



DRAFT BASIC ASSESSMENT REPORT

for

Dyasons Klip 5

on

Remainder of Farm Dyason's Klip 454 and grid connection
infrastructure on Remainder of Farm Rooipunt 617, Remainder
of Farm Tungsten Lodge 638 and Olyvenhouts Drift
Settlement Agricultural Holding 1080

In terms of the

National Environmental Management Act (Act No. 107 of 1998, as
amended) & 2014 Environmental Impact Regulations

Prepared for Applicant: Dyasons Klip 5 (Pty) Ltd.

Date: 08 September 2020

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Report Reference: KAI633/01

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APPROVAL FOR RELEASE

NAME	TITLE	SIGNATURE
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PURPOSE OF THIS REPORT:

I&AP Review and Comment

APPLICANT:

Dyasons Klip 5 (Pty) Ltd

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08 September 2020

DRAFT BASIC ASSESSMENT REPORT

in terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended) & Environmental Impact Regulations 2014 (as amended)

Dyasons Klip 5

Remainder of the Farm Dyason's Klip 454 and grid connection infrastructure on Remainder of Farm Rooipunt 617, Remainder of the Farm Tungsten Lodge 638 and Olyvenhouts Drift Settlement Agricultural Holding 1080

Submitted for:

Stakeholder Review & Comment

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REPORT DETAILS

Title:	Draft Basic Assessment Report for Dyasons Klip 5
Purpose of this report:	<p>This Draft Basic Assessment Report (BAR) is made available to all registered and potential Interested and Affected Parties (I&APs) for review and comment. All comments received will be incorporated into the Final Basic Assessment Report that will be submitted to the competent authority for decision making.</p> <p>This BAR forms part of a series of reports and information sources that are being provided during the Basic Assessment Process for the proposed Dyasons Klip 5 near Keimoes in the Northern Cape Province. Registered I&APs will be given an opportunity to comment on the following reports as part of this environmental process:</p> <ul style="list-style-type: none"> - Draft Basic Assessment Report, - All Specialist Studies, and - Draft Environmental Management Programme. <p>In accordance with the regulations, the objectives of an environmental process are to, through a consultative process:</p> <ul style="list-style-type: none"> (a) identify the relevant policies and legislation relevant to the activity; (b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location; (c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process; (d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment; (e) identify the key issues to be addressed in the assessment phase; (f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and (g) identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored. <p><u>The Draft Basic Assessment Report is available to all registered and potential interested and affected parties for a 30 day review and comment period. Proof of public participation on compliance with the regulations will be provided to the competent Authority with the Final Basic Assessment Report that will be provided for Decision Making.</u></p> <p>All comments received during this comment period will be incorporated into the Final BAR that will be submitted to the Department of Environment, Forestry and Fisheries for decision making.</p>
Prepared for:	Dyasons Klip 5 (Pty) Ltd
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Cape EAPrac Ref:	KAI633/01
DEA Case officer & Ref. No:	Mathlodi Maggorosi
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TECHNICAL CHECKLIST

The following technical checklist is included as a quick reference roadmap for the proposed project.

Applicant Details	Applicant Name:	Dyasons Klip 5 (Pty) Ltd
	Company Registration Number:	2019/627994/07
	BBBEE Status:	n/a
	Project Name:	Dyasons Klip 5

Size of the study area	Size in ha of initial study area.	1050ha
Development Footprint	This includes the total footprint of PV panels, auxiliary buildings, onsite substation, inverter stations and internal roads.	Approximately 267ha
Capacity of the facility	Capacity of facility (in MW)	Net generating capacity of 100MW _{AC}
Solar Technology selection	Type of technology	Solar photovoltaic (PV) with either of fixed-tilt, single-axis tracking- or dual-axis tracking-mounting structures.
	Structure height	Solar panels a maximum of \pm 3.5m from ground level
	Size of Associated Infrastructure	Laydown area: \pm 3 - 5ha Internal roads \pm 6.5ha Auxiliary buildings: \pm 1ha Facility substation: up to 1ha Battery storage area: up to \pm 4ha
	Structure orientation	Fixed-tilt: north-facing at a defined angle of tilt Single-axis: horizontal axis tracking from east to west
	Laydown area dimensions	Approximately 3-5ha of temporary laydown area will be required (the laydown areas will not exceed 5ha and will be situated within the assessed footprint). Permanent laydown area not exceeding 1ha.

Dyasons Klip 5 is to consist of solar photovoltaic (PV) technology with fixed, single or double axis tracking mounting structures, with a net generation (contracted) capacity of 100 MW_{AC} (MegaWatts), as well as associated infrastructure, which will include:

- Auxiliary buildings (gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);
- Access (at an existing access point on the N14 via an already constructed access road) and internal road network that extends beyond that already authorised for Dyasonsklip Solar Energy Facility 1.
- Laydown area;
- Battery Energy Storage System;
- Rainwater tanks;
- Perimeter fencing and security infrastructure;
- Inverter-stations, transformers and internal electrical reticulation (underground cabling);
- On-site switching-station / substation; and
- Overhead 132kV electrical distribution line / grid connection.

COMPONENT DETAILS

Component	Description/ Dimensions
Location of the site	Approximately 20km West of Upington along the N14
PV Panel area	A maximum of 250ha with a total project footprint of approximately 267ha
SG Codes	C02800000000045400000 C02800000000061700000 C02800000000063800000

	Agricultural Holding 1080 ¹
Preferred Site access	Access (at an existing access on the N14 via an already constructed access road) and internal road network that extends beyond that authorised for Dyasonsklip Solar Energy Facility 1 (14/12/16/3/3/2/705).
Export capacity	100 MWac
Proposed technology	PV with fixed-tilt-, single-axis tracking- or dual-axis tracking- mounting structures.
Height of installed panels from ground level	Solar panels a maximum of ± 3.5m from ground level
Width and length of internal roads	Main access road width: Up to 8m. Internal road width: Up to 5m, Length: Up to 15km.

LOCATION OF PREFERRED ALTERNATIVE

The co-ordinates of the preferred layout alternative are reflected in the table below.

Layout Alternative 1 (Preferred)	Latitude	Longitude
North-West Corner	28° 31' 33.03"S	21° 01' 29.75"E
North-East Corner	28° 30' 52.87"S	21° 01' 54.17"E
South-West Corner	28° 32' 24.70"S	21° 02' 20.82"E
South-East Corner	28° 32' 25.28"S	21° 02' 54.14"E

The co-ordinates of the preferred grid connection alternative are reflected in the table below.

Grid Corridor 1.2 (Preferred)²	Latitude	Longitude
Substation Alternative 1 (centre position)	28° 32' 09.99"S	21° 02' 52.37"E
Powerline Start ³	28° 32' 09.99"S	21° 02' 52.37"E
Powerline Middle	28° 34' 35.48"S	21° 05' 19.71"E
Powerline End ⁴	28° 32' 43.18"S	21° 08' 16.11"E

CONTENTS OF A BASIC ASSESSMENT REPORT.

Appendix 1 of Regulation 326 of the 2014 EIA Regulations (as amended) contains the required contents of a Basic Assessment Report. The checklist below serves as a summary of how these requirements were incorporated into this Basic Assessment Report.

Requirement	Details
(1) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include -	
(a) Details of - The EAP who prepared the report; and The expertise of the EAP, including, a curriculum vitae.	The report was compiled by Dale Holder of Cape EAPrac. The author has thirteen years' experience as an EAP and holds a ND Nature Conservation qualification. The CV of the EAP and Company Profile is included as Annexure J4 of this report.
(b) The location of the activity, including – The 21 digit Surveyor General code of each cadastral land parcel; Where available, the physical address and farm name;	The PV Facility is situated on a land portion with the following SG code: C0280000000045400000

¹ Agricultural Holding 1080 (cadastral unit containing the Upington MTS) does not have a registered S21 digit code.

² The numbering reflected in this alternative refers to sub-station alternative 1 and grid connection corridor 2.

³ It must be noted that the powerline co-ordinates are reflected as the approximate centre point of a 400m wide corridor.

⁴ The powerline end point is reflected as the approximate centre point of the Eskom Upington MTS.

Requirement	Details
<p>Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.</p>	<p>The Grid connection is situated on portions with the following SG codes: C02800000000045400000 C02800000000061700000 C02800000000063800000 Agricultural Holding 1080⁵</p> <p>±25km south-west of Upington in the Northern Cape.</p> <p><u>Corner co-ordinates of preferred layout alternative:</u> North-West Corner 28° 31' 33.03"S 21° 01' 29.75"E North-East Corner 28° 30' 52.87"S 21° 01' 54.17"E South-West Corner 28° 32' 24.70"S 21° 02' 20.82"E South-East Corner 28° 32' 25.28"S 21° 02' 54.14"E</p> <p><u>Co-ordinates of preferred grid connection alternative:</u> Substation Alt 1 28° 32' 09.99"S 21° 02' 52.37"E Powerline Start 28° 32' 09.99"S 21° 02' 52.37"E Powerline Middle 28° 34' 35.48"S 21° 05' 19.71"E Powerline End 28° 32' 43.18"S 21° 08' 16.11"E</p>
<p>(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or On land where the property has not been defined, the coordinates within which the activity is to be undertaken.</p>	<p>Refer to Appendix A and B of this report.</p>
<p>(d) a description of the scope of the proposed activity, including - All listed and specified activities triggered and being applied for; and A description of the activities to be undertaken including associated structures and infrastructure.</p>	<p>The relevant listed activities are captured in Section 3.1.2</p> <p>The description of the activity is provided in Section 2 of this report with graphic representation provided in Appendix B.</p>
<p>(e) A description of the policy and legislative context within which the development is proposed, including – An identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and .How the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks and instruments.</p>	<p>Please refer to Section 3 of this document.</p>
<p>(f) A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location.</p>	<p>Please refer to Section 2.2 of this document.</p>
<p>(g) A motivation for the preferred site, activity and technology alternative.</p>	<p>The preferred alternative has been identified as the best practicable option and is discussed in detail in Section 2.4 of this report.</p>
<p>(h) A full description of the process followed to reach the proposed preferred alternative within the site, including -</p> <ul style="list-style-type: none"> • Details of all alternatives considered; • Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; • A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; 	<p>Section 2.4 addresses feasible and reasonable alternatives which were identified for facility. Site, layout and technological alternatives were considered.</p> <p>Details of Public Participation are included in Section 8 of the report.</p> <p>A summary of all issues raised by I&APs as well as the responses thereto are included in Appendix F.</p>

⁵ Agricultural Holding 1080 (cadastral unit containing the Upington MTS) does not have a registered S21 digit code.

Requirement	Details
<ul style="list-style-type: none"> • The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; • The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated. • The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; • Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; • The possible mitigation measures that could be applied and level of residual risk; • The outcome of the site selection matrix; • If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and • A concluding statement indicating the preferred alternatives, including preferred location of the activity. 	<p>The environmental attributes of the study site are included in Section 5 of the report.</p> <p>The identification and assessment of Impacts are included in Section 6 of the report.</p> <p>The summary of proposed mitigation measures are included in Section 7 of the report.</p> <p>The outcome of the site selection matrix is attached in Annexure E7 and is summarised in Section 2.3 of the report.</p> <p>The concluding statement is contained in Section 6.14 of the report.</p>
<p>(i) A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including - A description of all environmental issues and risks that were identified during the basic assessment process; and An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.</p>	<p>Please see Summary and Section 6 of the report and Appendix E for the specialist reports.</p>
<p>(j) An assessment of each identified potentially significant impact and risk, including - Cumulative impacts; The nature, significance and consequences of the impact and risk; The extent and duration of the impact and risk; The probability of the impact and risk occurring; The degree to which the impact and risk can be reversed; The degree to which the impact and risk may cause irreplaceable loss of resources; and The degree to which the impact and risk can be mitigated.</p>	<p>Please see Section 6 of the report and Appendix E for the specialist reports.</p>
<p>(k) Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.</p>	<p>Please see Section 6 of the report and Appendix E for the specialist reports.</p>
<p>(l) An environmental impact statement which contains –</p> <ul style="list-style-type: none"> • A summary of the key findings of the environmental impact assessment; • A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and • A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives. 	<p>Section 6.23 and 6.14 of this report.</p> <p>See Appendix D</p> <p>Section 6.13 of this report.</p>

Requirement	Details
(m) Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr.	See Section 7 report.
(n) Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	See Section 7 of this report.
(o) A description of assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.	See Section 3.4 of this report.
(p) A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	See Section 9 of this report.
(q) Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded and the post construction monitoring requirements finalised.	The proposed activity does include operational aspects.
(r) An undertaking under oath or affirmation by the EAP in relation to: The correctness of the information provided in the reports; The inclusion of comments and inputs from stakeholders and I&APs; The inclusion of inputs and recommendations from the specialist reports where relevant; and Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	The declaration of the EAP is attached in Appendix G.
(s) Where applicable, details of any financial provisions for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts.	This environmental assessment does not include application for decommissioning and closure of activities
(t) Any specific information that may be required by the competent authority.	Currently not applicable but will be included if such a request is made.
(u) Any other matters required in terms of section 24(4)(a) and (b) of the Act.	This section will be updated on receipt of the mandatory comment from the competent authority.

DEFF COMMENT ON DRAFT BASIC ASSESSMENT REPORT

This section will be updated once the Department of Environment, Forestry and Fisheries (DEFF) provide comment on the Draft Basic Assessment Report.

ORDER OF REPORT

Report Summary

Draft Basic Assessment Report – Main Report

Appendix A	:	Location, Topographical Plans
Appendix B	:	Biodiversity Overlays
Appendix C	:	Site Photographs
Appendix D	:	Solar Facility Layout Plans
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Appendix D2	:	Cumulative impacts Map
Appendix E	:	Supplementary Reports (Specialist Reports and Technical Reports)
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Annexure E2	:	Avifaunal Impact Assessment (Van Rooyen, 2020)
Annexure E3	:	Freshwater Ecological Impact Assessment (Schermann, 2020)
Annexure E4	:	Agricultural Impact Assessment Report (Lubbe, 2020)
Annexure E5	:	Heritage Impact Assessment Report (van der Walt, 2020)
Annexure E6	:	Palaeontology Desktop Study (Almond, 2020)
Annexure E7	:	Visual Impact Assessment (Stead, 2020)
Annexure E8	:	Social Impact Assessment (Barbour, 2020)
Annexure E9	:	Technical Design Report (Dyasons Klip 5 (Pty) Ltd, 2020)
Annexure E9b	:	Technical report for Battery Energy Storage System (Dyasons Klip 5 (Pty) Ltd, 2020)
Annexure E10	:	Water Consumption Study (Dyasons Klip 5 (Pty) Ltd, 2020)
Annexure E11	:	Site Selection Matrix (Dyasons Klip 5 (Pty) Ltd, 2020)
Annexure E12	:	Traffic and Transportation Assessment (JG Afrika, 2020)
Annexure E13	:	Stormwater Management Plan (Sivest, 2020)
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Appendix F	:	Public Participation Process
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Annexure F2	:	Comments and Response Report (to be included with final BAR)
Annexure F3	:	Adverts & Site Notices (to be included in Final BAR)
Annexure F4	:	Draft BAR Notifications (To be included with final BAR)
Annexure F5	:	Draft BAR Comments and Responses (To be included with Final BAR)

Annexure F6	:	Approved Public Participation Plan
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Annexure G5	:	Title Deed / Windeed Report
Annexure G6	:	Proof of Availability of Services (to be included in Final BAR after engagement with LA)
Annexure G7	:	Specialist CV's
Annexure G9	:	Agenda and Minutes of Pre Application Meeting
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EXECUTIVE SUMMARY

I. INTRODUCTION

Cape EAPrac has been appointed by Dyasons Klip 5 (Pty) Ltd (hereafter referred to as the Applicant) as the independent Environmental Assessment Practitioner (EAP), to undertake the Basic Assessment process⁶ required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the Dyasons Klip 5 facility near Upington and Keimoes in the Northern Cape Province of South Africa.

The solar energy facility will have a maximum generation capacity of 100MW_{AC} for distribution via the national electrical grid network. The project will connect to the national grid via a new on-site substation⁷ and 132kV overhead distribution line, which will feed into the existing Eskom Upington Major Transmission Substation (MTS). The proposed facility also includes a Battery Energy Storage Area on Approximately 4ha.

The purpose of this **Draft Basic Assessment Report** (BAR) is to describe the affected environment and the proposed project, as well as to present the site constraints identified by the various specialist during their site assessments, and identify & assess the potential impacts that this development may have on the receiving environment. This information is herewith presented to all registered and potential Interested and Affected Parties (I&AP's), including the competent authority for review and comment.

The Draft BAR will be available to all registered and potential I&AP's for a 30-day review and comment period.

All comments received on the Draft BAR will be incorporated into the Final BAR that will be submitted to the Department of Environment, Forestry and Fisheries (DEFF) for consideration and decision making. After the department has taken made a decision on the application, this decision will be communicated to all I&AP's along with details of the appeal process.

RECOMMENDATION OF THIS BASIC ASSESSMENT REPORT

None of the participating specialists identified any impacts that remain high after mitigation. Due to the risk adverse approach followed for the development of the preferred layout, all the main sensitive features, (most notably significant water courses, very high and high sensitivity terrestrial features as well avifaunal sensitive areas and their buffers) were avoided.

The affected area is considered suitable for development and there are no impacts associated with Dyasons Klip 5 that cannot be mitigated to a medium or low level. As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layout provided for the assessment, Dyasons Klip 5 can be supported from a terrestrial ecology, avifaunal, freshwater, visual, social, heritage and agricultural point of view, subject to the implementation of the management and mitigation measures detailed in this report.

It is the EAP's considered opinion that the preferred alternative (Layout Alternative 1), preferred access road (Access Alternative 1), and Grid Connection (Grid Alternative 1.2) be considered for approval by the Competent Authority on condition that all other legislative approvals be obtained, and that the final EMP be adhered to.

NEED AND DESIRABILITY

⁶ The environmental process follows a basic assessment process, as it is located within the Upington Renewable Energy Development Zone, which was formally gazetted in 2018 in GN 113 and GN114.

⁷ Reference to the on-site substation throughout this report includes both the Eskom as well as the IPP portion of this substation.

Need and desirability for this project has been considered in detail in this environmental process. The overall need and desirability in terms of developing renewable energy generation in South Africa and globally is considered in Section 1, while the project specific need and desirability is considered in Section 5.

ENVIRONMENTAL LEGISLATIVE REQUIREMENTS

The current assessment is being undertaken in terms of the **National Environmental Management Act (NEMA, Act 107 of 1998)**. This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the National Department of Environment, Forestry and Fisheries (DEFF) based on the findings of an Environmental Assessment).

The proposed development entails several listed activities, which trigger the need for a Basic Assessment, conducted by an independent EAP. Cape EAPrac has been appointed to undertake this process.

Table 1: NEMA 2014 (as amended in April 2017) listed activities applicable to Dyasons Klip 5.

Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R983)	Description
11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	Construction of the on-site substation and the overhead powerline to the Upington MTS with a maximum capacity of 132 kilovolts.
12	The development of— (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	Construction of internal, perimeter and access road as well as PV mounting structures across the ephemeral washes and secondary watercourses as well as a single crossing of a larger watercourse by the main access road. These roads and structures will have a physical footprint exceeding 100 square metres
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	Construction of internal, perimeter and access road as well as PV mounting structures across the ephemeral washes and secondary watercourses as well as a single crossing of a larger watercourse by the main access road. The excavation and infilling associated with these roads and structures will exceed 10 cubic metres.
24	The development of a road— ((ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;	Construction of the main access road to the proposed Dyasons Klip 5 facility. The access road will have a width of 8m but with the inclusion of side drains will exceed a total width of more than 8m.
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The Dyasons Klip 5 facility is considered as commercial use, being proposed on an area used for agricultural purposes. Dyasons Klip 5 will have a total footprint of approximately 267 ha
56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre— (ii) where no reserve exists, where the existing road is wider than 8 metres;	The existing access track will be widened by more than 6m in certain sections.
Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 3 (GN R985)	Description
4	The development of a road wider than 4 metres with a reserve less than 13 metres. g. Northern Cape iii. Outside urban areas:	A section of the powerline crosses a CBA (CBA2). A construction and maintenance track will be beneath this powerline. Although the width of this

	(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	track will only be approximately 2 m, it will be wider than 4 m at each pylon position.
12	The clearance of an area of 300 square metres or more of indigenous vegetation. g. Northern Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans;	A section of the powerline falls within a CBA (CBA2). The construction of this powerline will require the removal of more than 300 square metres of vegetation within this CBA.
14	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more. g. Northern Cape ii. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	A section of the powerline falls within CBA (CBA2). The combined pylon footprint will exceed 10 square metres.
Activity No(s):	Scoping and EIR Activity(ies) as set out in Listing Notice 2 (GN R984)	Description
1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more,	The proposed Dyasons Klip 5 comprises a renewable energy generation facility, which will utilise PV technology and will have a net generation capacity of up to 100MW.
15	The clearance of an area of 20 hectares or more of indigenous vegetation	Dyasons Klip 5 will have a total footprint of approximately 267 ha.

