment Application

Landscape Dynamics determined that the following specialists should confirm and/or provide additional input (as per the ToR):

- Aquatics
  - The Department Water & Sanitation changed their requirement for water use authorisation applications since 2014 and the freshwater studies had to be updated with new information. The Freshwater Impact Assessment conducted in 2014 omitted to assess the impacts of all three power line route alternatives. Site verification and an updated report are therefore necessary to provide for informed decision making.

- Heritage
  - The HIA included in the 2014 EIA Report does not show specifically that the route alternatives were assessed at that time and the HIA was done between 2013 and 2104. The relevant heritage authorities do not accept heritage reports older than 5 years. Site verification is required and an updated report will be provided and submitted to SAHRA for comment.

- Bird Impact
    - Bird Impact is one of the most significant impacts associated with overhead powerlines. It is therefore necessary to confirm the findings of 6-7 years ago by means of a bird impact statement.

- Botany
    - It is obvious that vegetation / habitat could have changed since the previous study was undertaken 6 – 7 years ago. It requires to be updated by means of site verification and an updated report in order to facilitate informed decision making.

3.2 Terms of Reference

The following specialists' Terms of Reference was applicable:

- Confirm that the two route alternatives crossing the Orange River as presented in this amendment application were / were not assessed during the initial investigation.
- Confirm that the status quo and expected impact are the same as presented in the original EIA report, and if not, describe and assess accordingly. New impact rating tables should be provided where applicable.
- Confirm if a site verification was required.
- (Botanist only) Confirm if any protected species exist within the development site that would require a permit for removal.
- (Aquatic only) Ensure that the riparian/wetland area is appropriately delineated if not done.
- (Heritage only) An addendum to the original HIA should be compiled for submission to SAHRA for decision making.

3.3 Avifauna

An amendment letter was compiled by Chris van Rooyen from Chris van Rooyen Consulting and is attached as Appendix B1. A summary thereof follows below.

The original desk top report assessed all three original alignment options, which included the current Alternative 1 and Alternative 2. It concluded that both alternatives are acceptable, provided that appropriate mitigation measures are implemented. The following mitigation measures were suggested:

1. **Habitat transformation**: Construction activities should be restricted to the actual footprint as much as possible to minimise the impact of habitat transformation and disturbance. Access to the surrounding area should be strictly controlled. The construction of new access roads must be avoided as much as possible.

2. **Collisions**: The proposed 132kV power line should be marked with Bird Flight Diverters (BFDs) to lower the risk of avian collisions with the power line. The recommended BFD is the Double Loop Bird Flight Diverter. The BFDs should be fitted to the earthwire, 5 metres apart, alternating black and white. Line markers should be as large as possible, and highly contrasting with the background.

3. **Electrocutions**: It is recommended that bird perches are filled to the top of the poles to provide additional space for large birds to perch.

The specialist is in agreement with the conclusions of the original desk top report. However, the recommendations of the original report need to be updated and replaced with the following:

1. The proposed 132kV power line should be marked with Eskom approved Bird Flight Diverters or Bird Flappers to lower the risk of avian collisions with the power line for its entire length. The BFDs should be fitted to the earthwire, 5 metres apart, alternating black and white/yellow on the earthwire. The applicant should request Eskom to mark the existing 5-pole HV line as well to further reduce the collision risk.

2. It is strongly recommended that the DT 7649 vulture friendly structure is used for the grid connection as per Appendix 1 of the Avifauna Statement.

Comment from EAP

- *Alternatives are discussed and summarised in Chapter 4*
- *The EMPr has been updated accordingly*

3.4 Aquatic

An Aquatic Ecological Impact Assessment was compiled by Ms Toni Belcher from BlueScience (Pty) Ltd and is attached as Appendix B2. A summary thereof follows below.

DESCRIPTION OF THE STUDY AREA

Riparian flora

Indigenous riparian vegetation consists of a mix of indigenous small trees and shrubs such as *Salix*

mucronata, Vachellia karroo, Senegalia mellifera, Ziziphus mucronata, Buddleja saligna, Combretum erythrophyllum, Searsia pendulina, Diospyros lycioides, Euclea undulata, Lycium hirsutum, Lycium cinereum, Phaeoptilum spinosum and Asparagus *africanus,* together with some invasive species such as *Salix bablyonica* and *Prosopis glandulosa*. Common reeds *Phragmites australis* occur in patches within the marginal zone of the river.

Aquatic features and fauna

The main aquatic feature within the study area is the middle to lower reach of the Orange River. The river within the study area is characterised by a single river channel with some islands and bars that provide shallow habitat for biota.

Figure 3: View of the Orange River upstream of the proposed crossing

Figure 4: View of the Orange River downstream of the proposed crossing

The aquatic habitat associated with the river is particularly important considering the surrounding arid areas. Biota recorded in the Orange River near the site consists of the following:

1. Mammals such as the Cape clawless otter *Aonyx capensis* occur in the riparian zone;
2. Various fish species
3. Amphibians such as *Strongylopus springbokensis* (Namaqua Stream Frog), Xenopus laevis (African Clawed Frog), *Sclerophrys capensis* (Raucous Toad) and the Karoo Toad *Bufo gariepensis* are known to occur in riverine habitat in the wider area.

A small drainage feature also drains the hillside to the south-east of the preferred servitude for the proposed powerlines. The drainage feature seldom contains water and does not provide any aquatic habitat of significance, simply providing a conduit for water draining the bank south of the Orange River. Flow in the drainage line will only occur for short periods immediately flowing rainfall events that are likely to be very infrequent considering the low rainfall in the macro area.

Aquatic Biodiversity Importance

In terms of Freshwater Ecosystem Biodiversity Areas, the lower Orange River has been identified as a Fish Support Area. There should be no further deterioration in river condition for this section of the river. The Orange River and associated wetland areas have been mapped as a FEPA wetland area.

In terms of the Critical Biodiversity Areas (CBA) mapping, the channel of the Orange River has been mapped as a Critical Biodiversity Area. From a management of aquatic ecosystems point of view, the objective for these areas is to maintain near-natural landscapes with no or limited loss of biodiversity pattern and limited loss of ecosystem processes.

Figure 5: Namakwa Critical Biodiversity Area (SANBI Biodiversity GIS, January 2021)

The purpose of the freshwater assessment is to determine the relative importance, sensitivity and current condition (ecological state) to assess the impact of the proposed amendment to the powerline route on the aquatic ecosystems at the site. The assessment is also required to make recommendations in terms of mitigation measures that can be used to prevent or minimise the impact on the aquatic ecosystem. The key aquatic ecosystem at the site is the Orange River and its riparian zones. Some drainage features drain into the Orange River from the south-east and north and are near the powerline route alternatives; however the features are largely associated with drainage from the centre-pivot irrigation areas and are primarily artificial. For this reason, they were not included in the aquatic ecosystem assessments and were not considered a constraint to the proposed works.

River Characterisation

From the Site Characterisation assessment, the geomorphological and physical characteristics of the Orange River at the site are as follows:

Table 1: River Characteristics

Valley Form	Floodplain with terraces
Lateral mobility or entrenchment	Stable channel/moderately confined
Channel form	Single but compound in places
Channel pattern	Single channel flowing around islands
Channel type	Mixed alluvial and bedrock/boulders
Hydrology	Perennial

The catchment condition and land-use impacts on the site consist largely of agriculturally related disturbance activities.

Index Habitat Integrity (IHI)

The evaluation of Index of Habitat Integrity (IHI) provides a measure of the degree to which a river has been modified from its natural state.

The IHI assessment is based on an evaluation of the impacts of two components of the river, the riparian zone and the instream habitat. The total scores for the instream and riparian zones are then used to place the habitat integrity of both in a specific habitat category.

The riparian and instream habitat integrity of the Orange River at the proposed development sites can be described as being moderately modified as a result of upstream flow modification, water quality changes and vegetation removal.

Ecological Importance and Sensitivity of the River

The Ecological Importance and Sensitivity (EIS) Assessment considers a number of biotic and habitat determinants surmised to indicate either importance or sensitivity. The EIS rating gave this section of the river a rating of 2.5, which is High. The following definition is therefore applicable: *"Quaternaries/delineations considered to be unique on a national scale based on their biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) may be sensitive to flow modifications but in some cases may have substantial capacity for use."*

Recommended Ecological Category

Based on the Present Ecological Status and the Ecological Importance and Sensitivity of the Orange River at the site, the default recommended ecological category for the river is a B Category (largely natural).

AQUATIC ECOSYSTEM CONSTRAINS

Within the alternative servitudes under consideration for the construction of the proposed powerline, the aquatic ecosystem constraints consist of the Orange River and its associated riparian habitats. The small drainage feature that drains the bank to the south of the river, near Alternative 1, is a minor drainage feature that is largely avoided by the servitude.

The recommended buffer in which any construction activities should be set back from the mapped aquatic features associated with the Orange River is also shown in the map above. The recommended buffer from the outer edge of the delineated riparian zone is 50m as has been recommended in the original freshwater assessment for the project.

The mapped drainage lines should preferably be avoided although they are not considered aquatic constraints nor have they been buffered. If these features cannot be avoided, the impact would be negligible however the impact to the runoff in the drainage line would need to be mitigated.

The map below is also included as Appendix A3.

Figure 6: Aquatic Ecosystem Constraints

POTENTIAL AQUATIC IMPACT OF PROPOSED POWERLINE ROUTES

The impact assessment for aquatic features is provided in Chapter 6 of this report.

ALTERNATIVES

Route alternatives are discussed in Chapter 4 of this report.

RISK ASSESSMENT

A Risk Assessment was undertaken to inform the General Authorisation application and the results can be summarised as follows:

Assessment undertaken for Section 21(c) and (i) water use activities associated with the proposed works

Table 2: Summary of Aquatic Risk Assessment

Phases & Activity		**Impact**	**Alternative 1**		**Alternative 2**	
			Significance	Risk rating	Significance	Risk rating
Construction Construction of the proposed powerline		Disturbance of aquatic habitat and possibly some very limited water quality impacts	**66.625**	**M/L**	**30**	**L**
Maintenance activities associated with the proposed powerline		Ongoing disturbance of aquatic habitat - Facilitation of erosion and potential for invasion by alien plants	**49.5**	**L**	**27**	**L**

CONCLUSION AND RECOMMENDATIONS

The proposed amended powerline route will potentially impact on the Orange River and its associated aquatic habitats at the site. The Orange River is in a moderately modified ecological state with high ecological importance and sensitivity. The Orange River within the study area have been mapped as a Fish Support Area due to the importance of fish species within this reach of the Orange River and the wider river corridor is mapped as a FEPA wetland and CBA.

Providing that the recommended mitigation measures are implemented (adherence to the proposed buffers adjacent to the riparian zone of the Orange River, minimisation of impacts and rehabilitation of disturbed areas and the utilisation of the existing disturbed areas where possible) the significance of the impact is expected to be low to very low.

A water use authorisation will be needed from the Department Water & Sanitation, Northern Cape Regional Office for approval of the water use aspects of the proposed activities. Considering that the risk of the proposed activities on the aquatic features in the area is likely to be **low to very low**, it is likely that the activities would fall within the ambit of the General Authorisations for this potential water use (change to the bed, banks or characteristics of a watercourse or impeding/diverting the flow in a watercourse).

3.5 Heritage

An Addendum to the 2012 HIA was compiled by Dr David Morris from the McGregor Museum and is attached as Appendix B3. A summary thereof follows below.