NOTE: Basic Assessment as well as S&EIR Activities are being triggered by the proposed development, but since the project is contained in a legislated REDZ, the EIA Process will follow a Basic Assessment process.

Before any of the above-mentioned listed activities can be undertaken, authorisation must be obtained from the relevant authority, in this case the DEFF. Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other authorities who have a legal mandate in respect of the activity.

II. DEVELOPMENT PROPOSAL

Dyasons Klip 5 will have a net generating capacity of 100 MW with an estimated maximum footprint of \pm 267 ha.

The technology under consideration is PV modules mounted on either single or double axis tracking structures. Other infrastructure includes inverter stations, internal electrical reticulation, access road, internal roads, an on-site switching station / substation, auxiliary buildings, construction laydown areas and perimeter fencing and security infrastructure. The project will connect to the National Grid via the existing Eskom Upington MTS. This will include the construction of an on-site switching station / substation and an overhead distribution line to the Eskom Upington MTS.

The on-site switching station / substation will locate the main power transformer/s that will step up the generated electricity to a suitable voltage level for distribution into the national electricity grid. Auxiliary buildings include, *inter alia*, a control building, offices, warehouses, a canteen and visitors centre, staff lockers and ablution facilities, a gate house and security offices.

The proposal includes a battery energy storage system with a maximum footprint of 4ha.

III. PROFESSIONAL INPUT

The following professionals⁸ have provided input into this environmental process:

Table 2: Professional input informing the BAR for Dyasons Klip 5.

Study	Company	Author
Terrestrial Ecology	3 Foxes Biodiversity Solutions	Mr Simon Todd
Avifaunal	Chris van Rooyen Consulting	Mr Chris van Rooyen / Mr Albert Froneman
Archaeology	Heritage Contracts and Archaeological Consulting (HCAC)	Mr Jaco van der Walt
Palaeontology	Natura Viva	Dr John Almond
Heritage	Heritage Contracts and Archaeological Consulting (HCAC)	Mr Jaco van der Walt
Agricultural Potential	Mr Christo Lubbe	Mr Christo Lubbe (peer reviewed by Dr Hendrik Smith)
Visual	Visual Resource Management Africa	Mr Stephen Stead
Freshwater	Scherman Consulting	Dr Patsy Scherman
Social	Tony Barbour Consulting	Mr Tony Barbour
Engineering aspects	Dyasons Klip 5 (Pty) Ltd	Mr David Peinke
Stormwater Management	Sivest	Mr Richard Hirst
Traffic and Transportation	JG Afrika	Mr Adrian Johnson
Water Consumption	Dyasons Klip 5 (Pty) Ltd	Mr David Peinke
Planning	Macroplan	Mr JP Theron

IV. PLANNING CONTEXT

A Planning specialist will be appointed in order to consider the planning implications of the proposed Dyasons Klip 5 and submit the following required applications:

- Application for land use change in terms of the Spatial Planning and Land Use Management Act, Act 16 of 2013, submitted to the Kai !Garib Municipality in terms of their Land Use Management Scheme and relevant and approved SPLUMA by-laws.
- Notification of the intended process of land use change submitted to the Department of Agriculture Forestry and Fisheries (DAFF) in terms of the Subdivision of Agricultural Land Act, Act 70 of 1970.

A statement in this regard is appended to this report (Appendix E14).

V. ASSESSMENT OF IMPACTS

The potential key impacts identified and assessed by the various specialists (more details on the significance and ratings of these impacts are provided in Section 6 and in the attached specialist reports).

Ecological Impacts Assessed

Construction Phase Impacts

Direct impacts

- Loss and/or fragmentation of indigenous natural vegetation due to clearing;
- Loss of individuals of plant species of conservation concern and/or protected plants;
- Loss of faunal habitat and refugia;
- Direct mortality of fauna due to machinery, construction, and increased traffic;
- Displacement and/or disturbance of fauna due to increased activity and noise levels;

⁸ Note that not all of these professionals are considered specialists as contemplated in chapter 3 of Regulation 326. Studies such as Engineering, Stormwater, Traffic, water consumption and planning constitute “technical” studies, rather than specialist studies and as such, the requirements in appendix 6 of R326 do not apply to all these professionals

- Effects on physiological functioning of vegetation due to dust deposition;
- Increased poaching and/or illegal collecting due to increased access to the area.

Indirect impacts

- Establishment and spread of alien invasive plants due to the clearing and disturbance of indigenous vegetation;
- Changes to behavioural patterns of animals, including possible migration away or towards the project area;
- Increased runoff and erosion due to clearing of vegetation, construction of hard surfaces and compaction of surfaces, leading to changes in downslope areas.

Operational Phase Impacts

Direct impacts

- Continued disturbance to natural habitats due to general operational activities and maintenance;
- Direct mortality of fauna through traffic, illegal collecting, poaching and collisions and/or entanglement with infrastructure;

Indirect impacts

- Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors;
- Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape;
- Changes to behavioural patterns of animals, including possible migration away or towards the project area;
- Positive potential impact on climate change due to generation of electricity without the need for coal mining or burning of coal, currently the main form of power generation in South Africa.

Decommissioning Phase Impacts

Direct impacts

- Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites;
- Direct mortality of fauna due to machinery, construction and increased traffic;
- Displacement and/or disturbance of fauna due to increased activity and noise levels;
- Effects on physiological functioning of vegetation due to dust deposition;

Indirect impacts

- Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors;
- Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape;
- Changes to behavioural patterns of animals, including possible migration away or towards the project area;

Cumulative impacts

- Loss and/or fragmentation of indigenous natural vegetation due to clearing;
- Loss of individuals of plant species of conservation concern and/or protected plants;
- Changes to ecological processes at a landscape level;
- Mortality, displacement and/or disturbance of fauna;
- General increase in the spread and invasion of new habitats by alien invasive plant species;
- Reduction in the opportunity to undertake or plan conservation, including effects on CBAs and ESAs, as well as on the opportunity to conserve any part of the landscape;
- Loss of the wilderness character of the area;
- Positive cumulative impact on climate change.

Avifaunal Impacts Assessed

Construction Phase Impacts

- Displacement due to disturbance associated with the construction of the Dyasons Klip 5 plant and associated infrastructure;

Operational Phase Impacts

- Displacement due to habitat transformation associated with the construction of the Dyasons Klip 5 plant and associated infrastructure;
- Collisions with the solar panels;
- Entrapment in perimeter fences;
- Electrocutions in the onsite substation and inverter station;

Operational Phase Impacts

- Displacement due to disturbance associated with the decommissioning of the Dyasons Klip 5 plant and associated infrastructure.

Freshwater Impacts Assessed

- Loss of Very High Sensitivity systems:
- Impact on secondary alluvial water courses (Moderate Sensitivity), through physical disturbance;
- Impact on all riparian and wetland systems through the possible increase in surface water runoff on riparian form and function through hydrological changes;
- Increase in sedimentation and erosion;
- Risks on the aquatic environment due to water quality impacts;

Heritage Impacts Assessed

Construction Phase

- Impact on scenic routes during construction.

Operational Phase

- Impacts on the heritage resources;
- Impact on scenic routes;
- Impact of new structures on cultural landscape and character.

Cumulative impacts

- Change to the rural character;
- Socio-economic upliftment.

Archaeological Impacts Assessed

Construction Phase

- Disturbance to surface and sub-surface sediments.

Operational Phase

- None.

Cumulative Impacts

- No cumulative impacts will arise.

Visual Impacts Assessed

Construction Phase

- Visual scarring as a result of new development, clearing vegetation and construction works.
- Change of local and surrounds visual resources due to the construction and operation of the proposed (3.5m high) PV structures, and buildings.

- Change of local and surrounds visual resources due to the construction and operation of the proposed road access.

Operational Phase

- Change in the rural visual character of the site;
- Visual impact on key visual receptors and secondary visual receptors;
- Visual intrusion of lighting at night.

Socio-Economic Impacts Assessed

Construction Phase

- Creation of business and employment opportunities;
- Impacts associated with the presence of construction workers on site;
- Security and safety impacts associated with the presence of construction workers;
- Noise, dust and safety impacts associated with construction related activities and the movement of heavy vehicles.

Operational Phase

- Creation of employment and business opportunities;
- Impact on rural sense of place and character of the area;
- Crime levels and pressure on local services.

Traffic Impacts Assessed

Construction Phase Impacts

- Traffic Congestion;
- Noise pollution due to increased traffic;
- Air quality affected by dust pollution.

Impact Summary

The table below summarises the significance (with mitigation) of all impacts assessed⁹.

Table 3: Summary of the significance of impacts associated with Dyasons Klip 5¹⁰.

Impact	Significance (with mitigation)
Social Impacts during the construction Phase	
Creation of employment and business opportunities	Medium positive
Presence of construction workers and potential impacts on family structures and social networks.	Low negative
Influx of job seekers.	Low negative
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers.	Low negative
Increased risk of veld fires	Low negative
Impact of heavy vehicles and construction activities.	Low negative
Loss of farmland.	Low negative
Social Impacts during the operational phase	
Promotion of renewable energy projects	High positive
Creation of employment and business opportunities	Medium positive
Establishment of Community Trust	High positive

⁹ In order to attain these outcomes, the mitigation measures reflected in Section 7 of the report need to be implemented.

¹⁰ This includes cumulative impacts associated with the facility

Impact	Significance (with mitigation)
Generate income for affected landowner/s	Medium positive
Visual impact and impact on sense of place	Low negative
Impact on tourism	Low positive and negative
Visual Impacts during construction and operation phase	
Change of local and surrounds visual resources due to the construction and operation of the proposed (3.5m high) PV structures, and buildings.	Low negative
Change of local and surrounds visual resources due to the construction and operation of the proposed road access.	Low negative
Palaeontological Impacts of the construction phase	
Impact on potential palaeontological resources	Low negative
Agricultural Impacts	
Soil pollution with contaminants during the construction phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the construction of all facets of the facility: laydown area, concrete foundations of the auxiliary buildings, inverter stations subterranean cabling, main access and internal service roads.	Low negative
The establishment of the Dyasons Klip 5 Solar facility will be done at the expense of agricultural land. The area to be lost for agricultural development would be 267ha in size. This includes the area under PV panels, internal service roads and temporary laydown area	Low negative
The construction of a PV Solar facility will cause impairment of the land capability with the potential risk of erosion	Low negative
The establishment of the PV Solar facility may alter drainage patterns with construction and cause erosion	Low negative
Soil pollution with contaminants during the operational phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the maintenance of the facility.	Low negative
The quantity of available soil for agricultural production decreases as result of the footprints of these facilities. The quality of soil decreases in the way the construction of these structures alters the workability of the soil. This includes the physical deformation in the soil profile (Cumulative)	Medium negative
Clearing of vegetation increases flow speed and a lower infiltration tempo increases silt transport (Cumulative)	Medium negative
Chemicals, hazardous substances and waste used or generated during live span of the facility accumulate and pollute soil will become contaminated (Cumulative)	Medium negative
Freshwater Ecology Impacts	
Loss of Very High Sensitivity systems, namely the mainstem alluvial water course and a pan through physical disturbance although the proposed layout will avoid any of these systems.	Low negative
Impact on secondary alluvial water courses (Moderate Sensitivity), through physical disturbance	Low negative
Impact on all riparian and wetland systems through the possible increase in surface water runoff on riparian form and function through hydrological changes	Low negative
Increase in sedimentation and erosion	Low negative
Risks on the aquatic environment due to water quality impacts	Low negative
Cumulative impacts	Medium Negative
Terrestrial Fauna Impacts	
Loss and/or fragmentation of indigenous natural vegetation due to clearing;	Medium negative
Loss of individuals of plant species of conservation concern and/or protected plants	Low negative
Loss of faunal habitat and refugia	Low negative
Direct mortality of fauna due to machinery, construction and increased traffic	Low negative
Displacement and/or disturbance of fauna due to increased activity and noise levels	Low negative
Effects on physiological functioning of vegetation due to dust deposition	Low negative
Increased poaching and/or illegal collecting due to increased access to the area.	Low negative
Indirect impacts during the construction phase include the following	Low negative
Establishment and spread of alien invasive plants due to the clearing and disturbance of indigenous vegetation	Low negative

Impact	Significance (with mitigation)
Changes to behavioural patterns of animals, including possible migration away or towards the project area	Low negative
Increased runoff and erosion due to clearing of vegetation, construction of hard surfaces and compaction of surfaces, leading to changes in downslope areas.	Low negative
Cumulative Impacts	Medium negative
Avifaunal Impacts	
Construction of the solar PV plant and associated infrastructure	Low negative
Displacement due to habitat transformation	Medium negative
Collisions	Low negative
Entrapment	Low negative
Electrocution	Low negative
Decommissioning Impacts	Low negative
Cumulative Impacts	Low negative
Traffic Impacts	
Traffic Congestion	Low negative
Noise pollution due to increased traffic.	Low negative
Air quality affected by dust pollution	Low negative

As can be seen from the table above, there are a number of positive impacts associated with Dyasons Klip 5. The majority of the negative impacts are either low or medium. There are no high or very high negative impacts associated with Dyasons Klip 5.

Impact Statement

None of the participating specialists identified any impacts that remain high after mitigation. Due to the risk adverse approach followed for the development of the preferred layout, all the main sensitive features (most notably significant water courses, rocky outcrops, archaeology features, avifaunal buffers and visually sensitive areas) were avoided.

The affected area is considered suitable for development and there are no impacts associated with Dyasons Klip 5 that cannot be mitigated to a medium level. As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layout provided for the assessment, Dyasons Klip 5 can be supported from a terrestrial ecology, avifaunal, freshwater, visual, social, heritage and agricultural perspective.

A map showing the proposed activity in relation to the key sensitive features is attached as **Appendix D**. All sensitive features along with their appropriate buffers are shown in this plan. As required by the EMP, all areas outside of the proposed development footprint are to be demarcated as no-go areas.

Please refer to the table in the section above listing the key impacts and their significance post mitigation for the preferred alternative. This section must be read in conjunction with the suggested mitigation measures listed in Section 7 of this report.

The table below shows the listed activities applied for with a reference to where the impacts associated with each of the relevant listed are assessed by specialists.

Table 4: Specialist Impact Assessment of Listed Activities.

Listed activity as described in GN R.983, 984 and 985	Reference to Impact Assessment
Regulation 983 – Basic Assessment	
GN R983 Activity 11: <i>The development of facilities or infrastructure for the transmission and distribution of electricity-</i> <i>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or</i> <i>(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.</i>	Annexures E1, E2, E3, E4, E5, E7, E8, E12, E13 & E14.
GN R983 Activity 12:	Annexures E1, E8, E11 & E13

<p>The development of- (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;</p>	
<p>GN R983 Activity 19: <i>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic (i) a watercourse;</i></p>	Annexures E1, E8, E11 & E13
Regulation 984 – S&EIR	
<p>GN R984 Activity 1: The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area.</p>	Annexures E1, E2, E3, E4, E5, E7, E8, E10, E12, E13 & E14.
<p>GN R984 Activity 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	Annexures E1, E2, E3, E4, E5, E7, E8, E10, E12, E13 & E14.

VI. CONCLUSIONS & RECOMMENDATIONS

This environmental process is currently being undertaken to present the project to the public and potential I&APs, as well as to identify and assess environmental impacts, issues and concerns regarding the proposed development alternatives.

Cape EAPrac is of the opinion that the information contained in this BAR and the documentation attached hereto is sufficient to allow I&APs to gain an understanding of the potential negative and/or positive impacts associated with the development, in respect of the activities applied for. This environmental process has not identified any fatal flaws with the proposal and as such it is our reasoned view that the all I&APs and the competent authority have sufficient information to be able to apply their minds to the potential positive and negative impacts associated with this project. All specialists concur that the development as proposed (Layout Alternative 1, Access Road Alternative 1 and Grid connection alternative 1.2) can be considered for approval and that there are no reasons why the development should not be implemented. All impacts assessed range from high positive to medium negative and all very high, high and medium - high negative impacts have been avoided by the risk adverse approach to the design of this facility.

All stakeholders including the competent authority will have the opportunity to review the Draft BAR and the associated appendices (including all specialist studies), and provide comment, or raise issues of concern, directly to Cape EAPrac within the specified 30-day comment period. All comments received during this comment period will be included in the Final BAR submitted to DEFF for decision making.

This Draft BAR is available to all registered and potential I&AP's for a 30-day comment period.

It is the EAP's considered opinion that the preferred alternative (Layout Alternative 1), preferred access road (Access Alternative 1), and Grid Connection (Grid Alternative 1.2) be considered for approval by the competent Authority on condition that all other legislative approvals be obtained, and that the final EMPr be adhered to.

DRAFT BASIC ASSESMENT REPORT

1 INTRODUCTION

Cape EAPrac has been appointed by Dyasons Klip 5 (Pty) Ltd (hereafter referred to as the Applicant) as the independent Environmental Assessment Practitioner (EAP), to undertake the Basic Assessment process¹¹ required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the Dyasons Klip 5 facility near Upington and Keimoes in the Northern Cape Province of South Africa.

The solar energy facility will have a maximum generation capacity of 100MW_{AC} for distribution via the national electrical grid network. The project will connect to the national grid via a new on-site substation¹² and 132kV overhead distribution line, which will feed into the existing Eskom Upington Major Transmission Substation (MTS). The proposed facility also includes up to a battery energy storage system.

The purpose of this **Draft Basic Assessment Report** (BAR) is to describe the affected environment and the proposed project, as well as to present the site constraints identified by the various specialist during their site assessments, and identify & assess the potential impacts that this development may have on the receiving environment. This information is herewith presented to all registered and potential Interested and Affected Parties (I&AP's), including the competent authority for review and comment.

The Draft BAR is available to all registered and potential I&AP's for a 30-day review and comment period.

All comments received on the Draft BAR will be incorporated into the Final BAR that will be submitted to the Department of Environment, Forestry and Fisheries (DEFF) for consideration and decision making. After the department has taken made a decision on the application, this decision will be communicated to all I&AP's along with details of the appeal process.

1.1 RECOMMENDATION OF THIS EIA

None of the participating specialists identified any impacts that remain high after mitigation. Due to the risk adverse approach followed for the development of the preferred layout, all the main sensitive features, (most notably significant water courses, very high and high sensitivity terrestrial features as well avifaunal sensitive areas and their buffers) were avoided.

The affected area is considered suitable for development and there are no impacts associated with Dyasons Klip 5 that cannot be mitigated to a medium or low level. As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layout provided for the assessment, Dyasons Klip 5 can be supported from a terrestrial ecology, avifaunal, freshwater, visual, social, heritage and agricultural point of view, subject to the implementation of the management and mitigation measures detailed in this report.

It is the EAP's considered opinion that the preferred alternative (Layout Alternative 1), preferred access road (Access Alternative 1), and Grid Connection (Grid Alternative 1.2) be considered for

¹¹ The environmental process follows a basic assessment process, as it is located within the Upington Renewable Energy Development Zone, which was formally gazetted in 2018 in GN 113 and GN114.

¹² Reference to the on-site substation throughout this report includes both the Eskom as well as the IPP portion of this substation.

approval by the Competent Authority on condition that all other legislative approvals be obtained, and that the final EMPr be adhered to.

1.2 OVERVIEW OF ALTERNATIVE ENERGY IN SOUTH AFRICA AND THE NORTHERN CAPE

South Africa's generation capacity is dominated by coal-fired generation stations with a net output of 35.6 GWp, which represents over 85% of the country's total installed capacity of over 44 GW.

Globally, renewable energy (RE) has gained momentum, with a significant rise in the uptake of various technologies such as solar PV, wind energy, biogas and other biofuels, hydroelectricity, landfill gas, geothermal energy, and concentrated solar power (CSP).

Ministerial determinations by the South African government to procure Renewable Energy — such as the Integrated Resource Plan (IRP) for Electricity 2010-2030, which lays out the country's electricity future — have given growth in the renewable energy sector a significant boost.