Prior heritage impact assessment

An initial April 2012 Archaeological Impact Assessment (AIA) was conducted by way of a field survey of the site by Dr David Morris from the McGregor Museum as part of the EIA for the proposed Douglas Solar Energy Project. A widespread surface 'background scatter' of artefacts (as characterised by Orton 2016) was found to occur over the entire area surveyed – i.e. artefacts lacking assemblage coherence or integrity, subject to erosion and/or secondary deposition, being parts of palimpsests with mixing of material of possibly differing age. These are preponderantly of Pleistocene age, though in places probably including more recent material. While densities are often fairly high, the archaeological significance of such material is low.

Alternatives for solar field location, the location of associated buildings and options for electrical connection were weighed and, save for some suggestions concerning solar field location, it was recommended that, from an archaeological viewpoint, implementation could proceed without further mitigation.

Site verification

A field visit was conducted in January 2021 to verify the conclusions reached in the 2012 report, focussing on the two route alternative corridors for electricity grid connection, one approximately 3km (Alternative 1) and the other approximately 1,5km in length (Alternative 2).

The findings made in the 2012 HIA are confirmed. Areas through which the two corridors pass can be characterised as follows:

Alternative Corridor 1 (3km)

Much of the route followed by this alternative crosses terrain, west of the river, with 'background scatter' of surface artefacts in low significance secondary archaeological context as was noted in the original heritage report. There is however potential for later (Holocene) material to be preserved in silts near the river both on the west and more especially the east banks of the Orange

River, although on both sides there is some disturbance from agricultural activity. Some degree of alluvial diamond mining has occurred (and evidently still active) in adjacent areas on the west side of the river. This alternative may not have any significant impact on any heritage resources, but of the two corridors, it is not the preferred one.

Alternative Corridor 2 (1.5 km)
Most of the route followed by this alternative crosses terrain with the same kind of 'background scatter' of surface artefacts in low significance secondary archaeological context mentioned for Alternative 1. While there is potential for later (Holocene) material to be preserved near the west bank of the Orange River, the landscape in this vicinity is disturbed, being adjacent to road and bridge infrastructure as well as the weir built across the river at this point. The north/east bank of the river is similarly disturbed up to the Eskom power facility. Any power line here is likely to have minimal impact on any heritage resources that may be present.

Discussion: a general comment
With respect to the magnitude and extent of potential impacts, it has been noted that the erection of power lines would have a relatively small impact on Stone Age sites, in light of Sampson's (1985:21) observations during surveys beneath power lines in the Karoo (actual modification of the landscape tends to be limited to the footprint of each pylon), whereas other kinds of development such as a water supply pipeline or road would tend have greater linear impact.

Preferred alternative and mitigation
Route alternatives are discussed in Chapter 4 of this report.

Conclusion
The heritage impact on both route alternatives is low with minimal mitigation being proposed.

3.6 Vegetation

A Vegetation Survey was undertaken by Ms Tania Anderson an ecologist and is attached as Appendix B4. A summary thereof follows below.

VEGETATION

The land cover is dominated by natural habitats with low shrublands and tall riparian woodland along the river. Since the 2012 survey, more circular croplands have been developed and area of land transformed has increased, particularly on the eastern side of the Orange River on Bucklands 271 & 272 which has deeper red soils. Here, many protected camel thorn trees were removed during the cropland development (between February 2016 and April 2017). The current land-use of the section away from the river is livestock farming, and this has affected the vegetation to

some degree. Other transformed areas include quarries and prospecting for mine development.

The study area is on the edge of the Eastern Kalahari Bushveld Bioregion of the Savanna Biome (Mucina & Rutherford 2006). The Orange River section is classified as a Critical Biodiversity Area (CBA) in the Northern Cape provincial CBA maps (www.bgis.sanbi.org).

According to the 2018 vegetation map (www.bgis.sanbi.org), there are two vegetation types present, namely the Northern Upper Karoo and Upper Gariep Alluvial Vegetation. The conservation status of the Northern Upper Karoo is considered Least Threatened, while the Upper Gariep Alluvial Vegetation is classified as Vulnerable.

PROTECTED SPECIES

Two protected tree species were recorded along both route alternatives. These are the Shepherd's tree *Boscia albitrunca* and the camel thorn *Vachellia erioloba*. None of the other 11 protected species that are, and could be, present on the properties (see Anderson 2012) were found along the routes.

The total number of protected trees within the 20m corridor for Alternative 1 (3km) is 20, and for Alternative 2 (1.5km) is 8. The total number of protected trees within a 100m corridor for Alternative 1 is 49, and for Alternative 2 is 16.

The map below is also attached as Appendix A3

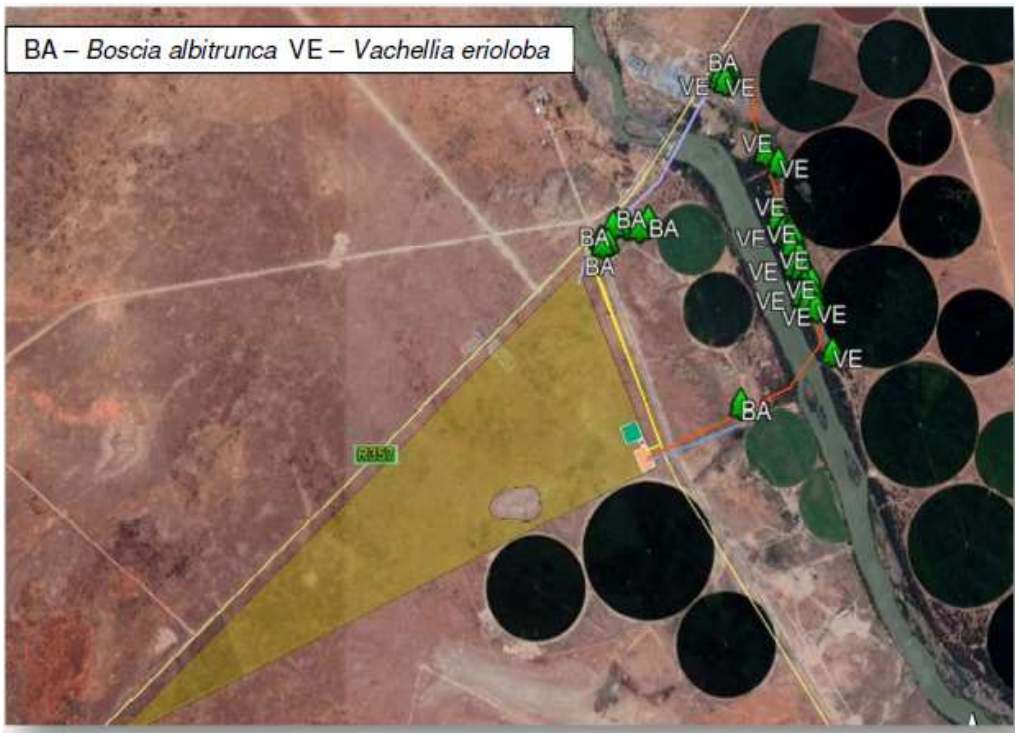

Figure 7: Protected trees map

Figure 8: Shepherd's tree *Boscia albitrunca*

Figure 9: Camel thorn *Vachellia erioloba*

INVASIVE ALIEN SPECIES

Two invasive alien species are fairly abundant on sections of the routes – Mexican poppy *Argemone ochroleuca* and Mesquite *Prosopis cf glandulosa*.

Mexican poppy fields and Mexican poppy (Argemone ochroleuca) is abundant on Bucklands 271) and listed as a category 1b invasive plant.

Figure 10: Mexican poppy (*Argemone ochroleuca*)

A small mesquite tree Prosopis cf glandulosa on the farm Bucklands 270 where the densest population is present. Listed as a category 3 invasive plant.

Figure 11: Mesquite tree (*Prosopis cf glandulosa*)

The ***National Forests Act*** (Act 84 of 1998) provides for the protection of certain tree species, and a license is required to either remove, cut, disturb, damage or destroy the listed protected trees. The Department of Environment, Fisheries and Forestry issues the required permits.

The ***Northern Cape Nature and Environmental Conservation bill of 2009*** was developed to consolidate and amend the laws relating to nature and environmental conservation, and to provide for matters incidental thereto. According to this Ordinance, no person without a valid permit from the Northern Cape Department of Environment and Nature Conservation may pick, buy, sell, donate, import or export any specially protected and protected plant species. The Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform issue the required permits.

Permits from the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform and the Department of Environment, Forestry and Fisheries will be required to trim or remove any protected trees along the authorised power line route.

The ***Conservation of Agricultural Resources Act*** (CARA 1983) According to the amended regulations (No. R280) of March 2001 of CARA (1983), declared weeds and invader plants are divided into three categories:

- *Category 1a & b* may not be grown and must be eradicated and controlled,
- *Category 2* may only be grown in an area demarcated for commercial cultivation purposes and for which a permit has been issued, and must be controlled, and
- *Category 3* plants may no longer be planted and existing plants may remain as long as their spread is prevented, except within the flood line of watercourses and wetlands. It is the legal duty of the land user or land owner to control invasive alien plants occurring on the land under their control.

The ***National Environmental Management: Biodiversity Act*** (NEMBA 2004, chapter 5, sections 73– 75) regulates activities involving invasive species, and lists duty of care as follows:

- the land owner/land user must take steps to control and eradicate the invasive species and prevent their spread, which includes targeting offspring, propagating material and regrowth, in order to prevent the production of offspring, formation of seed, regeneration or re-establishment, take all required steps to prevent or minimise harm to biodiversity, and ensure that actions taken to control/eradicate invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment.

Invasive species that invade the servitude will have to be removed for the life of the project and post closure if still present.

POTENTIAL IMPACTS AND MITIGATION

The impact assessment and mitigation is discussed in Chapter 6 of this report

ASSESSMENT OF ALTERNATIVES

The selection of alternatives is discussed in Chapter 4 of this report.

CONCLUSION ON FLORA

There are two major vegetation types present along the route alternatives. Of these, the Northern Upper Karoo is considered to be Least Threatened. The Upper Gariep Alluvial Vegetation is classified as Vulnerable and is a CBA. It is a highly sensitive ecosystem with many large old protected *Vachellia erioloba* trees and is fragmented. Significant sections of this riparian woodland have already been cleared and degraded and there are two existing powerlines running through it.

3.7 Visual

The information below was obtained from the EIA Report dated October 2014. Further input into the visual impact is not deemed necessary.

Viewsheds were calculated for the electrical connection layout alternatives and their visibility is summarised in the table below. The visibility of these structures is **high** for all layouts and configurations, however these structures are common features of the existing landscape: several power lines and substations exist within the viewshed, and a 132kV power line passes just north of the site proposed for the development. Another set of 132kV power lines run parallel to the regional road R357 approximately 2.5km north of the proposed site and are highly visible in the landscape.

Table 3: View Catchment Areas for Grid Layout Alternatives

Route alternative	Total Viewshed Area (km2)
Original authorised route (500m) (Alternative 1 in EIA Report)	349
Route Alternative 1 (3km) (Alternative 2 in EIA Report)	376
Route Alternative 2 (1.5km next to road) (Alternative 3 in EIA Report)	368

The viewshed maps for power line alternatives show that even though the viewsheds are very similar (both in size and in specific areas that will potentially be affected) there are differences in how much of each will be visible. A power line in route Alternative 1 (3km) will be highly visible in the landscape (i.e. many pylons will be visible where there are views of the power line), whereas the short loop-in line of the authorised route has low comparative visibility. Alternative 2 (1.5km) has a visibility that is in between these two.