South Africa's green economy, partly driven by the country's utility-scale Renewable Energy Independent Power Production Procurement Programme (REIPPPP), reflects these trends and is leading the way in some areas. According to Moody's, South Africa had the fastest growing green economy in the world in 2015. The REIPPPP, a key factor in this growth, is in its sixth year and has achieved remarkable successes. To date, the programme has:

- Procured over 6 300 MWp of RE generation capacity, of which over 2 500 MWp was connected and has been feeding electricity into the national grid since June 2016.
- Selected 102 preferred bidders to develop utility-scale projects across the country – with projects in every province across South Africa.
- Received a ministerial determination to procure a further 6 300 MWp of generation capacity. This is the second time capacity to the programme has been doubled – a testimony to its success.
- Attracted over R195 billion of investment into South Africa, with over 25% from foreign investors. In doing so, the programme, through local content requirements, has successfully stimulated the development of a local RE technology components manufacturing sector. Given the additional 6 300 MWp still to be procured, this sector is set to grow further.
- Achieved significant technology price reductions, with South Africa boasting some of the world's lowest clean energy costs.

Beyond these successes, the programme and, consequently, the utility-scale RE industry, is well positioned to continue contributing to South Africa's national development, as enshrined in the government's Strategic Infrastructure Projects (SIP) and the National Development Plan (NDP). The programme's socio-economic development (SED) and enterprise development (ED) mechanisms give successful project developers a unique opportunity to be competitive in their bidding strategy, while contributing meaningfully to the local and national economy. Project developers have fully embraced the SED/ED component of the REIPPPP, resulting in numerous inspiring contributions to priority areas on the government's developmental agenda. Among other areas, these contributions span community development, local economic development, skills development, and early childhood development.

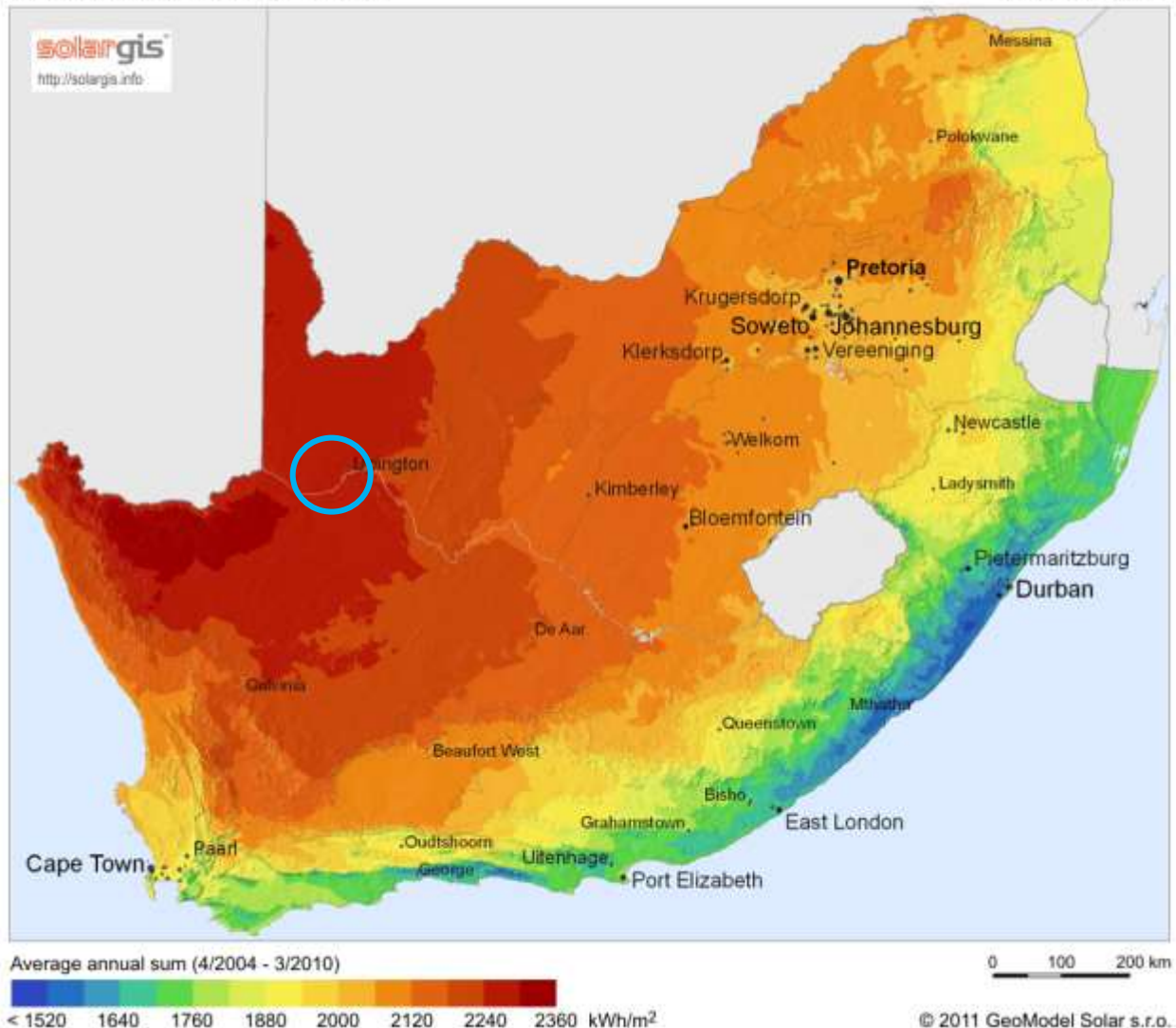
The recent uncertainties involving the state-owned utility, Eskom, highlight the need for reforms in an evolving energy sector, where electricity generation, transmission and distribution systems require unbundling. The interest from local municipalities in procuring RE generation capacity from independent power producers (IPPs) contributes further to the shift in the structure of the country's power sector.

Regionally, the Northern Cape is suggested by many to be the ideal location for various forms of alternative energy; this has resulted in a number of feasibility studies being conducted, not least of which, an investigation by the Industrial Development Corporation in 2010 into potential for photovoltaic, thermal, solar and wind power (Northern Cape Business website, 2010).

The northern area of the Northern Cape and Namibia boasts the highest solar radiation intensity anywhere in Southern Africa. Solar energy is therefore likely to be the most viable alternative energy source for the Northern Cape, although wind-power potential is generally good along the coast (State of the Environment, S.A, 2014)

Global horizontal irradiation

South Africa



The Northern Cape area is considered to have extremely favourable solar radiation levels over the majority of the year, making it ideal for the production of solar-power via photovoltaic (fixed and tracking panels) and concentrated (solar thermal) solar technology systems. Several solar irradiation maps have been produced for South Africa, all of which indicate that the Northern Cape area has high solar irradiation.

The Northern Cape is not too dusty, the land is flat and sparsely populated, and there are little to no geological or climate risks, meaning that the sun can be used year-round (BuaNews online, 2014). An advantage that the Northern Cape has over the Sahara Desert is the relatively wind-free environment that prevails in large portions of the province. A Clinton Climate Initiative (CCI) pre-feasibility study has found that South Africa has one of the best solar resources on the planet (Northern Cape Business website – solar power, 2015).

The introduction of private sector generation offers multiple benefits; it will contribute greatly to the diversification of both the supply and nature of energy production, assist in the introduction of new skills and in new investment into the industry, and enable the benchmarking of performance and pricing. The

Department of Energy (DoE), National Treasury (NT) and the Development Bank of Southern Africa (DBSA) established the IPP Office for the specific purpose of delivering on the IPP procurement objectives. The REIPPPP is a competitive bidding process used by national government to procure RE generation capacity in line with the national IRP for Electricity 2010-2030.

NOTE: It is the intention that Dyasons Klip 5 will submit a bid under this REIPPPP.

The Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2013) identified eight (8) Renewable Development Zones (REDZs). The REDZs identified areas where large scale renewable energy facilities can be developed in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country.

Dyasons Klip 5 is located within the Upington REDZ, which was formally gazetted in 2018. The area has therefore been identified as suitable for the establishment of renewable energy facilities, specifically large-scale solar farms.

1.3 ASSUMPTIONS & LIMITATIONS

The following assumption and limitations are relevant to this environmental assessment process:

- It is assumed that the information on which this report is based (specialist studies and project information, as well as existing information) is **correct, factual and truthful**.
- The proposed development is **in line** with the statutory planning vision for the area (namely the local Spatial Development Plan) as well as the Upington REDZ, and thus it is assumed that issues such as the cumulative impact of development in terms of character of the area and its resources, have been taken into account during the strategic planning for the area.
- It is assumed that all the relevant **mitigation and management measures** and agreements specified in this report will be implemented to ensure minimal negative impacts and maximum environmental benefits.
- It is assumed that due consideration will be given to the **discrepancies in the digital mapping** (PV panel array layouts against possible constraints), caused by differing software programs, and that it is understood that the ultimate/final positioning of solar array will only be confirmed on-site with the relevant specialist/s.
- The Department of Water and Sanitation **will consider the submission of a water use application** necessary for allowing the use of water from any water resource on site. The assumption is made that water provision is to be obtained from the local municipality.
- It is assumed that Stakeholders and Interested and Affected Parties notified of the availability of this will submit all relevant **comments within the designated 30-days** review and comment period, so that these can included in the Final BAR to be timeously submitted to the competent authority, the Department Environment, Forestry and Fisheries for consideration.

The assumptions and limitations of the various specialist studies are included in their respective reports attached in Appendix E.

2. PROPOSED ACTIVITY

The Applicant is proposing the establishment of a commercial PV facility, called Dyasons Klip 5, on the Remainder of Farm Dyason's Klip 454. The proposed site is located approximately 20 km south west of Upington and 17 km north east of Keimoes in the Kai !Garib Local Municipality (ZF Mgcawu District Municipality) in the Northern Cape. The description of the proposed activity has been summarised from the various technical reports (Technical Design Report, Water Demand Management Plan, Traffic Impact Assessment and Battery Energy Storage Report) that are all attached in Appendix E.

The technology under consideration is Solar PV modules mounted on either fixed-tilt or tracking structures. Other infrastructure includes inverter stations, internal electrical reticulation, internal roads,

an on-site switching station / substation, overhead powerline, battery energy storage system, auxiliary buildings, construction & permanent laydown areas and perimeter fencing & security infrastructure.

Auxiliary buildings include, inter alia, a control building, offices, warehouses, a canteen and visitors centre, staff lockers and ablution facilities, a gate house, and security offices.

Table 5: Component areas and percentage of total project area for Dyasons Klip 5.

PV Facility Component	Estimated Area	% of Total Area (± 267ha)	% of Farm Area (5725.28 ha)
PV array	± 250ha	93.6 %	4.3 %
Permanent and construction laydown areas	± 3ha	1.1%	0.05 %
Auxiliary buildings	± 1 ha	0.37 %	0.02 %
Internal roads	± 6.5ha	2.4 %	0.11 %
Substation	± 1 ha	0.37%	0.02 %
Battery Energy Storage System	± 4 ha	1.5%	0.07 %

The sections below depict the typical components associated with the Dyasons Klip 5.

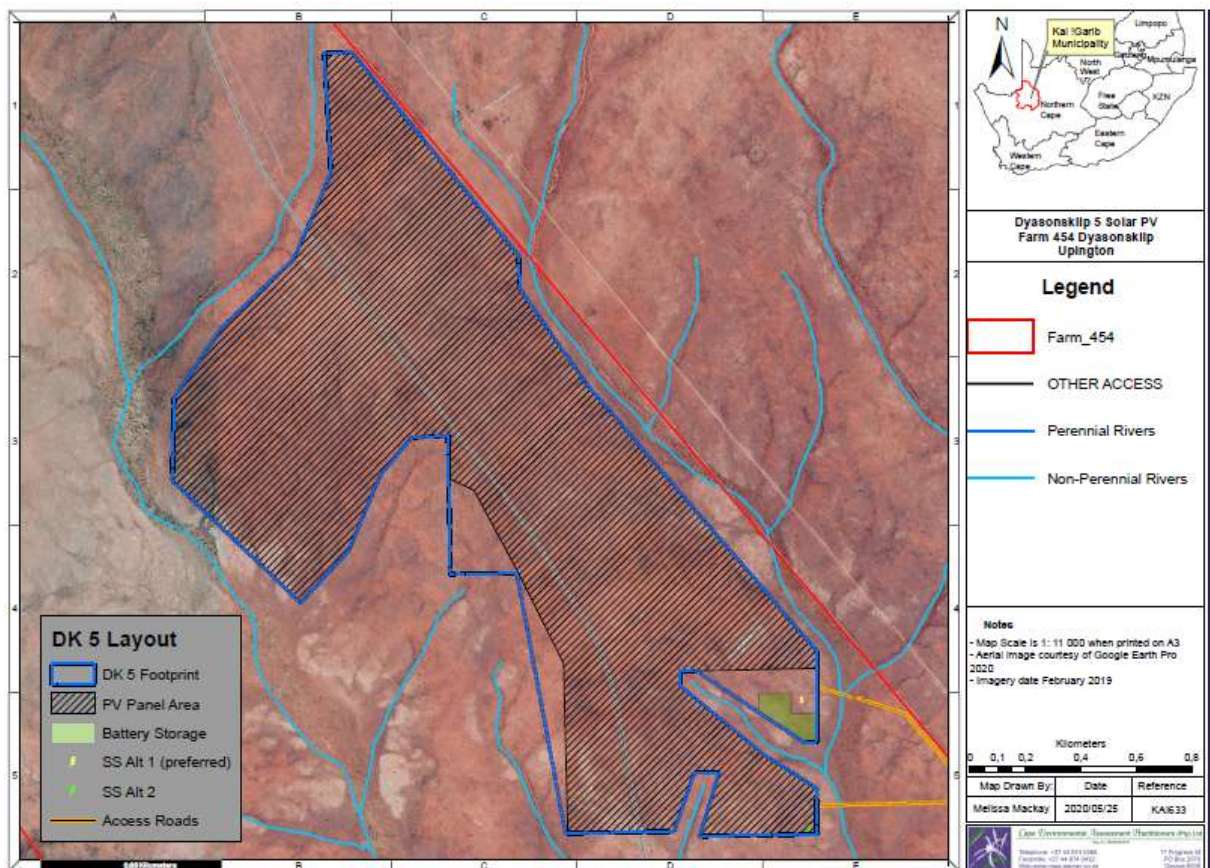


Figure 1: Simplified layout of Dyasons Klip 5. Please refer to the detailed site layout plan in Appendix D.

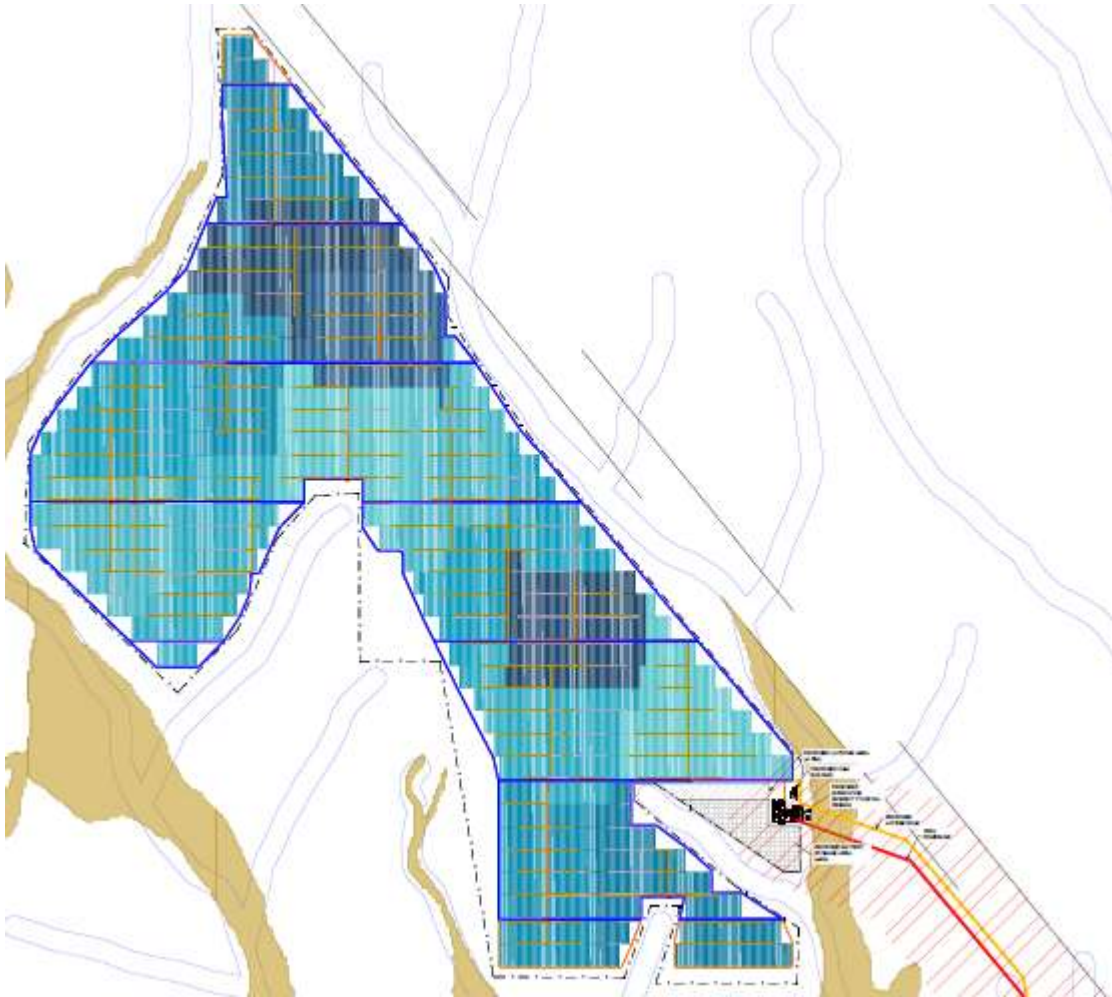


Figure 2: Excerpt from detailed site layout plan. The full scale plans are attached in Appendix D.

2.1 SOLAR ARRAY

Solar PV modules are connected in series to form a string. A number of strings are then wired in parallel to form an array of modules. PV modules are mounted on structures that are either fixed, north-facing at a defined angle, or mounted to a single or double axis tracker to optimise electricity yield.

2.2 MOUNTING STRUCTURES

Various options exist for mounting structure foundations, which include cast/pre-cast concrete, driven/rammed piles, or ground/earth screws mounting systems. Due to the presence of ephemeral washes within the PV footprint, driven/rammed piles and earth screws are the preferred mounting technology.



Figure 3: Cast Concrete Foundation (alternative mounting)



Figure 4: Driven/ Rammed Steel Pile (left) and Ground Screw (right) are the preferred mounting technology.

The impact on agricultural resources and production of these options are considered to be the same, however concrete is least preferred due the effort required at a decommissioning phase in order to remove the concrete from the soil, and therefore its impact on the environment. The Dyasons Klip 5 energy facility will therefore aim to make the most use of either driven/rammed piles, or ground/earth screws mounting systems, and only in certain instances resort to concrete foundations should geotechnical studies necessitate this. This BAR also proposes that no concrete mounting structures be used for sections of PV infrastructure crossing secondary water courses.

2.3 AUXILIARY BUILDINGS

The auxiliary buildings will comprise of the following as a minimum:

- Control Building / Centre;
- Office;
- Warehouses;

- Canteen and Visitors Centre;
- Staff Lockers and Ablution; and
- Gate house / security offices.

The total area occupied by auxiliary buildings is approximately 1 ha (this area excludes the on-site substation, which is discussed separately).

2.4 BATTERY ENERGY STORAGE SYSTEM

The proposal includes the installation of a battery energy storage system situated on a 4ha footprint in the south western section of the project footprint.

Different battery storage technologies, such as lithium-ion (Li-ion), zinc hybrid cathode, sodium ion, flow (e.g. zinc iron or zinc bromine), sodium sulphur (NaS), zinc air and lead acid batteries, were considered for Dyasons Klip 5. Compared to other battery options, Li-ion batteries are highly efficient, have a high energy density, are lightweight and have a lower environmental risk. As a result of the declining costs, Li-ion technology now accounts for more than 90% of battery storage additions globally.

Therefore, in line with the above, it is proposed that Lithium Battery Technologies be considered as the preferred technology.

Traditional utility-scale Li-ion battery energy storage systems include the following main components:

- Battery cells → modules → packs → racking system (DC).
- Storage container (HVAC system, thermal management, monitors and controls, fire suppression, switchgear, and energy management system).
- Power conversion system (bidirectional inverter to convert AC to DC for battery charging and DC to AC for discharging).
- Transformer (to step up 480-V inverter output to 12–66 kV).

Figure 5 below illustrates the components that generally make up the primary battery energy storage system, Figure 6 is a typical flow diagram of a PV plant with battery storage and Figure 6 is a conceptual example of a typical battery energy storage system.