Views of these routes contain various large structures already, including roads, power lines, substations and features related to commercial irrigated crops. As such the visual intrusion on views of any of the proposed alternative power lines is likely to be low. The authorised route will have the least effect on viewers since the proposed power line will be short and will feed into the existing line. Alternative 1 is the longest route (3km), but follows the existing power line route. The additional pylons and lines are unlikely to be noticed by viewers beyond 1 km since there are many features in their views that already contrast with the natural landscape. Alternative 2 (1.5km) includes a new servitude along the regional road R357 and may cause more intrusion on views than the other two alternatives, but again views of this area in the landscape are complex and visual intrusion is expected to be low.

Note from EAP
Since there is little difference between the two route alternatives in terms of visual impact, additional mitigation measures for inclusion in the EMPr are not proposed.

3.8 Agriculture

No impacts on agricultural resources and production have been identified for the electrical connections to the national grid, and therefore these alternatives have no influence on the agricultural impact assessment.

3.9 Socio-Economic

The information below was obtained from the EIA Report dated October 2014. Further input into the socio-economic impact is not deemed necessary.

When considering the overall costs and benefits of the solar project and its associated infrastructure it was found that the latter should be more prominent allowing for the achievement of a net benefit. Benefits would be particularly prominent for the project applicant, the land owners of the site and in the achievement of national and regional energy policy goals. The

project would also result in significant positive economic spin-offs primarily because of the large expenditure injection that would flow to employees and sub-contractors/suppliers.

With respect to risks and negative impacts, these should prove relatively low for adjacent land owners with mitigation. In addition, risks to tourism should prove acceptable provided adequate mitigation is put in place. *Note from EAP: please note that this statement is applicable to the entire 100MW solar energy plant and its associated infrastructure and does not apply to the power line routes on its own. The visual impact of the power line will be low when seen in context with other infrastructure in the area.*

The authorised route was slightly preferable to the other two route alternatives as it would make maximum use of existing power lines thereby minimising the likelihood of visual or other impacts.

The study concluded that the socio-economic impacts on the landowners as well as surrounding land users would be low / low-neutral.

Note from EAP
Since socio-economic impact will be low / low-neutral and the fact that there is little difference between the two route alternatives in terms of socio-economic impact, additional mitigation measures for inclusion in the EMPr are not proposed.

CHAPTER 4: ALTERNATIVE ROUTE SELECTION

ADVANTAGES and DISADVANTAGES of the ROUTE ALTERNATIVES

4.1 Specialist studies

Specialist studies were conducted and the following conclusions were made regarding the selection of alternatives:

AVIFAUNA

It is recommended that Alternative 1 is used, because it runs next to an existing high voltage line built on a wooden 5-pole design. This reduces the risk of bird collisions because placing two lines next to each other increases the visibility of the obstacle and reduces the risk of collisions for both lines. Furthermore, if Alternative 2 is used, it will create a new impact where one did not exist before. However, both alternatives are acceptable provided the line is mitigated with Eskom approved Bird Flight Diverters or Bird Flappers as stipulated in the EMPr.

AQUATIC

In terms of the two proposed powerline route alternatives, both routes will need to cross the Orange River. The river and riparian zone for Alternative 2 near the R357 are more impacted by activities in and adjacent to the road. Also, the route is shorter and avoids construction in and adjacent to the riparian habitat on the northern bank of the river. It can thus be expected that this route would have less of an impact than Alternative 1. Alternative 1 would, however, be constructed adjacent to existing powerlines and would thus consolidate the powerline infrastructure within the site.

HERITAGE

Alternative Corridor 1 (3km)
There is potential for later (Holocene) material to be preserved in silts near the river both on the west and more especially the east banks of the Orange River, although on both sides there is some disturbance from agricultural activity. This alternative may not have any significant impact on any heritage resources, but of the two corridors it is not the preferred one.

Alternative Corridor 2 (1.5 km)

Most of the route followed by this alternative crosses terrain with the same kind of 'background scatter' of surface artefacts in low significance secondary archaeological context mentioned for Alternative 1. While there is potential for later (Holocene) material to be preserved near the west bank of the Orange River, the landscape in this vicinity is disturbed, being adjacent to road and bridge infrastructure as well as the weir built across the river at this point. The north/east bank of the river is similarly disturbed up to the Eskom power facility. Any power line here is likely to have minimal impact on any heritage resources that may be present.

Alternative Route 2 (1.5km adjacent to the tarred road) is the preferred option.
Mitigation measures are not considered necessary for this option.

VEGETATION

The selection of alternatives was based on the outcome of the impact assessment and the following applies:

It is recommended that the powerline route Alternative 2 is authorised for the following reasons:

- The potential impact on the vegetation will be low negative as it is only approximately 1.5km in length, the vegetation is of low sensitivity and there are fewer and smaller protected trees (*Boscia albitrunca*) present along the route that will be removed or trimmed.
- It is clear that approving Alternative 1 will cause a far greater impact (high negative) because it is double the length, it will affect riparian woodland of high sensitivity within a CBA, and there are older and larger protected trees (*Vachellia erioloba*) that will be removed or trimmed**. Alternative 1 should be considered a 'no go'.**

VISUAL

The viewshed maps for the power line alternatives show that even though the viewsheds are very similar (both in size and in specific areas that will potentially be affected) there are differences in how much of each will be visible. A power line in route Alternative 1 (3km) will be highly visible in the landscape (i.e. many pylons will be visible where there are views of the power line). Alternative 2 (1.5km) has a slightly lower viewshed than Alternative 1.

Views of these routes contain various large structures already, including roads, power lines, substations and features related to commercial irrigated crops. As such the visual intrusion on views of any of the proposed alternative power lines is likely to be low. Views of this area in the landscape are complex and visual intrusion is expected to be low. There is thus no preferred route alternative from a socio-economic point of view.

AGRICULTURE

No impacts on agricultural resources and production have been identified for the electrical connections to the national grid, and therefore these alternatives have no influence on the agricultural impact assessment.

SOCIO-ECONOMIC IMPACT

When considering the overall costs and benefits of the Douglas Solar PV project it was found that the latter should be more prominent allowing for the achievement of a net benefit. Benefits would be particularly prominent for the project proponents, the land owner on the site and in the achievement of national and regional energy policy goals.

The authorised route was slightly preferable to the other two route alternatives as it would make maximum use of existing power lines thereby minimising the likelihood of visual or other impacts.

The study concluded that the socio-economic impacts on the landowners as well as surrounding land users would be low / low-neutral. There is thus no preferred route alternative from a socio-economic point of view.

4.2 Alternative selection summary table

Table 4: Alternative Selection Summary Table

Specialist study	Alternative 1 (3km)	Alternative 2 (1.5km)	No specific preference
Avifauna	Preferred, but Alt 1 will be acceptable with mitigation		
Aquatic		Preferred, but Alt 1 will be acceptable with mitigation	
Heritage		Preferred, but Alt 2 will also be acceptable	
Botany	Alt 1 is a no-go	Preferred	
Visual			X
Agriculture			X
Socio-economic			X

This study therefore concludes that Route Alternative 2 (±1.5km and adjacent to the R357 tarred road) be authorised in this EA amendment application.

CHAPTER 5: PUBLIC PARTICIPATION

5.1 Objectives of the Public Participation Programme

The main aim of public participation is to ensure transparency throughout the environmental process. The objectives of public participation are the following:

- To identify all potentially directly and indirectly affected stakeholders, government departments, municipalities and landowners;
- To communicate the proposed project in an objective manner with the aim to obtain informed input;
- To assist the Interested & Affected Parties (IAPs) with the identification of issues of concern, and providing suggestions for enhanced benefits and alternatives;
- To obtain the local knowledge and experience of IAPs;
- To ensure that all reasonable alternatives are identified for assessment.
- To communicate the proceedings and findings of the specialist studies;
- To ensure that informed comment is possible;
- To ensure that all concerns, comment and objections raised are appropriately and satisfactorily documented and addressed.

5.2 Public Participation Process Followed

Interested & Affected Parties Register

Significant measures were taken to ensure that all stakeholders that could have been affected or have an interest in this project were identified. The IAP Register (attached as Appendix D5) consists of directly and indirectly affected landowners, stakeholders and government departments.

Newspaper advertisement

A newspaper advertisement was placed in the local newspaper, The Siyancuma Rekord, on 4 December 2020. A request was made for comment and for registration of IAPs. Proof thereof is provided as Appendix D1.

Onsite notices

Onsite notices were placed as follows:

- At the entrance to the Ovaal substation on the R357 road
- At the corner of the R357 and an unnamed tarred road just to the west of the Orange River where Alternative 2 will cross the road.

- At the position where Alternative 1 will cross the unnamed tarred road just to the west of the Orange River


Figure 12: Onsite notice 1
Entrance to the Ovaal substation on the R357 road


Figure 13: Onsite notice 2
At the corner of the R357 and an unnamed tarred road just to the west of the Orange River where Alternative 2 will cross the road


Figure 14: Onsite notice 3
At the position where Alternative 1 will cross the unnamed tarred road just to the west of the Orange River

Distribution of the Draft Motivational Report

The Draft Motivational Report (this document) will now be distributed to everybody on the IAP Register. Proof thereof will be submitted in the Final Motivational Report.

The EA Amendment Application Form and Motivational Report will be submitted to DEFF for registration of the project and their comment on the project.

Final Motivational Report

Comment received on the Draft Motivational Report will be included in the Final Report and submitted to DEFF for their approval and amendment of the Environmental Authorisation. The IAPs will be informed of their right to appeal DEFF's decision.

CHAPTER 6: IMPACT ASSESSMENT

6.1 Impact assessment and Mitigation Measures

6.1.1 Specialist fields where new impact was not identified

- **Palaeontology**: An exemption letter was obtained in 2014
- **Soil & Agriculture**: No impact associated with the three route alternatives was identified
- **Visual**: The visual impact for the different route alternatives is low and very similar and no mitigation is proposed.
- **Socio-Economic**: The socio-economic impact for the different route alternatives is low/neutral and very similar and no mitigation is proposed.

6.1.2 Impact assessment and mitigation

AVIFAUNA

The recommendations of the original report need to be updated and replaced with the following:

1. The proposed 132kV power line should be marked with Eskom approved Bird Flight Diverters or Bird Flappers to lower the risk of avian collisions with the power line for its entire length. The BFDs should be fitted to the earthwire, 5 metres apart, alternating black and white/yellow on the earthwire. The applicant should request Eskom to mark the existing 5-pole HV line as well to further reduce the collision risk.
2. It is strongly recommended that the DT 7649 vulture friendly structure is used for the grid connection as per Appendix 1 of the Avifauna Statement.

Note from EAP: The EMPr was updated accordingly

AQUATIC

Potential impacts consist largely of the direct disturbance of aquatic habitat and the associated impacts to aquatic biota and to a lesser degree potential water quality impacts that would mostly take place in the construction phase of the project. Longer-term maintenance activities also have the potential to result in some disturbance of aquatic habitat.

Cumulative impact

The Orange River at the site is in modified ecological condition mostly as a result of flow and water quality impacts in its upstream catchment. Land use activities in and adjacent to the proposed powerline route have resulted in a direct modification to the aquatic and riparian habitats associated with the river. These aquatic habitats are considered to be of high ecological importance and sensitivity and thus further degradation of this aquatic habitat should not be allowed to occur.

As part of the cumulative impact discussion in the original freshwater impact assessment, it was assumed that a powerline route alternative that would need to cross the Orange River would not take place. Construction of additional cables over the Orange River was deemed to be increasing the cumulative impacts due to fragmentation of the river corridor, from the perspective of avian fauna. This was conservatively assessed to be associated with a moderate to high irreplaceability of resources.