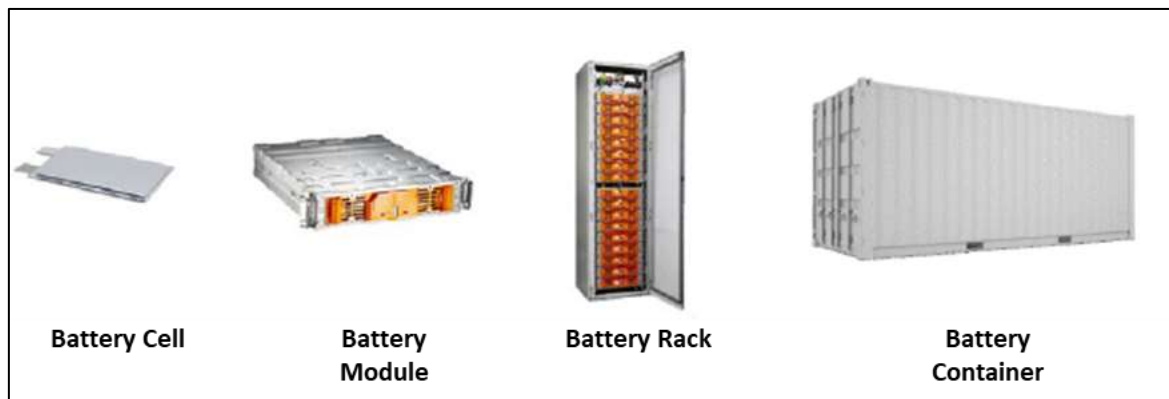


Figure 5: Typical Battery Energy Storage System Components.

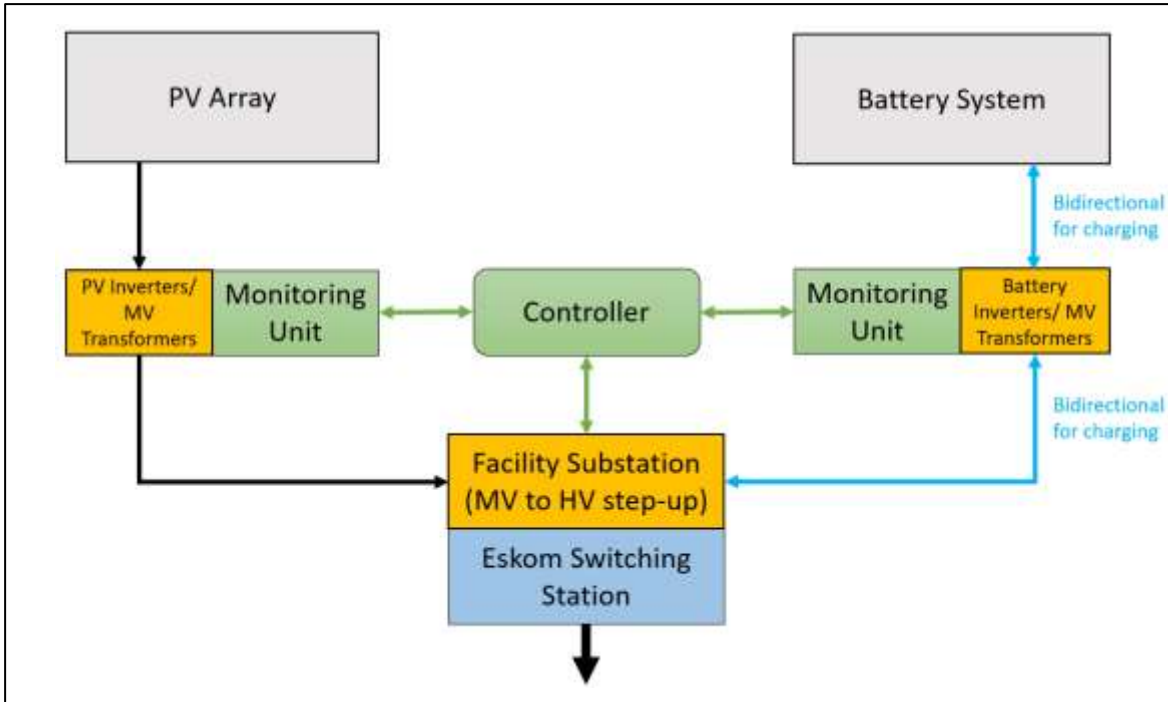


Figure 6: Typical flow diagram of PV plant with battery energy storage system



Figure 7: Pivot Power's proposed 50MW lithium-ion battery energy storage system in Kemsley, Kent.

The battery energy storage system will be constructed on a 4ha footprint adjacent to the on-site substation as shown on the site layout plan in the Appendix D.

2.5 WASTE MANAGEMENT

A summary of the waste management actions associated with Dyasons Klip 5 are provided below. The waste management during construction and operation is discussed in more detail in the EMP and Waste Management plan appended.

2.5.1 Solid waste

Solid waste during the construction phase will mainly be in the form of construction material, excavated substrate and domestic solid waste. All waste will be disposed of in scavenger proof bins and temporarily placed in a central location for removal by the contractor. Any other waste will be removed once construction is complete and disposed of at a registered waste facility. Excess excavation material will either be spoiled offsite at a registered facility or used for landscaping berms within the overall PV footprint.

2.5.2 Sewerage

During the construction phase, chemical ablation facilities will be utilised. These ablation facilities will be maintained, serviced and emptied by an appointed contractor, who will dispose of the effluent at a licensed facility off site. Once construction is complete, the chemical ablation facilities will be removed from the study area. A conservancy tank which will be regularly emptied by a registered service provider will be installed at the Operations and Maintenance building.

2.6 HAZARDOUS SUBSTANCES AND WASTE

During the construction phase, the following hazardous substances are anticipated to be present on site:

- Cement powder and fly ash associated with the batching plant;
- Petrol/diesel for trucks/ cranes/ bulldozers; and
- Limited amounts of lubricants and transformer oils.
- Defunct / damaged or end of life battery cells / units.
- Damaged PV Modules

Temporary storage and disposal of hazardous waste will be done in compliance with relevant legislation and the EMPr. A formal battery recycling plan will be developed prior to commencement of construction.

2.7 GRID CONNECTION AND CABLING

Dyasons Klip 5 intends to connect to the Upington MTS (400/132 kV) located \pm 13km to the east of the site, via the 132kV Dyasons Klip 5 on-site substation/ switching station located within the south eastern boundary of the site. The proposed Dyasons Klip 5 on-site substation/ switching station will be approximately 100m x 100m in total; \pm 100m x 50m for the facility side, and \pm 100m x 50m for the Eskom Switching Station side. A step-up transformer/s will be installed to transmit electricity via a 132 kV OHL directly from the Dyasons Klip 5 Substation and onto the Upington MTS. The OHL is envisaged to be \pm 13km in length, a maximum height of 32m and occupy a servitude width of between 35 and 52m. A 100MWac installation will require specific electrical components to meet the national grid code requirements in order to generate and supply electricity into the national grid.

The conversion from DC (modules) to AC is achieved by means of inverter stations. A single inverter station is connected to a number of solar arrays and will be placed along the internal service roads for ease of access. A number of inverter stations will be installed for the PV facility (either centralised or string inverters), each of which is connected to the on-site / facility substation.

Final placement of the inverter stations and on-site/facility substation will need to take ground conditions into consideration. Interconnecting electrical cabling will be trenched where practical and follow internal access roads to the greatest extent. A number of grid connection alternatives have been considered and assessed. These are described in more detail in Section 2.11 of this report.

2.8 ACCESS ROUTES AND INTERNAL ROADS

The proposed Dyasons Klip 5 is accessible via the N14 National Road which connects Upington and Keimoes in a south-west direction.

Preferred point of access will be via the existing Dyasons Klip 1 and 2 site entrance off the N14 Road. Approximately. A large portion of the existin road between the N14 and Dyasons Klip 1 and 2 will be utilized prior to running along the East of the already constructed. It then utilises a section of road authorised as part of the Dyasonsklip Solar Energy Facility 1 (not yet constructed). This AR therefore considers the impact of the road from Dyasonsklip Solar Energy Facility 1 to Dyasons Klip 5.

Two access road alternatives have been assessed as shown in the image below and described in more detail in Section 2.1.1 of this report.

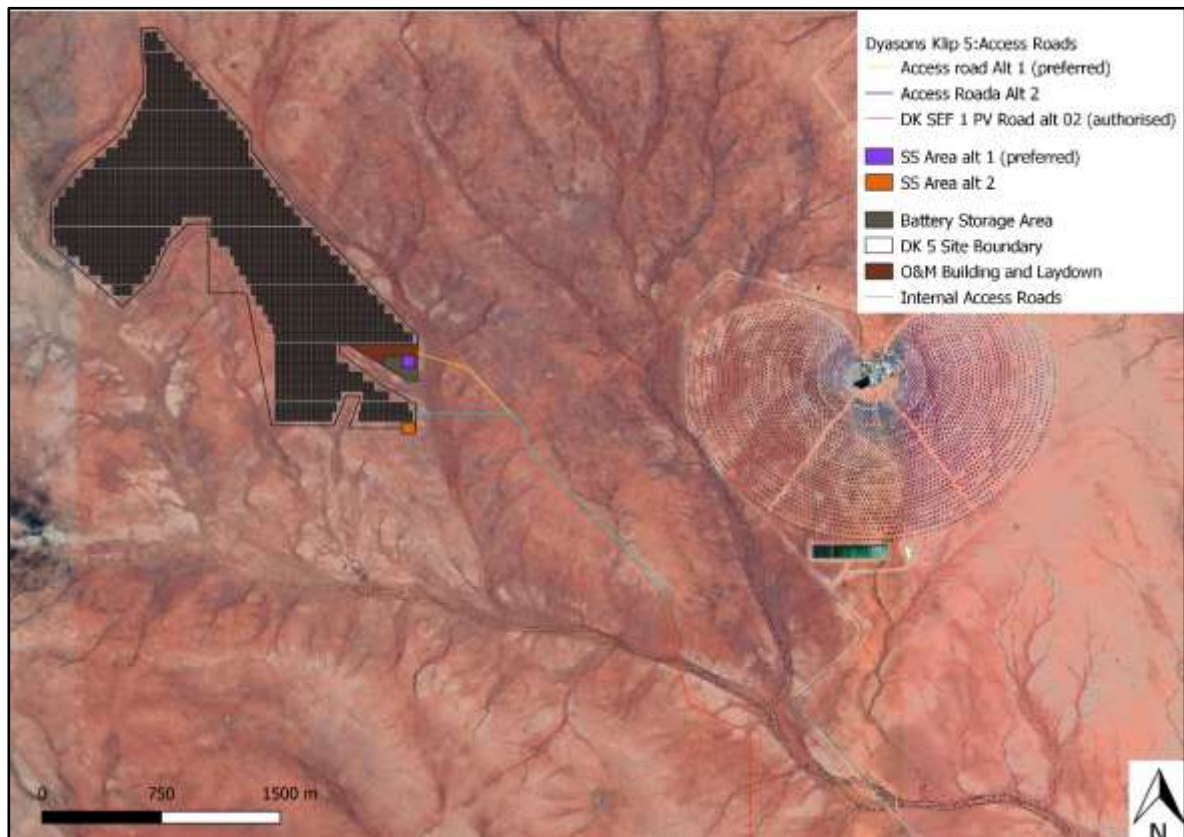


Figure 8: Access Routes to Dyasons Klip 5 Site Entrance

The internal road network of Dyasons Klip 5 will be gravelled roads, approximately 5m in width, within the solar array and around the perimeter. Roads located in-between the solar modules will be un-surfaced tracks to be used for maintenance and cleaning of solar PV panels.

A detailed Traffic Impact Assessment (TIA) has been compiled for the project. This TIA concluded that Access road alternative 1, is deemed the preferred access route, as it allows relatively direct access to the proposed site and does not infringe on existing solar energy facilities. Precautionary measures will need to be taken to mitigate the risk of ground disturbances where access roads will be constructed. Special attention must be given to drainage, water flow and erosion by applying appropriate building methods and implementing the stormwater management plan.

2.9 PROJECT NEED AND DESIRABILITY

In keeping with the requirements of an integrated Environmental Impact process, the DEA&DP¹³ *Guidelines on Need and Desirability (2010 & 2011)* were referenced to provide the following estimation of the activity in relation to the broader societal needs. The concept of need and desirability can be explained in terms of its two components, where *need* refers to *time* and *desirability* refers to *place*. Questions pertaining to these components are answered in the sections below.

The section in 1.2 above considers the overall need for alternative, so-called 'green energy' in light of the known environmental burdens associated with the impact of coal power generation through which most of our country's electricity is currently being generated. Associated aspects such as air pollution, water use and carbon tax are discussed in order to further explain the need and desirability for 'green energy' projects in general.

This section summarises the need and desirability of the project and must be read in conjunction with social impact assessment in Appendix E7 which describes the project in terms of existing policy in great detail.

2.9.1 Feasibility consideration

The commercial feasibility for the proposed 100MW_{AC} Dyasons Klip 5 to be built on private land between Upington and Keimoes, has been informed by its contextual location, and economic, social and environmental impacts and influence (with due consideration to the project falling within a REDZ). The project has gathered sufficient information and conducted studies of the site and the region to make qualified and reliable assumptions on the project's various impacts.

2.9.1.1 Solar Resource & Energy Production

The arid climate experienced in the Northern Cape lends itself to the availability of high levels of solar energy. Considering the steady nature of the solar radiation at the Dyasons Klip 5 site, the resource is sufficient to guarantee a positive return on investment.

2.9.1.2 Solar Farm & Grid Connection

Among the outstanding characteristics of the Dyasons Klip 5 site is its exceptionally flat nature, sufficient medium-low sensitivity environments (the proposed layout plan was able to avoid all areas with a high sensitivity and very high sensitivity) and accessible location, facilitating the delivery of bulky PV panel infrastructure, and the construction and assembly process. The proximity of the site to the N14 decreases the impact on secondary roads and natural habitat from the traffic going to and from Dyasons Klip 5 during construction and operations. The close proximity of the existing Eskom Upington MTS also allows for connection via a relatively short distribution line. As the site is not used for intensive agricultural purposes and already contains existing PV facilities, Dyasons Klip 5 will not significantly interfere with the agricultural productivity of the area.

2.9.1.3 Social impact

Please refer to the Social Impact Assessment Report in Annexure E7 for a detailed description of the social environment. The Northern Cape region is economically challenged due to its arid climate, challenging agricultural conditions, lack of water and limited natural resources (away from the Orange River). The local economy, mainly supported by limited agriculture, simply isn't enough to accommodate the high level of unemployment.

Private sector development is seen to offer opportunities to access Enterprise Development funds of the main mining groups. This can contribute to entrepreneurial activities linked to their supply chain. The

¹³ The Western Cape Provincial guidelines on Need and Desirability were considered in the absence of National and Northern Cape Guidelines.

same applies to the investment, in terms of employment opportunities and entrepreneurial activities, associated with renewable energy projects.

Power generation is one of the rare growth opportunities for the Northern Cape (and even more so within the REDZ such as where Dyasons Klip 5 is proposed) due to the high solar irradiation levels and its strategic position relative to the National Transmission Network. This setup creates unprecedented growth opportunities for the area and the establishment of a renewable energy project is considered important to diversify and complement the economic development of the region.

2.9.1.4 Employment & Skills Transfer

The benefits of renewable energy facilities to local regions are not confined to the initial investment in the project. They also provide a reliable and on-going income for landowners and municipality, creating direct employment opportunities for locals, as well as flow-on employment for local businesses through provision of products and services to the project and its employees.

Dyasons Klip 5 will have a positive impact on local employment. During the estimated 18 month construction phase, the project will employ approximately 300 – 400 individuals of various qualifications. The majority will be provided by the local labour market. During operations, Dyasons Klip 5 is expected to have up to 60 employment opportunities ranging from security staff to administration and artisans. Due to the fact that there is limited local skilled labour in the field of renewable energy, the employment structure will likely consist of local and outside capacity. To guarantee successful operations over the lifetime of the investment, Dyasons Klip 5 will likely use the skills of outside labour to cross-train local specialists. This cross training and skills development will take place especially in the area of technical maintenance and administration.

2.9.2 Need (time)

The need of the facility can be summarised by considering and answering a number of questions to determine whether the facility is needed at this particular time.

Table 6: Details regarding the need for the Dyasons Klip 5 PV facility at this point in time.

Consideration	Applicability to Dyasons Klip 5
Is the land use considered within the timeframe intended by the existing approved Spatial Development Framework (SDF)? (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP?	Yes, the employment of renewable energy technology / development has a spatial strategic place in the Kai !Garib Municipality SDF while the need for a policy on the development of sustainable solar energy facilities has been identified as Key Development Priority / Project.
Should the development occur here at this point in time?	Yes, the proposed Dyasons Klip 5 energy facility is to be located outside the Upington and Keimoes Urban Edges urban edge, but within a legislated REDZ, and would promote diversification to the local economy as well as serve as a catalyst for further expansion in the stream of sustainable renewable energy development within these REDZ (identified as a priority development strategy IDP & SDF). There are currently 4 operational renewable energy developments in very close proximity to the proposed Dyasons Klip 5 (2 of which are on the same property).
Does the community / area need the activity and the associated land use concerned?	The Kai !Garib Municipality identified the opportunity for a renewable energy project through their SDF and IDP processes, which include public participation. The proposed Dyasons Klip 5 development will allow for a diversification of employment, skills and contribute to the potential development of small business associated with its construction, operation and maintenance activities. The proposed Dyasons Klip 5 development will contribute electricity to the constrained Northern Cape and National electrical network, contributing to a provincial and national need. Dyasons Klip 5 has been designed in such a way so

Consideration	Applicability to Dyasons Klip 5
	as to avoid or minimise potential negative impacts of the local environment while enhancing potential positive impacts, locally and regionally. The social specialist undertook interviews with various municipal officials as part of the Social Impact Assessment. The proposed development was supported by Mr McKay and Mr Clarke, the Director of Planning and Head of Engineering Services respectively at the Kai !Garib Municipality.
Are the necessary services with adequate capacity currently available?	Some services are existing but some new services are required. Dyasons Klip 5 requires the installation of an overhead power line to connect to the existing Eskom MTS Upington Substation (feed into the national grid system), as well as an access road to the development site from the N14 (following the existing Dyasons Klip 1 and 2 access road for most part). The cost of supplying the new infrastructure will be covered by the Applicant, and the impacts thereof have been assessed in this environmental process. The water required for the construction and operation of Dyasons Klip 5 will be sourced from the Kai !Garib Municipality and will be supplemented by stored rainwater (proof of confirmation of availability included in Annexure G6). The applicant may at a later stage consider the utilisation of groundwater to supplement this supply, this will however be subject to approval in terms of the National Water Act. Construction waste (general waste) will be disposed of at the existing landfill sites - confirmation of capacity of the municipal landfill site to accept the estimated volumes of general waste is included in in Annexure G6. Defunct and damaged modules and batteries will be returned to the supplier for recycling and/or disposal.
Is this development provided for in the infrastructure planning of the municipality?	Yes. Attracting private investment and the employment opportunities associated with renewable energy development are identified as priority strategies to create sustainable urban and rural settlements.
Is this project part of a national programme to address an issue of national concern or importance?	Yes. In order to meet the increasing power demand within South Africa, Eskom has set a target of 30% of all new power generation to be derived from independent power producers (IPPs). The Applicant is one such IPP which intends to generate up to 100MW of electricity from the proposed Dyasons Klip 5, for input into the national grid (via the existing Upington MTS Substation). The proposed Dyasons Klip 5 is also situated within a legislated REDZ.

2.9.3 Desirability (place)

The desirability of the facility can be summarised by considering and answering a number of questions to determine whether the facility is needed at this place.

Table 7: Details regarding the desirability for the Dyasons Klip 5 PV facility at this particular.

Consideration	Applicability to Dyasons Klip 5
Is the development the best practicable environmental option for this land / site?	The target property is outside the Upington and Keimoes Urban Edge, within a legislated REDZ and as such will unlikely be considered for an alternative land use such as urban development. The property has a poor agricultural potential due to the arid climate and other limiting factors.