By selecting the route with the least impact, one can prevent any unacceptable impacts to these freshwater features, particularly over the longer term. Cumulatively, these impacts are likely to be of a low significance and can be monitored and easily mitigated. The proposed mitigation measures are largely intended to minimise the impacts that may occur within the construction phase when the potential impact is the greatest.

CONSTRUCTION ACTIVITIES

Significance of impacts without mitigation

A localised shorter-term impact of medium to low intensity that is expected to have a low overall significance in terms of its impact on the identified aquatic ecosystems in the area. This is because there are existing powerlines and other infrastructure already in place where the powerline is proposed.

Proposed mitigation

- Construction activities should as far as possible take place outside of the delineated aquatic features and the proposed buffer zones. These areas should be marked as no-go areas before construction.
- Neither the pylons, their anchors nor any access roads to the pylons should be placed within the river channel, riparian zone and the recommended buffer zones. The overhead powerlines may, however, cross over the buffer zones and the river.
- As far as possible existing access roads or existing disturbed areas should be utilised to minimise the extent of disturbance in the area. Access roads should be contoured along any steep slope (if applicable). Run-off over the exposed areas should be mitigated to reduce the rate and volume of run-off and prevent erosion.
- Since the vegetation in the study area is still largely indigenous vegetation with minimal invasive alien plant growth, any of the cleared areas should be rehabilitated after

construction is completed. Where necessary, these areas should be re-vegetated with suitable indigenous plants. Any invasive alien plant growth occurring within the immediate area of the construction activities should be removed and any regrowth prevented.

- Run-off over any exposed areas on the northern slope, near the substation, should be mitigated to reduce the rate and volume of run-off and prevent erosion.
- Contaminated runoff from construction should be prevented from entering the river. All materials on the construction site should be properly stored and contained.
- Disposal of waste from the site should also be properly managed.
- Construction workers should be given ablution facilities at the construction site that are located outside of the recommended buffer for the river and regularly serviced.
- These measures should be addressed, implemented and monitored in terms of the approved Environmental Management Plan for the construction phase.

Significance of impacts after mitigation

A localised, short-term impact will still occur during the construction phase; however, the overall significance of the impact on the aquatic ecosystems is expected to be **very low**.

Construction phase impact summary

Table 5: Aquatic Impact Assessment Tables: Construction Phase

Potential impact on freshwater features	**Construction of the proposed powerline for Alternative 1**	**Construction of the proposed powerline for Alternative 2 (preferred alternative)**
Nature of impact:	Disturbance of habitat and water quality impacts	
Extent and duration of impact:	Localised short term impacts	
Intensity of Impact	Medium to low intensity (depending on the distance between the construction activities and the freshwater features)	Low intensity
Probability of occurrence:	Probable considering extent of powerline within mapped aquatic habitat	Possible depending on the extent of construction activities within aquatic features
Degree to which impact can be reversed:	High to Medium	High
Irreplaceability of resources:	Medium	Medium
Significance of impact pre-mitigation	Medium to low	Low
Cumulative impact prior to mitigation:	Medium to low	Low
Degree of mitigation possible:	Low	Very low
Significance after mitigation	Low	Very Low
Cumulative impact post mitigation:	Low	Very Low

OPERATIONAL PHASE ACTIVITIES

Nature of Impact

An impact of very limited significance is expected on any of the aquatic features that are associated with the longer-term maintenance activities during the operational phase. Potential impacts relate to disturbance of aquatic habitat and the provision of an ongoing opportunity for invasive alien plant growth.

Significance of impacts without mitigation

A localised longer-term impact of low intensity is expected to have a very low overall significance in terms of its impact on the identified aquatic ecosystems in the area.

Proposed mitigation

- Maintenance of infrastructure related to the project should only take place via a designated access route.
- Disturbed areas along the access route should be monitored to ensure that the area does not become subject to erosion or invasive alien plant growth.

Significance of impacts after mitigation

A localised, long-term impact of a **very low** overall significance could be expected to occur.

Operational phase impact summary

Table 6: Aquatic Impact Assessment Tables: Operational Phase

Potential impact on freshwater features	**Maintenance activities associated with the proposed powerline (Alternative 1)**	**Maintenance activities associated with the proposed powerline (Alternative 2) (preferred alternative)**
Nature of impact:	Disturbance of habitat	
Extent and duration of impact:	Localised longer term impacts	
Intensity of Impact	Low	Very Low
Probability of occurrence:	Probable	Possible to unlikely
Degree to which impact can be reversed:	High to medium	High
Irreplaceability of resources:	Medium	Medium
Significance of impact pre-mitigation	Low	Very low
Cumulative impact prior to mitigation:	Low	Low
Degree of mitigation possible:	Very low	
Significance after mitigation	Low	Very Low
Cumulative impact post mitigation:	Low	Very Low

Note from EAP: The recommended mitigation measures were included in the updated EMPr

HERITAGE

With respect to the magnitude and extent of potential impacts, it has been noted that the erection of power lines would have a relatively small impact on Stone Age sites, in light of Sampson's (1985:21) observations during surveys beneath power lines in the Karoo (actual modification of the landscape tends to be limited to the footprint of each pylon), whereas other kinds of development such as a water supply pipeline or road would tend have greater linear impact.

The following mitigation is proposed:
In the event of any unanticipated significant heritage feature being uncovered during construction or operation phases of the project, alert the relevant heritage authority and mitigate as recommended and/or deemed necessary.

Note from EAP: The recommended mitigation measure was included in the updated EMPr

VEGETATION

Impacts
The potential impacts and cumulative impacts of the solar project and gird connection were detailed in the EIA report (Anderson 2012). To summarise, the impacts include:

- A loss of natural vegetation along the powerline route,
- Habitat fragmentation,
- Loss of species of special concern (protected species), and
- Establishment of invasive alien plants.

The impacts will be permanent. After closure and rehabilitation, certain species (such as the protected trees and some dwarf shrubs) are not expected to return as the vegetation recovers to a modified state to the original natural condition before construction.

It is likely that the two alien invasive species present will invade the areas cleared of vegetation as they are fairly abundant along the routes. If left uncontrolled, this will add to the deterioration of the natural vegetation and the Orange River ecosystem locally and further afield.

Cumulative impacts arise from the combined presence of developments and land transformation within an area which affect ecological processes operating at broader scales, or where each have a small impact which becomes significant when combined. This project has the potential to cumulatively impact on our country's *conservation obligations and targets* at a local as well as national level. It should be viewed along with other types of local and regional impacts that affect CBAs and conservation areas.

No significant disruption of ecosystem functioning is assumed in least threatened vegetation types (which still have more than 80% of their original extent intact), in this case the Northern Upper Karoo present along the routes. Loss of parts of this vegetation is expected to result in an insignificant cumulative impact on the conservation status of this regional vegetation type.

Loss of natural vegetation in the Vulnerable Upper Gariep Alluvial Vegetation along the Orange River on Bucklands 271 & 272 is considered to be significant. The cumulative impact of circular fields cleared for crops and the two existing powerlines cutting through the riparian woodland in this vulnerable CBA along the Orange River is already significant. The many camel thorn and other large trees cleared are evident from the piles of dead trees along the edges of the fields at the powerlines. A few isolated trees standing between the crop fields indicate the extent of the camel thorn woodland before croplands were cleared (between Feb 2016 and April 2017).

No further vegetation clearing should be allowed in the remaining strip of riparian woodland to maintain its biodiversity, ecological integrity and the ecological services it provides to the Orange River system.

Table 7: Vegetation Impact Assessment Table

Impact	Project phase	Powerline route alternative 1		Powerline route alternative 2	
		With mitigation	Without mitigation	With mitigation	Without mitigation
Loss of vegetation	Construction	High (-tve)	High (-tve)	Low (-tve)	Low (-tve)
	Operation	High (-tve)	High (-tve)	Low (-tve)	Low (-tve)
Habitat fragmentation (loss of connectivity)	Construction	Medium (-tve)	Medium (-tve)	Low (-tve)	Low (-tve)
	Operation	Medium (-tve)	Medium (-tve)	Low (-tve)	Low (-tve)
Impact on species of special concern	Construction	High (-tve)	High (-tve)	Low (-tve)	Low (-tve)
	Operation	High (-tve)	High (-tve)	Low (-tve)	Low (-tve)
Establishment of invasive alien plants	Operation	Low (-tve)	Medium (-tve)	Low (-tve)	Medium (-tve)

Mitigation

Possible mitigation measures for both route alternatives include:

- Existing servitude roads must be used during construction. If not feasible, vegetation clearing must be restricted to the servitude tracks and pole footprints and kept to a minimum.
- Unnecessary impacts on surrounding natural vegetation (such as driving and turning heavy vehicles off road) must be avoided.
- The collection, hunting or harvesting of any plants, fuel wood or animals at the site should be strictly forbidden and the contractors and their staff educated to prevent this from happening.
- Cleared areas should be rehabilitated as quickly as possible once construction is completed.

- Any invasive alien plants must be immediately controlled, or at least annually before they set seed.
- An on-going monitoring programme should be implemented to detect and quantify any aliens that may become established and provide information for the management of aliens according to best practice methods for each species.
- Invasive species will need to be controlled for the life of the project and after closure if still present.

Note from EAP: The recommended mitigation measures which were not included in the 2014 EMPr have been included in the updated EMPr

CONCLUSION OF IMPACT ASSESSMENT

It is clear that all identified impacts associated with the recommended Route Alternative 2, could be mitigated to acceptable levels.

CHAPTER 7: CONCLUSION

7.1 Assumptions, Uncertainties, and Gaps in Knowledge

Assumptions
It is assumed that all documentation and information obtained from the different stakeholders, professional team members and specialists are accurate, unbiased and valid.

Uncertainties
The development proposal in relation to its environment was thoroughly investigated by various specialists and professionals and there are therefore no uncertainties with regards to the development as proposed.

Gaps in knowledge
Extensive relevant specialist and engineering studies were undertaken for this project and it is highly unlikely that any missing information could influence the outcome of this project.

7.2 Environmental Impact Statement

A Final Environmental Impact Statement will be provided after the completion of the Public Participation Programme and will be included in the Final Motivational Report.

At this stage, the following however applies:

The following specialist studies were conducted:

- Statements were obtained from the ornithologist, aquatic specialist, heritage consultant and ecologist. **The studies concluded that the power line route will have a low impact after mitigation has been applied.**
- Route Alternative 2 (1.5km along the R357 provincial road) is being recommended for implementation.

7.3 Why the Amendment Should, or Should Not be Authorised

Reasons for authorisation will be provided after the completion of the Public Participation Programme and will be included in the Final Motivational Report.

7.4 Recommendation by the Environmental Assessment Practitioner

Recommendations that should be included in the amended EA will be provided after the completion of the Public Participation Programme and will be included in the Final Motivational Report.

7.5 Affirmation by the Environmental Assessment Practitioner

We, Susanna Nel & Annelize Grobler, herewith affirm the following:

- The information contained in this report is to the best of our knowledge and experience correct.
- All relevant comment and input provided by the stakeholders and IAPs will be included and addressed in the Final Motivational Report.
- Input and recommendations from the specialist reports are provided in and integrated in this Motivational Report.
- All information made available by the EAP to IAPs and any responses thereto as well as comment and input from IAPs will be provided in the Motivational Report.

Susanna Nel
DATE: 05 February 2021

Annelize Grobler
DATE: 5 February 2021

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