Consideration	Applicability to Dyasons Klip 5
	These factors have rendered the property vacant with limited land use option alternatives.
Would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?	No. According to the IDP, attracting Renewable Energy Investment is seen as an IDP Strategy and economic driver to alleviate unemployment and poverty and “to ensure sustainable economic and social transformation in the District”. The performance of which would be reflected in the development of a Renewable Energy Strategy and Policy for the District (IDP, 2012-2018). The IDP furthermore specifically promotes socio-economic development, SMME’s, job creation and private sector investment and identifies solar energy as a growth opportunity within the local economy.
Would the approval of this application compromise the integrity of the existing approved environmental management priorities for the area?	Unlikely. According to the national vegetation map (Mucina & Rutherford 2012), the solar development site lies entirely within a vegetation type that is classified as Least Threatened, namely Kalahari Karroid Shrubland and Bushmanland Arid Thicket (ecosystems that cover most of their original extent and which are mostly undamaged, healthy and functioning). Portions of the grid connection are situated in a CBA 2 area – the reasoning for this is that it is an aquatic support area to the orange river (which is considered an important fish habitat). The freshwater specialist has however confirmed the impact of Dyasons Klip 5 on these systems will be minimal. Considering the extent of this relatively intact ecosystem type, and the fact that the site is not highly sensitive (there are no unique, threatened or otherwise unique habitats present which are not widely available in the wider landscape), it can withstand some loss of natural area through development.
Do location factors favour this land use at this place?	<p>Yes. The region has been identified as being one of the most viable areas for solar energy generation due to the following factors:</p> <ul style="list-style-type: none"> • Excellent solar radiation (compared to other regions); • Close to existing main transport routes and access points; • Close to connection points to the local and national electrical grid; • Outside Critical Biodiversity 1 and 2 Areas (with the exception of a portion of the grid connection which passes through a CBA2 area); and • Largely outside of Ecological Support Areas. <p>The proposed site is furthermore situated within a legislated REDZ and as such has been subjected to a detailed SEA in which highly sensitive landscapes were already excluded from these areas.</p> <p>The ecological sensitive areas on and surrounding the solar site have informed the optimal location and layout for the proposed solar project, with minimal impact to the receiving environment, subject to implementation of mitigation measures.</p>
How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas?	The alternatives considered for the solar development have been iteratively designed and informed by various investigations and assessments that considered both the natural and cultural landscapes. The natural and culturally sensitive areas have been identified and where possible, avoided to prevent negative impacts on such areas.

Consideration	Applicability to Dyasons Klip 5
How will the development impact on people's health and wellbeing?	The site is located outside of the Upington and Keimoes Urban Edge and as a result is unlikely to impact negatively on the community's health and wellbeing. The closest populated settlement is situated on Kanoneiland and Ses Brugge, situated more than 8km and 6km from the site respectively.
Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?	Unlikely. The next best land use alternative to the solar facility is limited agriculture (the status-quo). However, the proposed solar development site does not have any significant agricultural value and has not been utilised for any intensive agricultural purposes. The carrying capacity of the site is too low to generate noteworthy financial benefit from agricultural activities. The development of the proposed Dyasons Klip 5 facility would constitute the loss of less than 267ha of the overall property. The economic benefits and opportunities that the proposed solar development holds for the landowner and the local economy of the municipal area cannot be recovered from the current or potential agricultural activities. The opportunity costs in terms of the water-use requirements of Dyasons Klip 5 are within acceptable bounds if one considers the minimal demand on the resources.
Will the proposed land use result in unacceptable cumulative impacts?	Unlikely. Due to the fact that the Northern Cape, and specifically sites within the legislated REDZ have been identified as an area with high potential for renewable energy generation: solar irradiation and availability of vast tracts of land with low sensitivity; there are a number of on-going applications in the region already (with 2 facilities already constructed on the property). The potential for further, future solar developments in the area cannot be discounted (as many have already been approved or are in progress). However these will have synergistic benefits for the economy and growth of the area, while the contribution to cumulative habitat loss in the area associated with this and potential future solar development would be relatively small in relation to the land resources available, with low impacts restricted to the local area.

2.10 SITE SELECTION PROCESS

The site selection process followed a two-stage approach; firstly, to select the property for the proposed development (Remainder of Farm Dyason's Klip 454), and secondly, to select the footprint of the proposed development within the farm portion. A site selection matrix supplied by the applicant is attached in Annexure E11.

2.10.1 Property Selection

2.10.1.1 Proximity to towns with a need for socio-economic upliftment

The Dyasons Klip 5 site is situated approximately 30 km south west of Upington in the Northern Cape Province. The Kai !Garib Local Municipality is typically masked with high rates of unemployment and poverty, which is largely the case throughout the Northern Cape Province. To this extent, Dyasons Klip 5 is situated near the towns of Upington, Keimoes and Kakamas. Consequently, local labour would be easy to source, which fits in well with the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) economic development criteria for socio-economic upliftment. Currently, a large

proportion of local labour is used in the mining and agricultural industry. There are several negatives related to agricultural employment including that it is very seasonal, and it is not always in close proximity to the homes of farm workers, forcing workers to travel large distances on a daily basis to reach their place of employment. Over the years, employment in the mining sector has shown to be very volatile. The Northern Cape has been identified as a node for the development and construction of solar PV within South Africa and the locality of the Dyasons Klip 5 site would therefore present new opportunities for local skilled labour through previous work experience on surrounding preferred bidder plants.

2.10.1.2 Access to grid

The new Upington MTS is in close proximity to the Site. There are 3 options (considered as 400m wide corridors) proposed to connect Dyasons Klip 5 to the Eskom Upington MTS:

- Alternative 1 runs past (switches into) the Dyasonsklip Solar Energy Facility 1 substation, along the north and then western boundary of DK3 into DK1/2 Switching Station, and then parallel to the existing 132kV line all the way back to Upington MTS.
- Alternative 2¹⁴ runs past (switches into) the Dyasonsklip Solar Energy Facility 1 substation, runs down the eastern boundary, and then parallel to the existing 132kV line all the way back to the MTS.
- Alternative 3 runs past (switches into) the Dyasonsklip Solar Energy Facility 1 substation, runs down the eastern boundary, and then parallel to the proposed 400kV Aries-Upington line all the way back to the MTS.

Ease of access into the Eskom electricity grid is vital to the viability of a solar PV facility. Projects which are near a connection point and/or demand centre are favourable, and reduce the losses associated with power transmission. In addition, Eskom's '2040 Transmission Network Study' has drawn on various scenarios to determine the grid's development requirements, as well as to identify critical power corridors for future strategic development, of which the Northern corridor is one of these. The national power corridors consisting of five transmission power corridors of 100 km in width have been gazetted by the Department of Environmental Affairs (DEA) following the outcome of the strategic environmental assessment (SEA) which aimed to identify environmentally acceptable routes over which long-term environmental impact assessment (EIA) approvals can be secured. Dyasons Klip 5 falls into the Northern corridor as shown in the figure below.

2.10.1.3 Need and Desirability of the Development at the preferred site location

The Upington area has been ear-marked as a hub for the development of solar energy projects due to the viability of the solar resource for the area, and this area is included in the solar corridor which has been identified by the Northern Cape Spatial Development Framework. The overarching objective for the solar energy facility is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. From a regional site selection perspective, this region is preferred for solar energy development by virtue of its annual solar irradiation values. From a local perspective, the Dyasons Klip 5 site has specifically been identified as being highly desirable for the development of a solar PV facility due to its suitable topography (i.e. in terms of slope and local topography), site access (i.e. to facilitate the movement of machinery during the construction phase), land availability, the extent of the site, and enabling optimal placement of the infrastructure considering potential environmental sensitivities or technical constraints, as well as the consolidation of renewable projects within an already identified node.

¹⁴ Grid Connection Alternative 2 (along with sub-station position 1) is the preferred grid connection alternative identified in this environmental process.

2.10.1.4 REDZ

The proposed Dyasons Klip 5 site falls within the gazetted geographical areas / focus area most suitable for the rollout of the development of solar energy projects (called “Upington Solar priority area”) within the Northern Cape Province.

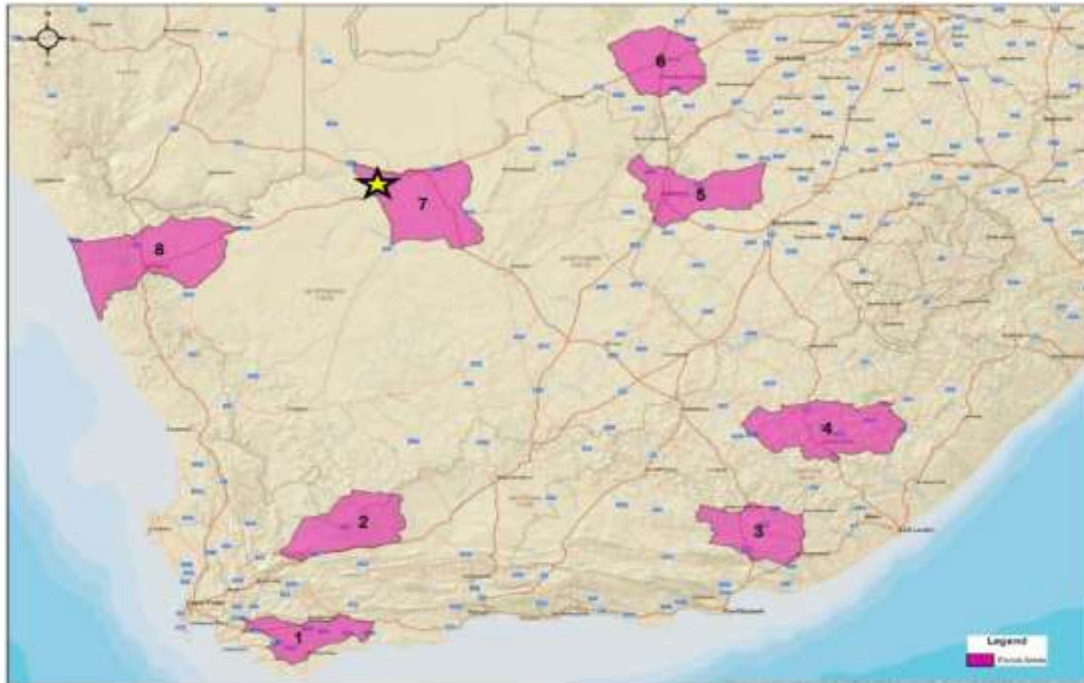


Figure 9: Renewable Energy Development Zones (CSIR 2014); Dyasons Klip 5 is shown by the yellow star and falls within REDZ 7.

2.10.1.5 Agricultural Potential

The unfavourable climate of the Kalahari environment greatly decreases agricultural potential. The area is known to be an agricultural hub but the Remainder of Farm Dyason’s Klip 454 is located too far from the Orange River and its fertile banks to ever be considered for high intensity grazing and/or cultivation practices. The development does not encroach on land that is currently being used for grape production which is crucial for the economy of South Africa and the Upington area.

2.10.1.6 The Solar Irradiation

The economic viability of a solar facility is directly dependent on the annual direct solar irradiation values. The Northern Cape receives the highest average daily direct normal irradiation (DNI) in South Africa. In addition, Upington exhibits some of the best solar irradiation in South Africa, and the world. Global horizontal irradiation (GHI) for the Upington region varies between 2250 and 2300 kWh/m²/annum. The GHI for the Dyasons Klip 5 site is in the region of approximately 2278 kWh/m²/annum. The high irradiation level is an important factor in a highly competitive bidding environment under REIPPPP, the economic viability of a project is a critical success factor.

2.10.1.7 Proximity to access road for transportation of material and components

The proximity of the site to the N14 decreases the impact on secondary roads from traffic during the construction and operation phases. As material and components would need to be transported to the Dyasons Klip 5 site during the construction phase of the project, the accessibility of the Dyasons Klip 5 site was a key factor in determining the viability of the project, particularly taking transportation costs

(direct and indirect) into consideration and the impact of this on project economics and therefore the ability to submit a competitive bid under the Department of Energy's (DoE) REIPPPP.

2.10.1.8 Upington airport

The Upington airport is located approximately 26km to the north-east of the Dyasons Klip 5 site, and therefore will not pose any threat to the aviation industry.

2.10.1.9 Landowner Support

The selection of a site where the landowner is supportive of the development of renewable energy is essential for ensuring the success of the project. The landowner does not view the development as a conflict with their current land use practices. The support from the landowner for the development to be undertaken on the affected property has been solidified by the provision of the consent for the project to proceed on the property through the signing of a land lease agreement with the developer. The applicant, Dyasons Klip 5 (Pty) Ltd, has an established relationship with the landowner of the Remainder of Farm Dyason's Klip 454, due to developing several PV projects on surrounding landowners' land. Based on the above list of findings it was decided that the proposed Site would be suitable for such a development. Based on the extent of Remainder of Farm Dyason's Klip 454, it is believed that the site could accommodate a further 100 MW of contracted capacity permitted under the DoE's RFP, and furthermore, that all this power would be able to be absorbed into the national grid via the Upington MTS.

2.10.2 Footprint selection

The selection of the proposed study area within the Remainder of Farm Dyason's Klip 454 followed a risk adverse, bottom up approach to ensure that the impacts of the proposed developments can be avoided as far as possible. This avoidance approach reduces the degree of mitigation required in order ensure that potential environmental impacts are within acceptable levels.

This approach was achieved by means of appointing the ecology, avifaunal, heritage (archaeology¹⁵) and aquatic experts to undertake a site sensitivity analysis of the entire property prior to the design of the layout. The following sensitive features were identified by the participating specialists during the site sensitivity investigations. Please refer to the discussion in Section 5 of the report, where site sensitivities are discussed in further detail.

- Watercourses (including both, major, secondary and ephemeral washes);
- Pans;
- Koppies;
- Protected plant species;
- Avifaunal sensitive areas and buffers; and
- WULA regulated zones.

¹⁵ The Archaeology specialist did not identify any specific features that need to be incorporated into the layout design. The areas avoided from other specialist disciplines (pans, koppies, main water courses) are the same landscape features likely to be of archaeological significance. Some stone cairns were identified within the project footprint, but it is unlikely that these constitute graves.

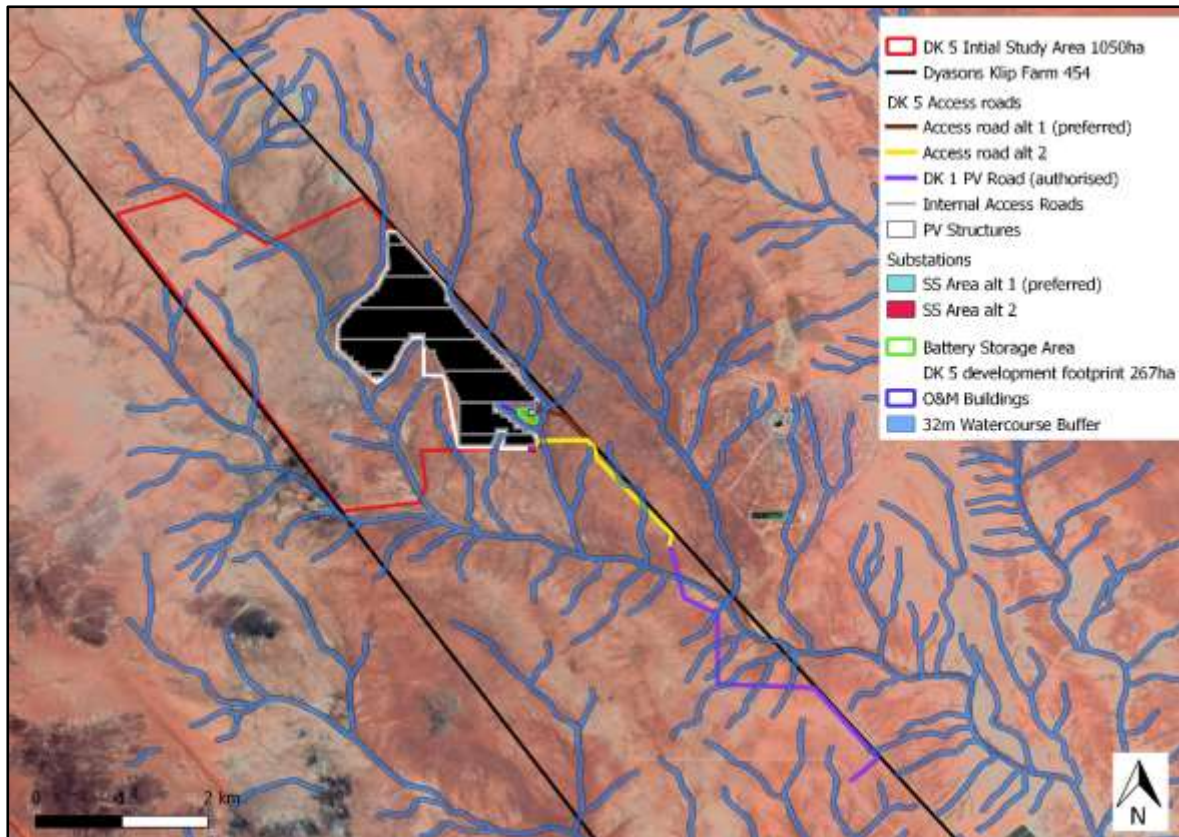


Figure 10: Sensitive features on Remainder of Farm Dyason's Klip 454 as identified by the participating specialists. These include low, medium, and high sensitivity features. Please refer to the full-scale sensitivity plans attached in Appendix B.

The initial study area (including alternative footprints) was then developed to utilise areas where the least sensitive features occurred. The specialists were then engaged in detail throughout the layout development phase to ensure that the preferred alternative resulted in the lowest overall impact. See the section below for a discussion on this process.

2.11 CONSIDERATION OF ALTERNATIVES

Dyasons Klip 5 will consist of solar PV technology with fixed, single, or double axis tracking mounting structures, with a net generation (contracted) capacity of 100MW_{AC} as well as associated infrastructure, which will include:

- On-site switching-station / substation;
- Auxiliary buildings (gatehouse and security, control centre, office, warehouse, canteen and visitors centre, staff lockers etc.);
- Inverter-stations, transformers, and internal electrical reticulation (underground cabling);
- Access and internal road network;
- Laydown area;
- Battery energy storage system with a footprint of up to 4ha;
- Dyasons Klip 5 will connect from the onsite sub-station to the Upington MTS (400/132 kV),
- Rainwater tanks; and
- Electrified Perimeter fencing and security infrastructure.

As mentioned earlier in this report, a large identified initial assessment area on Farm Dyason's Klip 454 was analysed by relevant specialists to determine the property sensitivity. The layout design took these sensitivities into account and numerous iterations of the layout occurred through a consultative design process in conjunction with the specialists. The preferred layout proposed in this report has thus gone

through multiple stages of refinement to get to its current stage. This layout has been accepted by all specialists as being the best practicable environmental option. For the purposes of this assessment, we will provide chronological details on the alternatives considered throughout this design phase and will provide a detailed assessment of the preferred alternative and the no-go alternative.

2.11.1 Initial Assessment Area

An initial/ conceptual area of ± 1050 ha was identified during the planning phase of the Basic Assessment for Dyasons Klip 5. The initial/ conceptual area is located in the north eastern portion of the Remainder of Farm Dyason's Klip 454.

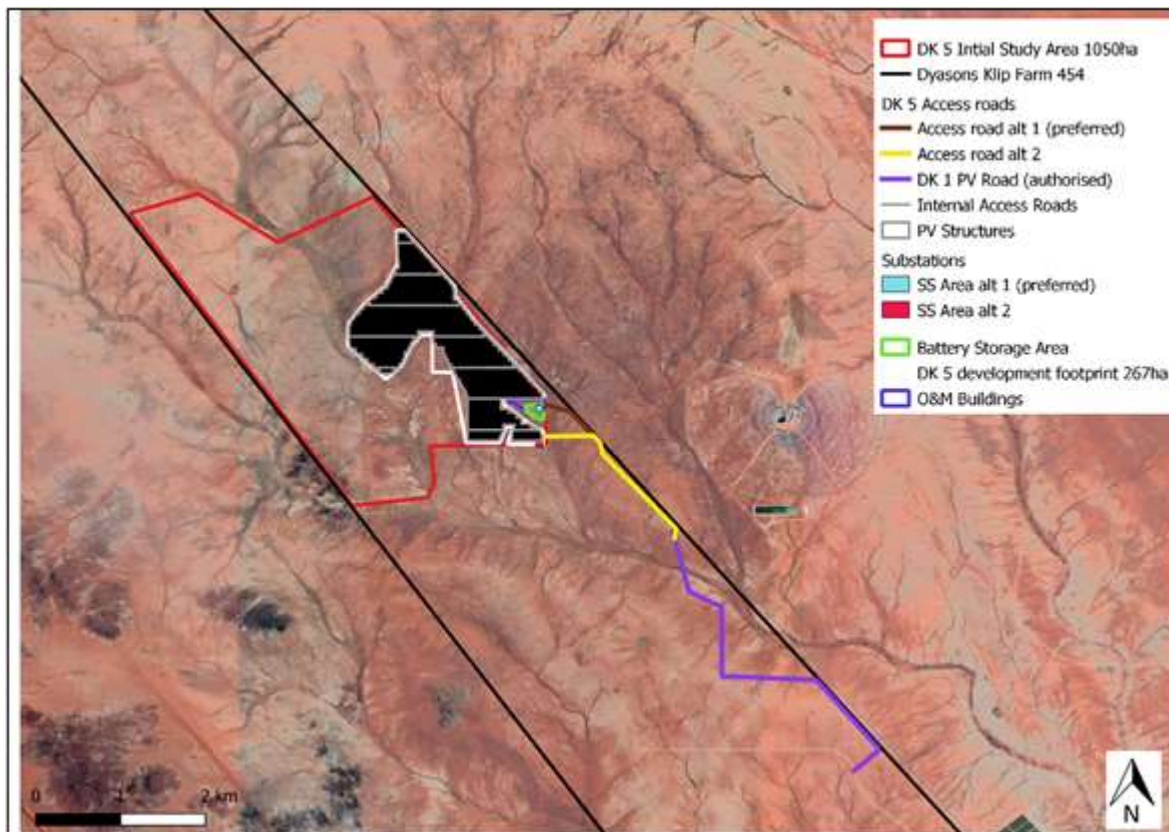


Figure 11: Initial/ Conceptual Area

The initial assessment area did not take environmental sensitive areas into consideration. This initial assessment area was driven primarily by its proximity to the N14 access road as well as reduced OHL distance to connect into the Uppington MTS, located ± 9 km to the south east of the site.

2.11.2 Site Sensitivity Screening

Following the identification of the initial assessment area, various specialists namely ecological, aquatic and avifaunal were appointed to assist in the site selection process in the form of mapping the sensitive area of the initial/ conceptual area following a site visit. These sensitivity files were then used to determine the location of the preferred layout alternative during the planning and design phase, which aimed to avoid all areas with a high and very high sensitivity as indicated in the figure below.

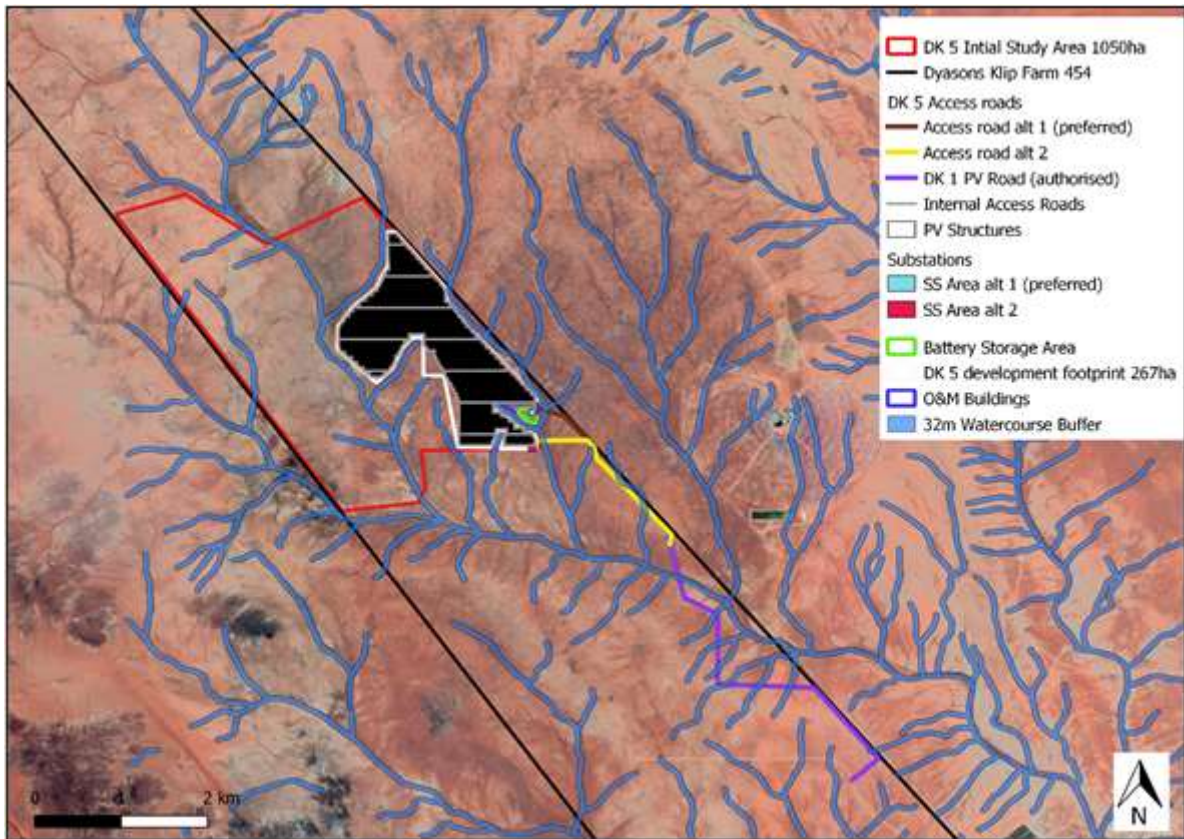


Figure 12: Ecological Sensitivity for Dyasons Klip 5 located on the Remainder of Farm Dyason's Klip 454.

2.11.3 Layout Alternative 1 (Preferred)

As mentioned above, extensive upfront consultation was undertaken during the planning and design phase of the project with the various specialists particularly the ecological and aquatic specialists in order to mitigate the proposed impacts on the high and very high sensitive environmental features associated with Dyasons Klip 5 study area. This process resulted in Dyasons Klip 5, development area being reduced from the initial assessment area of 1050ha to a refined scoping area of 383ha. This scoping area which was further refined to the final development area of 267ha.

Therefore, the preferred layout alternative within the initial assessment area was the only layout alternative that was assessed further. Layout Alternative 1 (preferred layout) predominantly occupies only Low/Medium sensitivity areas.

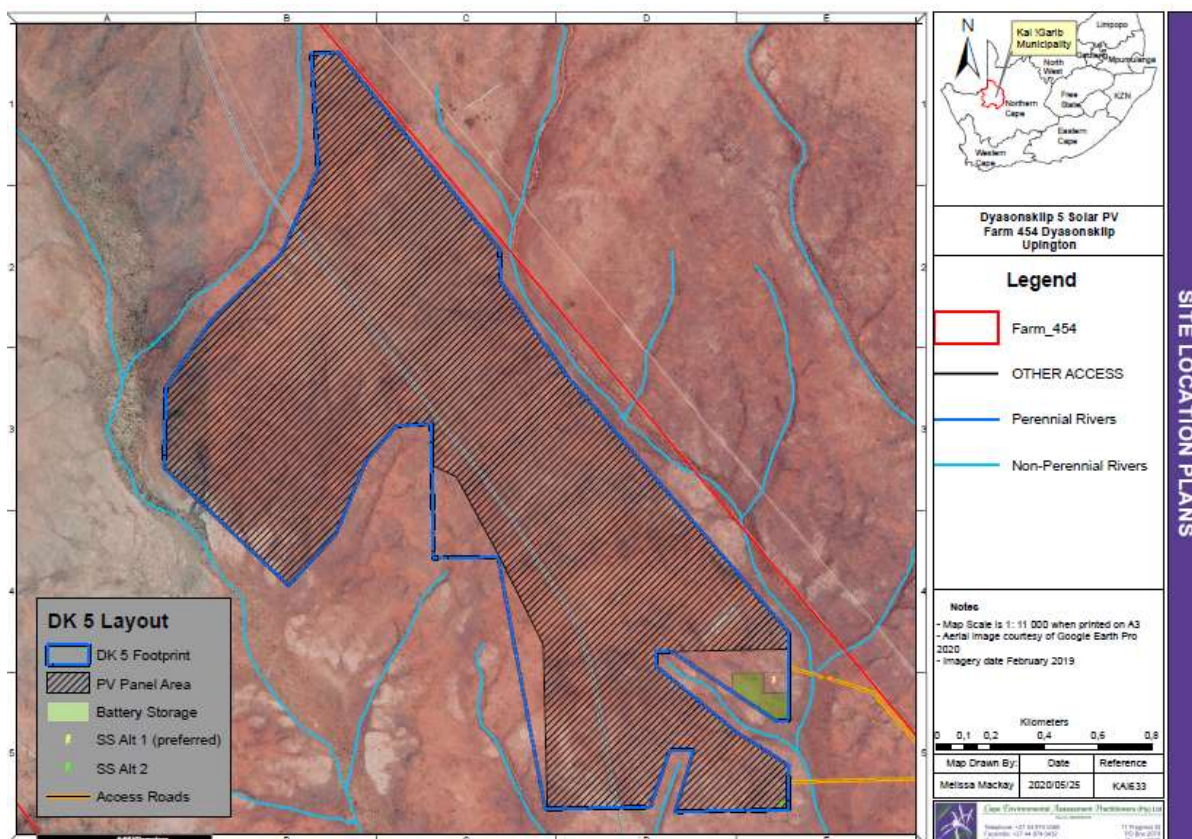


Figure 13: Preferred layout alternative (Layout Alternative 1).

2.11.4 Grid Connection Alternatives.

Two substation alternatives each with three proposed grid line corridors to connect the Dyasons Klip 5 to the Upington MTS were incorporated into the Dyasons Klip 5 layout to be assessed in this BAR.

Substation Alternative 1 (preferred) is located near the north-eastern corner of the Dyasons Klip 5 Battery Energy Storage System, whilst Substation Alternative 2 is located at the south-eastern corner of the development footprint which borders the authorised Dyasonsklip Solar Energy Facility 1. Grid Corridor Alternative 1 (1.1 and 2.1) runs past (switches into) the Dyasonsklip Solar Energy Facility 1 substation, along the north and then western boundary of RE Capital 3C into Dyasons Klip1/2 Switching Station, and then parallel to the existing 132kV line all the way back to Upington MTS.

Grid Corridor Alternative 2¹⁶ (1.2 and 2.2) runs past (switches into) the Dyasonsklip Solar Energy Facility 1 substation, runs down the eastern boundary, and then parallel to the existing 132kV line all the way back to the MTS.

Grid Corridor Alternative 3 (1.3 and 2.3) runs past (switches into) the Dyasonsklip Solar Energy Facility 1 substation, runs down the eastern boundary, and then parallel to the proposed 400kV Aries-Upington line all the way back to the MTS. The figures below illustrate the grid corridors which have been assessed in this BAR. The dimensions of the grid corridors are stipulated the table below.

Table 8: Dimensions of the Grid connection alternatives assessed.

	Length	Width
Substation Alternative 1 (Preferred)		

¹⁶ Powerline alternative 2 and substation alternative 1 is the preferred alternative identified in this environmental process (i.e. Grid Connection alternative 1.2)

Grid Corridor 1.1	19.7km	400m
Grid Corridor 1.2 (Preferred)	12.7km	400m
Grid Corridor 1.3	13.8km	400m
e		
Grid Corridor 2.1	19.5km	400m
Grid Corridor 2.2	ee	400m
Grid Corridor 2.3	e	400m

e

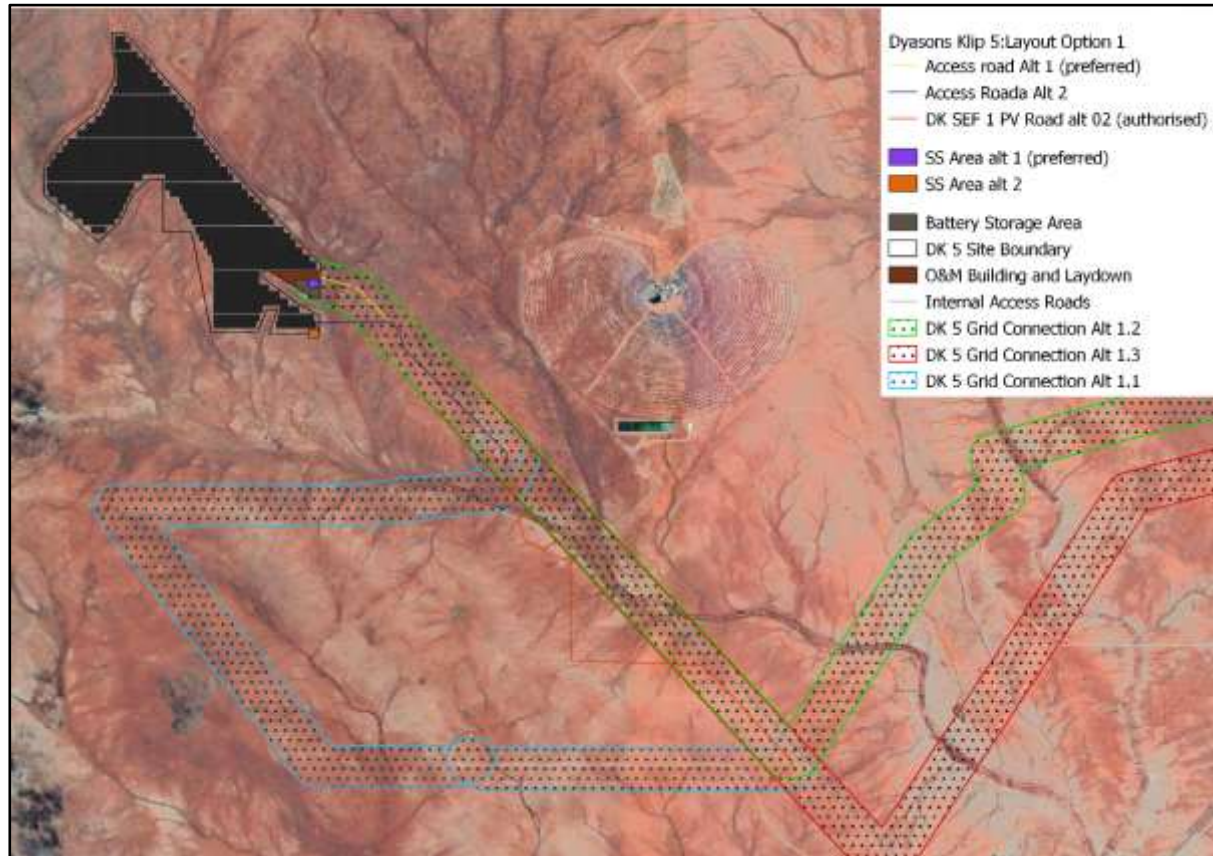


Figure 14: Dyasons Klip 5 Site Development Boundary and Grid Corridor Alternatives

2.11.5 Access Road Alternatives

Two access road points were considered. The first proposed access point utilises the existing Dyasonsklip 1 and Dyasonsklip 2 access point and the second proposes the use of the Khi Solar One Access.

The Khi access point, however, is not considered to be a viable option due to its proximity to the operational Khi Solar One solar power plant. This access alternative will therefore not be considered further.



Figure 15: Proposed Access Point (JG Afrika, 2020).

The existing Dyasons Klip 1 and 2 access road are located on the N14, which is classified as a Class 1 Expressway. The N14 is a single carriageway with one lane per direction running in an east/west direction. Sight distances at this intersection/access point are deemed acceptable.

The Dyasons Klip 5 access road (shown in blue in the Figure below) will extend from the existing Dyasons Klip 1 and 2 access road.

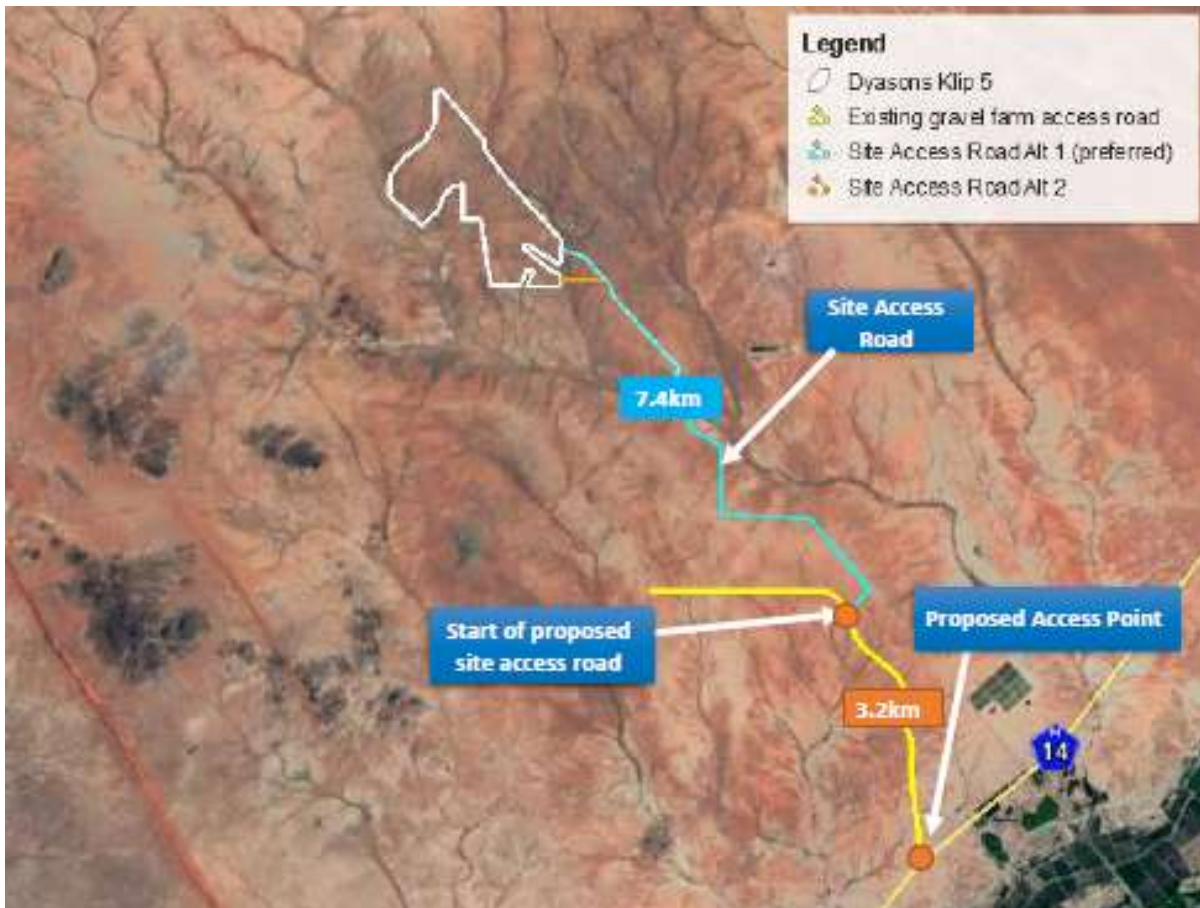


Figure 16: Showing proposed Access Road for Dyasons Klip 5 (JG Afrika, 2020)

The internal road network of the PV Facility will be gravelled roads, approximately 5m in width, around the solar array periphery. Roads located in-between the solar modules will be un-surfaced tracks to be used for maintenance and cleaning of solar PV panels.

A detailed transport and traffic plan compiled by JG Afrika is attached in Appendix E12. This plan concluded that the access point and access road in the map above is deemed the preferred access.

The TIA confirmed that the access point proposed for Dyasons Klip 5 will need to be upgraded to cater for the construction vehicles navigating the road to the laydown areas on site. It must however be noted that the access road from the N14 to Dyasonsklip 1 has already been upgraded as part of the development of Dyasonsklip 1. No further upgrade of this section would be required, but only maintenance of the existing road.

The traffic impact study furthermore recommended that the site access be controlled via a boom and gatehouse. Security staff should be stationed on site at the access booms during construction and an electronic number plate reader should be implemented once the solar farm is in operation. It furthermore recommends to allow for at least 25m stacking distance at the boom access to the site.

Precautionary measures will be taken to mitigate the risk of ground disturbances where access roads will be constructed. Special attention will be given to drainage, water flow and erosion by applying appropriate building methods listed in the aquatic specialist report and the stormwater management plan.

2.11.6 The no-go alternative

The no-go Alternative (or status quo) proposes that Dyasons Klip 5 not go ahead and that the area in proximity to the Eskom Upington MTS and within a Renewable Energy Development Zone remain

undeveloped as it is currently. The land on which the Dyasons Klip 5 is proposed is currently vacant. It is currently used for limited game and livestock grazing activities, however due to a combination of water scarcity and extreme climatic conditions, it has no potential for irrigated crop cultivation (this has been confirmed by the Agricultural Specialist in his report attached in **Appendix E4**). The area in question is also considered too small to generate noteworthy financial benefit from agricultural activities due to its low carrying capacity.

The solar-power generation potential of the Northern Cape area, particularly in proximity to the existing and proposed substations, is significant and will persist should the no-go alternative occur.

The no-go alternative will limit the potential associated with the land and the area as a whole for ensuring energy security locally, as well as the meeting of renewable energy targets on a provincial and national scale. Should the no-go alternative be considered, the positive impacts associated with Dyasons Klip 5 (increased revenue for the farmer, economic investment, local employment and generation of electricity from a renewable resource) will not be realised.

The no-go alternative is thus not considered a favourable option in light of the benefits associated with the proposed Dyasons Klip 5 within a REDZ, however it will be used as a baseline from which to determine the level and significance of potential impacts associated with the proposed Dyasons Klip 5.

2.11.7 Comparison of alternatives

The table below summarises the key environmental advantages and disadvantages of the two layouts (i.e. the preferred layout and initial assessment area).

Table 9: Comparison of Advantages and Disadvantages of Layout Alternatives.

Alternative	Preference	Reasons (incl. potential issues)
PV LAYOUT ALTERNATIVES		
Alternative 1	Preferred	<ul style="list-style-type: none"> - Avoids all high and very high ecologically sensitive areas. - Avoids all high and very high hydrologically sensitive areas. - Avoids all Avifaunal sensitive areas.
Initial Conceptual Area	Less Preferred, eliminated from further assessment	<ul style="list-style-type: none"> - The Initial Conceptual area is significantly less preferred due to its impact on areas of high and very high environmental sensitivity. Due to these significant impacts, it has been eliminated from further assessment as part of this environmental process. - Traverses high and very-high ecologically sensitive areas. - Traverses high and very-high hydrologically sensitive areas. - Falls within avifaunal buffers

As can be seen in the table above, there is an environmental preference for Layout Alternative 1 due to its lower impact on sensitive features. The preferred access road option is the Eastern Alternative (access point 1) due to its lower overall impact on watercourses.

2.12 PROJECT PROGRAMME AND TIMELINES

As mentioned previously Dyasons Klip 5 is intended to be bid into the REIPPPP. The programme has definite and stringent timelines that the project needs to meet. Note that the DoE has not yet released the exact dates of the bidding schedules, so the implementation schedule below is based on the best available information we have at this time and is subject to change.

Table 10: Preliminary implementation schedule.

	Description	Timeline
1	Expected REIPPPP submission date (5th round)	Third Quarter of 2020
2	Preferred bidders selected	First Quarter 2021
3	Finalisation of agreements	First Quarter 2022

4	Procurement of infrastructure	Second Quarter 2022
5	Construction	2022 - 2023
6	Commissioning	2023

The table above clearly depicts the dependence of the project on the REIPPPP's timelines. Any delay or acceleration within the REIPPPP will have a corresponding effect on the timelines of the projects. Also, as mentioned, no official public submission date for Round 5 has been communicated by the DoE.

NOTE: Dyasons Klip 5 intends submitting their bid during the 5th bidding window or thereafter if unsuccessful in immediate bidding rounds. Due to the uncertainty regarding the timing of these bidding windows, the Department is herewith requested that the validity period of the environmental authorisation, if authorised, be for the full 10 years allowable in terms of the regulations.

3. LEGISLATIVE AND POLICY FRAMEWORK

The legislation that is relevant to this study is briefly outlined below. These environmental requirements are not intended to be definitive or exhaustive, but serve to highlight key environmental legislation and responsibilities only.

3.1 NATIONAL LEGISLATION

This section deals with nationally promulgated or nationally applicable legislation associated with the proposed Dyasons Klip 5.

3.1.1 The Constitution of the Republic of South Africa

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measures are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

The Constitution and Bill of Rights provides that:

Everyone has the right:

- to an environment that is not harmful to their health or well-being; and
- to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures:
 - prevent pollution and ecological degradation
 - promote conservation; and
 - secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.

NEMA (discussed below) is the enabling legislation to ensure this primary right is achieved.

3.1.2 National Environmental Management Act (NEMA)

The current assessment is being undertaken in terms of the **National Environmental Management Act (NEMA, Act 107 of 1998)**¹⁷. This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the

¹⁷ The Minister of Water and Environmental Affairs promulgated new regulations in terms of Chapter 5 of the National Environmental Management Act (NEMA, Act 107 of 1998), viz, the Environmental Impact Assessment (EIA) Regulations 2014 (as amended in April 2017). These regulations came into effect on 08 December 2014 (amended on 07 April 2017) and replace the EIA regulations promulgated in 2006 and 2010.

competent authority (in this case, the national Department of Environment, Forestry and Fisheries, DEFF) based on the findings of an Environmental Assessment.

The proposed development entails a number of listed activities, which would normally require a Scoping & Environmental Impact Reporting process, but due to the project falling within a legislated REDZ, only requires a Basic Assessment Process. Such a process must be conducted by an independent EAP. Cape EAPrac has been appointed to undertake this process. The figure below depicts a summary of the Basic Assessment process.

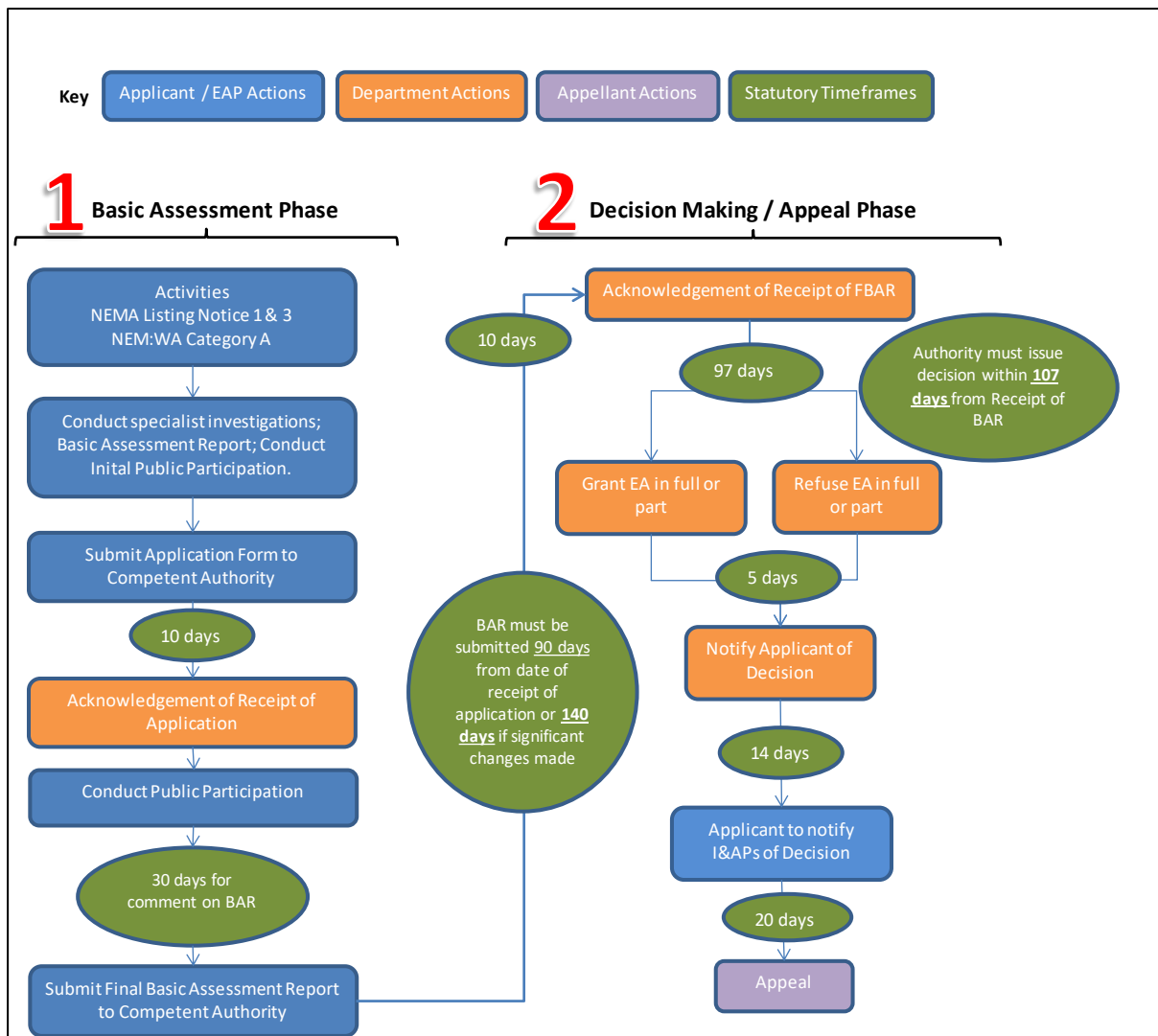


Figure 17: Summary of Basic Assessment Process in terms of the 2014 Regulations (as amended).

The listed activities associated with the proposed development, as stipulation under 2014 Regulations 327, 325 and 324 are as follows:

Table 11: NEMA 2014 (As amended in April 2017) listed activities applicable to Dyasons Klip 5.

Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R983)	Description
11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	Construction of the on-site substation and the overhead powerline to the Upington MTS with a maximum capacity of 132 kilovolts.
12	The development of— (ii) infrastructure or structures with a physical footprint of 100 square metres or more;	Construction of internal, perimeter and access road as well as PV mounting structures across the ephemeral washes and secondary

Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R983)	Description
	where such development occurs— (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	watercourses as well as a single crossing of a larger watercourse by the main access road. These roads and structures will have a physical footprint exceeding 100 square metres
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	Construction of internal, perimeter and access road as well as PV mounting structures across the ephemeral washes and secondary watercourses as well as a single crossing of a larger watercourse by the main access road.. The excavation and infilling associated with these roads and structures will exceed 10 cubic metres.
24	The development of a road— (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;	Construction of the main access road to the proposed Dyasons Klip 5 facility. The access road will have a width of 8m but with the inclusion of side drains will exceed a total width of more than 8m.
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The Dyasons Klip 5 facility is considered as commercial use, being proposed on an area used for agricultural purposes. Dyasons Klip 5 will have a total footprint of approximately 267 ha
56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre— (ii) where no reserve exists, where the existing road is wider than 8 metres;	The existing access track will be widened by more than 6m in certain sections.
Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 3 (GN R985)	Description
4	The development of a road wider than 4 metres with a reserve less than 13 metres. g. Northern Cape iii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	A section of the powerline crosses a CBA (CBA2). A construction and maintenance track will be beneath this powerline. Although the width of this track will only be approximately 2 m, it will be wider than 4m at each pylon position.
12	The clearance of an area of 300 square metres or more of indigenous vegetation. g. Northern Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans;	A section of the powerline falls within a CBA (CBA2). The construction of this powerline will require the removal of more than 300 square metres of vegetation within this CBA.
14	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more. g. Northern Cape ii. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	A section of the powerline falls within CBA (CBA2). The combined pylon footprint will exceed 10 square metres.

Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R983)	Description
Activity No(s):	Scoping and EIR Activity(ies) as set out in Listing Notice 2 (GN R984)	Description
1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more,	The proposed Dyasons Klip 5 comprises a renewable energy generation facility, which will utilise PV technology and will have a net generation capacity of up to 100MW.
15	The clearance of an area of 20 hectares or more of indigenous vegetation	Dyasons Klip 5 will have a total footprint of approximately 267 ha.

Table 12: Activities applied for and their applicability to the components in the project description.

Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R983)	Applicable Aspects of Project Description
11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	On-site switching-station / substation; Inverter-stations, transformers and internal electrical reticulation (underground cabling); Battery Energy Storage System
12	The development of— (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse;	Access and internal road network; Perimeter fencing and security infrastructure.
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	Access and internal road network; Perimeter fencing and security infrastructure.
24	The development of a road— (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;	Access road
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	Solar photovoltaic (PV) technology, fixed-tilt-, single-axis tracking- or dual-axis tracking-mounting structures, with a net generating capacity of 100 MW as well as all associated infrastructure.
56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre— (ii) where no reserve exists, where the existing road is wider than 8 metres;	Access Road
Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 3 (GN R985)	Description
4	The development of a road wider than 4 metres with a reserve less than 13 metres. g. Northern Cape iii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	Construction / maintenance track under Powerline.
12	The clearance of an area of 300 square metres or more of indigenous vegetation. g. Northern Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA	Powerline and pylons.

Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R983)	Applicable Aspects of Project Description
	or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans;	
14	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more. g. Northern Cape ii. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	Powerline and pylons
Activity No(s):	Scoping and EIR Activity(ies) as set out in Listing Notice 2 (GN R984)	Description
1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more,	Solar photovoltaic (PV) technology, fixed-tilt-, single-axis tracking- or dual-axis tracking-mounting structures, with a net generating capacity of 100 MW.
15	The clearance of an area of 20 hectares or more of indigenous vegetation	Solar photovoltaic (PV) technology, fixed-tilt-, single-axis tracking- or dual-axis tracking-mounting structures, with a net generating capacity of 100 MW as well as all associated infrastructure, which will include: <ul style="list-style-type: none"> - On-site switching-station / substation; - Auxiliary buildings (gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.); - Inverter-stations, transformers and internal electrical reticulation (underground cabling); - Battery Energy Storage System; - Access and internal road network; - Laydown area; - IPP portion of the on-site substation, - Rainwater tanks; and - Perimeter fencing and security infrastructure.

NOTE: Basic Assessment as well as S&EIR Activities are being triggered by the proposed development, but since the project is contained in a legislated REDZ, the EIA Process will follow a Basic Assessment process.

Before any of the above-mentioned listed activities can be undertaken, authorisation must be obtained from the relevant authority, in this case the DEFF. Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who have a legal mandate in respect of the activity.

3.1.3 National Environmental Management: Biodiversity (Act 10 of 2004)

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The Draft National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No 32689, 6 November 2009) has been gazetted for public comment.

The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the NSBA 2004. In terms of the EIA regulations, a basic assessment report is required for the transformation or removal of indigenous vegetation in a critically endangered or endangered ecosystem regardless of the extent of transformation that will occur. **However, the vegetation types** (namely Karroid Shrubland and Bushmanland Arid Thicket) **on the property are classified as Least Threatened.**

NEMBA also deals with endangered, threatened and otherwise controlled species. The Act provides for listing of species as threatened or protected, under one of the following categories:

- **Critically Endangered:** any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- **Endangered:** any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- **Vulnerable:** any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- **Protected species:** any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Certain activities, known as Restricted Activities, are regulated by a set of permit regulations published under the Act. These activities may not proceed without environmental authorization.

The study area is located in the Kalahari Karroid Shrubland (Least threatened) and Bushmanland Arid Grassland (Least threatened) vegetation types. The study area is not located in a threatened ecosystem the Lower Gariep Alluvial Vegetation threatened ecosystem is located south of the study area. The footprint of Dyasons Klip 5 falls entirely within Kalahari Karroid Shrubland, while the access road and powerline also fall within Bushmanland thicket.

Kalahari Karroid Shrubland vegetation type is endemic to the Northern Cape Province. The vegetation type is characteristic of forming belts alternating with belts of *Gordonia* Duneveld on plains northwest of Upington through Lutzputs and Noenieput to the Rietfontein/Mier area in the north. Other patches occur around Kakamas and north of Groblershoop. The unit is also found in the neighbouring Namibia. The vegetation can be described as low karroid shrubland on flat, gravel plains. Karoo-related and northern floristic elements such as shrubs meet here, indicating a transition to the Kalahari region and sandy soils. Altitude varies mostly from 700 - 1100 m.

The conservation target is set at 21% with very little statutorily conserved in the Augrabies Falls National Park. Although only a small area has been transformed many of the belts of this type were preferred routes for early roads, thus promoting the introduction of alien plants (about a quarter of the unit has scattered *Prosopis* species). Erosion is very low (94%) (Mucina & Rutherford, 2010).

The Bushmanland Arid Grassland vegetation type occurs only in the Northern Cape Province. It spans about one degree of latitude from around Aggeneys in the west to Prieska in the east. The southern border of the unit is formed by edges of the Bushmanland Basin while in the northwest this vegetation unit borders on desert vegetation (northwest of Aggeneys and Pofadder). The northern border (in the vicinity of Upington) and the eastern border (between Upington and Prieska) are formed with often intermingling units of Lower Gariep Broken Veld, Kalahari Karroid Shrubland and *Gordonia* Duneveld. Most of the western border is formed by the edge of the Namaqualand hills. Altitude varies mostly from 600–1 200 m. The conservation target is set at 21% with only small patches statutorily conserved in Augrabies Falls National Park and Goegab Nature Reserve. Very little of the area has been transformed. Erosion is very low (60%) and low (33%) (Mucina & Rutherford, 2010).

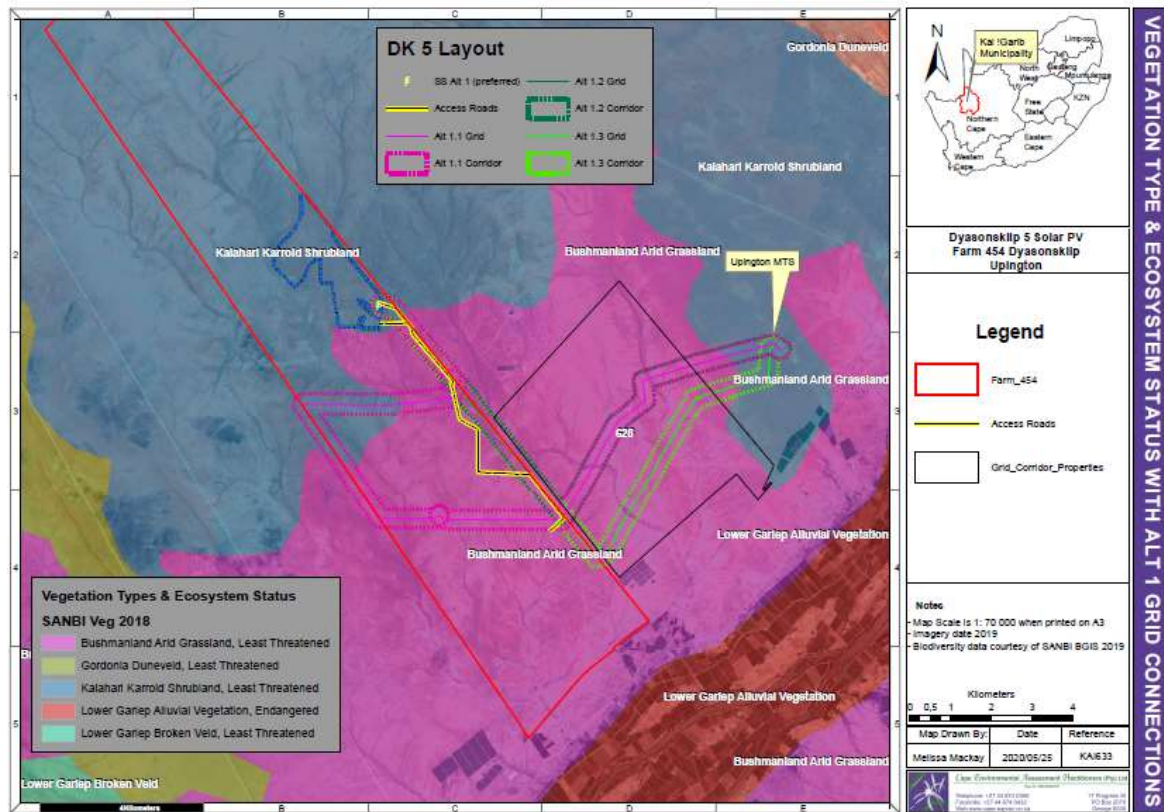


Figure 18: The study area for Dyasons Klip 5 and Alternative 1 Grid Corridors in relation to threatened ecosystems, namely the Lower Gariep Alluvial Vegetation situated to the south of the site.

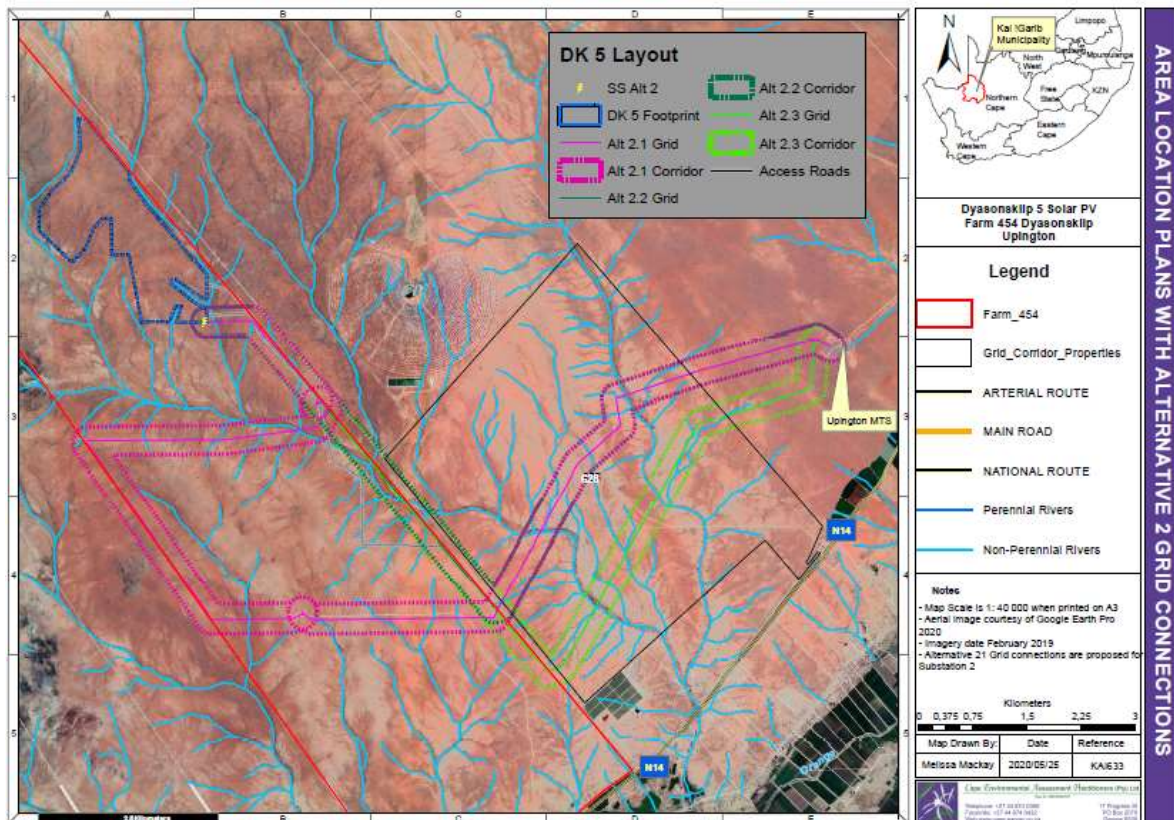


Figure 19: The study area for Dyasons Klip 5 and Alternative 2 Grid Corridors in relation to threatened ecosystems, namely the Lower Gariep Alluvial Vegetation situated to the south of the site.

3.1.4 Conservation of Agricultural Resources Act – CARA (Act 43 of 1983):

The Conservation of Agricultural Resources Act (CARA) provides for the regulation of control over the utilisation of the natural agricultural resources in order to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. CARA defines different categories of alien plants:

- Category 1 - prohibited and must be controlled;
- Category 2 – must be grown within a demarcated area under permit; and
- Category 3 - ornamental plants that may no longer be planted, but existing plants may remain provided that all reasonable steps are taken to prevent the spreading thereof, except within the flood lines of water courses and wetlands.

The abundance of alien plant species on the Dyasons Klip 5 site is very-low, which can be ascribed mainly to the aridity of the site.

The Department of Agriculture, Land Reform and Rural Development is guided by Act 43 of 1983.

In order to comply with their mandate in terms of this legislation, the applicant is required to take note of the following:

Article 7.(3)b of Regulation 9238: CONSERVATION OF AGRICULTURE RESOURCES, 1983 (Act 43 of 1983)

Utilisation and protection of vleis, marshes, water sponges and water courses

- 7.(1) “no land user shall utilize the vegetation in a vlei, marsh or water sponge or within the flood area of a water course or within 10 meters horizontally outside such flood area in a manner that causes or may cause the deterioration of or damage to the natural agriculture resources.”
- (3)(b) “cultivate any land on his farm unit within the flood area of a water course or within 10 meters horizontally outside the flood area of a water course”.

Kindly refer to the Freshwater Ecological Impact Assessment in Appendix E3 for a discussion of potential impacts on the freshwater resources on site. As confirmed in this specialist report, all the main drainage lines have been completely avoided by the proposed Dyasons Klip 5, with the exception of a single crossing by the main access road.

3.1.5 The Subdivision of Agricultural Land, Act 70 Of 1970

The Subdivision of Agricultural Land Act 70 of 1970 (SALA”) came into operation on 2 January 1971. The Department of Agriculture, Forestry and Fisheries (DAFF) administers the Subdivision of Agricultural Land Act No. 70 of 1970. Subdivision of agricultural land, therefore, requires DAFF’s consent.

DAFF is considered a commenting authority on this environmental process, but will be a decision-making authority on the SALA application which will take place after the project receives an EA. Please refer to the Planning Statement attached in Appendix E14.

3.1.6 National Water Act, No 36 of 1998

Section 21c & i of the National Water Act (NWA) requires the Applicant to apply for authorisation from the Department of Water and Sanitation for an activity in, or in proximity to any watercourse. Such an application would be required for any access road or PV infrastructure that crosses any watercourse.

Section 21(a) of the National Water Act is related to the abstraction of water from a water resource (including abstraction of groundwater); a Water Use Licence (WUL) would be required for such abstraction.

Water required for the construction and operation of Dyasons Klip 5 is to be sourced from the Kai !Garib Local Municipality (Please refer to Appendix G6 for written confirmation of availability). Should the applicant in the future wish to utilise groundwater for the purposes of construction or operation of the facility, such use will require a licence in terms of Section 21(a) of the NWA.

The freshwater specialist has identified a number of watercourses such as drainage lines and alluvial washes which occur on plains as well as slopes within the broader study area. The preferred layout has avoided all the main drainage lines (with the exception of a single road crossing), pans as well as the high sensitivity alluvial washes. Certain aspects of the development (mainly the perimeter tracks and some of the modules to a lesser degree) do however encroach on some of the low sensitivity alluvial washes. Such encroachments may require authorisation in terms of the National Water Act.

The Department of Water and Sanitation have been registered as a key stakeholder in this environmental process.

3.1.7 National Forests Act (No. 84 of 1998):

The National Forests Act (NFA) provides for the protection of forests as well as specific tree species, quoting directly from the Act: “no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated”.

The ecological specialist, Mr Simon Todd, identified the following species on site which are protected in terms of the National Forest Act.

Table 13: Species present on site that are protected in terms of the National Forest Act.

Species	Common Name	SANBI National Red List ¹⁸	Northern Cape Protected ¹⁹	National Forest Act (1998) ²⁰	Habitat Description
<i>Boscia albitrunca</i>	Shepherd's tree	Least Concern	Yes	Yes	Terrestrial – including seven provinces excluding Western and Eastern Cape
<i>Vachellia erioloba</i>	Camel thorn	Least Concern	Yes	Yes	Widespread in the arid northern provinces of South Africa, also Namibia, Botswana, Zimbabwe, southern Angola and south-western Zambia

Notwithstanding, the significance associated with the removal of protected trees for the proposed development, the applicant will be required to apply in terms of the NFA for a licence to remove individuals of these two species.

The Department of Agriculture, Forestry and Fisheries (DAFF) (now the department of Environment, Forestry and Fisheries) have been registered as a key stakeholder in this environmental process and will be requested to provide comment in this regard.

3.1.8 National Heritage Resources Act, 25 of 1998

¹⁸ <http://redlist.sanbi.org/>

¹⁹ Northern Cape Nature Conservation Act (Act No 9 of 2009)

²⁰ Notice of the list of protected tree species under the National Forests Act 84 of 1998 published in GN 182 in GG 41100 of 8 September 2017

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). South African National Heritage Resources Agency (SAHRA) is the enforcing authority in the Northern Cape and is registered as a Stakeholder for this environmental process.

In terms of Section 38 of the National Heritage Resources Act, SAHRA will comment on the detailed Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process.

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- any development or other activity which will change the character of a site exceeding 5 000 m² in extent; and
- the re-zoning of a site exceeding 10 000m² in extent.

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority.

- In terms of Section 36 (3), no person may destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority.
- In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority.

Mr Jaco van der Walt of HCAC heritage consultants, has undertaken a heritage impact assessment for the proposed Dyasons Klip 5. This heritage study has included a Paleontological Desktop Assessment undertaken by Dr John Almond.

Please refer to the Heritage Impact Report, Paleontological Desktop Assessment attached in Appendix E5 and E6 respectively.

The application in terms of the NHA will be lodged with SAHRA via their SAHRIS system.

3.1.9 National Energy Act (No. 34 of 2008)

The purpose of the National Energy Act (No. 34 of 2008) is to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation; while taking environmental management requirements into account. In addition, the Act also provides for energy planning, and increased generation and consumption of Renewable Energies.

The objectives of the Act, are to amongst other things, to:

- Ensure uninterrupted supply of energy to the Republic.
- Promote diversity of supply of energy and its sources.
- Facilitate energy access for improvement of the quality of life of the people of the Republic.
- Contribute to the sustainable development of South Africa's economy.

The National Energy Act therefore recognises the significant role which electricity plays growing the economy while improving citizens' quality of life. The Act provides the legal framework which supports the development of Renewable Energy facilities for the greater environmental and social good, and

provides the backdrop against which South Africa's strategic planning regarding future electricity provision and supply takes place.

3.2 PROVINCIAL LEGISLATION

This section deals with provincially promulgated or provincially applicable legislation associated with the proposed Dyasons Klip 5.

3.2.1 Northern Cape Nature Conservation Act, No. 9 of 2009

The Northern Cape Nature Conservation Act provides inter alia for the sustainable utilisation of wild animals, aquatic biota and plants as well as permitting and trade regulations regarding wild fauna and flora within the province. In terms of this act the following section may be relevant with regards to any security fencing the solar development may require.

Manipulation of boundary fences: 19. No Person may –

(a) erect, alter, remove or partly remove or cause to be erected, altered, removed or partly removed, any fence, whether on a common boundary or on such person's own property, in such a manner that any wild animal which as a result thereof gains access or may gain access to the property or a camp on the property, cannot escape or is likely not to be able to escape therefrom.

It is recommended that the perimeter fencing around the solar development site will be constructed in a manner which allows for the passage of small and medium sized mammals:

The ecology specialist identified the following species protected in terms of this Act.

- *Aloidendron dichotomum* (Asphodolaceae),
- *Aloe claviflora* (Asphodolaceae),
- *Aloe gariensis* (Asphodolaceae),
- *Avonia albissima* (Anacampserotaceae),
- *Boscia foetida*,
- *Boscia albitrunca*
- *Mesembryanthemum* sp. (Aizoaceae),
- *Ruschia* sp. (Aizoaceae),
- *Euphorbia braunsii*, and
- *Nerine laticoma* (Amaryllidaceae).

Despite not being threatened, any impacts on these species will require a permit from the relevant authorities. There is a possibility that additional protected species occur on site that were not detected during the field survey. It is recommended that an ecological walk-through be done prior to commencement of construction, to quantify the numbers of protected species to be affected.

The specialist noted that many of these species are widespread and not of any conservation concern, but protected due to the fact that the Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009) protects entire families of flowering plants irrespective of whether some members are rare or common.

The implication is that a comprehensive list of species occurring within the footprint of the proposed infrastructure is required and a permit application submitted for any of those listed as protected.

Please also refer to the Ecological Impact Report attached in Appendix E1 for further information on protected species present on site.

3.2.2 Nature and Environmental Conservation Ordinance, No 19 of 1974

This legislation was developed to protect both animal and plant species within the various provinces of the country which warrant protection. These may be species which are under threat or which are already considered to be endangered. The provincial environmental authorities are responsible for implementing the provisions of this legislation, which includes the issuing of permits etc. In the Northern Cape, the Department of Environment and Nature Conservation fulfils this mandate as per the Northern Cape Nature Conservation Act as described above.

3.2.3 Astronomy Geographic Advantage Act, 2007 (Act No 21 Of 2007)

The purpose of the Act is to preserve the geographic advantage areas that attract investment in astronomy. The entire Northern Cape Province, excluding the Tsantsabane Municipality, has been declared an astronomy advantage area. The Northern Cape optical and radio telescope sites were declared core astronomy advantage areas. The Act allowed for the declaration of the Southern Africa Large Telescope (SALT), Meerkat and Square Kilometre Array (SKA) as astronomy and related scientific endeavours that has to be protected.

Chapter 2 of the act allows for the declaration of astronomy advantage areas whilst Chapter 3 pertains to the management and control of astronomy advantage areas. Management and control of astronomy advantage areas include, amongst others, the following:

- Restrictions on use of radio frequency spectrum in astronomy advantage areas;
- Declared activities in core or central astronomy advantage area;
- Identified activities in coordinated astronomy advantage area; and
- Authorisation to undertake identified activities.

The South African SKA Project Office have been registered as a key stakeholder on this environmental process and have been requested to provide input in terms of the Astronomy Geographic Advantage Act and potential impact to SKA. The potential Impact of Dyasons Klip 5 is likely to be low, due to the considerable distance to the nearest SKA infrastructure.

3.2.4 Northern Cape Provincial Spatial Development Framework (PSDF) 2012

The Northern Cape Provincial Spatial Development Framework (PSDF) 2012 states that the overarching goal for the Province is to enable sustainability through sustainable development. The Province considers social and economic development as imperative in order to address the most significant challenge facing the Northern Cape, which is poverty.

The PSDF considers the release of greenhouse gas (GHG) emissions created by human activity as the key cause of global warming, which in turn could result in major negative effects and disasters in the short- and medium-term. This effect would increasingly undermine human development gains. Innovative strategies would have to be implemented to reduce the impact of global deterioration.

The PSDF identifies key sectoral strategies and plans which are considered to be the key components of the PSDF. Sectoral Strategy 19 refers to a provincial renewable energy strategy. Within the PSDF a policy has been included which states that renewable energy sources (including the utilisation of solar energy) are to comprise 25% of the Province's energy generation capacity by 2020.

The overall energy objective for the Province also includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the diversity of domestic energy supply and avoiding energy imports, while also minimising the detrimental environmental impacts. The implementation of sustainable renewable energy is also to be promoted within the Province through appropriate financial and fiscal instruments.

Considering the need for the development of renewable energy facilities in order to achieve the objective of sustainability the development of the proposed PV facility within the Northern Cape and within the study area is considered to be aligned with the Northern Cape PSDF.

3.2.5 Northern Cape Province Provincial Growth and Development Strategy

The Northern Cape Provincial Growth and Development Strategy (NCPGDS) identifies poverty reduction as the most significant challenge facing the government and its partners. All other societal challenges that the province faces emanate predominantly from the effects of poverty. The NCPGDS notes that the only effective way to reduce poverty is through long-term sustainable economic growth and development. The sectors where economic growth and development can be promoted include:

- Agriculture and Agro-processing;
- Fishing and Mariculture;
- Mining and mineral processing;
- Transport;
- Manufacturing;
- Tourism.

However, the NCPGDS also notes that economic development in these sectors also requires:

- Creating opportunities for lifelong learning;
- Improving the skills of the labour force to increase productivity;
- Increasing accessibility to knowledge and information.

The achievement of these primary development objectives depends on the achievement of a number of related objectives that, at a macro-level, describe necessary conditions for growth and development. These are:

- Developing requisite levels of human and social capital;
- Improving the efficiency and effectiveness of governance and other development institutions;
- Enhancing infrastructure for economic growth and social development.

Of specific relevance to this EIA and more specifically, the SIA is that the NCPGDS make reference to the need to ensure the availability of inexpensive energy. The section notes that in order to promote economic growth in the Northern Cape the availability of electricity to key industrial users at critical localities at rates that enhance the competitiveness of their industries must be ensured. At the same time, the development of new sources of energy through the promotion of the adoption of energy applications that display a synergy with the province's natural resource endowments must be encouraged. In this regard the NCPGDS notes "the development of energy sources such as solar energy, the natural gas fields, bio-fuels, etc., could be some of the means by which new economic opportunity and activity is generated in the Northern Cape". The NCPGDS also highlights the importance of close co-operation between the public and private sectors in order for the economic development potential of the Northern Cape to be realised.

The NCPGDS also highlights the importance of enterprise development, and notes that the current levels of private sector development and investment in the Northern Cape are low. In addition, the province also lags in the key policy priority areas of SMME Development and Black Economic Empowerment. The proposed solar energy facility therefore has the potential to create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province.

In this regard care will need to be taken to ensure that the proposed STPs and other renewable energy facilities do not negatively impact on the regions natural environment. In this regard the NCPGDS notes that the sustainable utilisation of the natural resource base on which agriculture depends is critical in the Northern Cape with its fragile eco-systems and vulnerability to climatic variation. The document also indicates that due to the provinces exceptional natural and cultural attributes, it has the potential to become the preferred adventure and ecotourism destination in South Africa. Care therefore needs to be taken to ensure that the development of large renewable energy projects, such as the proposed solar energy facility, do not affect the tourism potential of the province.

3.2.6 Northern Cape Climate Change Response Strategy

The key aspects of the PCCRS Report are summarised in the MEC's (NCPG: Environment and Nature Conservation) 2011 budget speech: "The Provincial Climate Change Response Strategy will be underpinned by specific critical sector climate change adaptation and mitigation strategies that include the water, agriculture and human health sectors as the 3 key adaptation sectors, the industry and transport alongside the energy sector as the 3 key mitigation sectors with the disaster management, natural resources and Human society, livelihoods and services sectors as 3 remaining key sectors to ensure proactive long term responses to the frequency and intensity of extreme weather events such as flooding and wild fire, with heightened requirements for effective disaster management".

Key points from MEC's address include the NCPG's commitment to develop and implement policy in accord with the National Green Paper for the National Climate Change Response Strategy (2010), and an acknowledgement of the NCP's extreme vulnerability to climate-change driven desertification. The development and promotion of a provincial green economy, including green jobs, and environmental learnership is indented as an important provincial intervention in addressing climate change. The renewable energy sector, including solar and wind energy (but also biofuels and energy from waste), is explicitly indicated as an important element of the Provincial Climate Change Response Strategy. The MEC also indicated that the NCP was involved in the processing a number of wind and solar energy facility EIA applications.

3.3 REGIONAL AND MUNICIPAL LEGISLATION

This section deals with regionally and municipally promulgated or regionally or municipally applicable legislation associated with the proposed Dyasons Klip 5²¹.

3.3.1 ZF Mgcawu District Municipality Integrated Development Plan

The vision set out in the ZFMDM is "Quality support to deliver quality services". The mission is a "Centre of excellence in providing quality basic services through support to local municipalities".

In terms of the National Spatial Development Perspective, The ZF Mgcawu District area has been classified as a "medium" importance area which means that no significant investment is concentrated in the region. In terms of the National Spatial Development Perspective, The ZF Mgcawu District area has been classified as a "medium" importance area which means that no significant investment is concentrated in the region.

The IDP lists a number of strategic objectives and development objectives. The relevant objectives include:

Strategic objective
<p>To Facilitate the Development of Sustainable regional land use, economic, spatial and environmental planning frameworks that will support and guide the development of a diversified, resilient and sustainable district economy. The associated development objective is to:</p> <ul style="list-style-type: none"> • Establish a vehicle to ensure all businesses are co-operating (i.e. District LED Forum); • Create investment opportunities in sectoral development (i.e. investment activities; Entrepreneurial business support programme);

²¹ This section includes legislation applicable to both the District (Category C) and Local (Category B) municipalities.

- Enable an environment for business establishment and support initiatives (i.e. Increase the number of businesses; entrepreneurial support).

Strategic objective

To market, develop and co-ordinate tourism in the ZFMDM. The associated development objective is to:

- Promote the Green Kalahari tourism brand in the ZF Mgcawu district

The IDP identifies a number of key challenges. The following are relevant to the proposed development:

- High rate of unemployment;
- Inadequate human capital;
- Youth development;
- Access to health care facilities.

In terms of the Kai !Garib Municipality, the priority issues include:

- Lack of Basic Services;
- Lack of proper housing / existing informal settlements/ Lack of Land Ownership;
- Poverty & unemployment, lack of youth development and social issues contributing thereto (Local Economic Development) / Lack of farming land/ commonage;
- Lack of sport and recreational facilities and services;
- Lack of sufficient and proper health services (HIV/AIDS).

The IDP also notes that the ZF Mgcawu District Municipality acknowledges that climate change poses a threat to the environment, its residents, and future development. Actions are required to reduce carbon emissions (mitigation), and prepare for the changes that are projected to take place (adaptation) in the District. ZF Mgcawu District Municipality has therefore prioritised the development of a Climate Change Vulnerability Assessment and Climate Change Response Plan.

3.3.2 Kai !Garib Local Municipality Integrated Development Plan

The vision for the Kai !Garib LM is “Creating an economically viable and fully developed municipality, which enhances the standard of living of all the inhabitants / community of Kai !Garib through good governance, excellent service delivery and sustainable development.” The mission is the “Provision of transparent, accountable and sustainable service delivery”.

The IDP notes that that the activities of the KGLM are guided by a number of values, of which the following are relevant to the proposed development:

- Transparency in planning and management;
- Proper understanding of the needs of communities;
- The implementation of a development orientated approach to Local Government;
- Building capacity among the staff and Community wherever possible in order to enable them to play an effective role in Local Government.

The IDP is aligned with the National Government identified Key Performance Areas (KPA's) which are:

- KPA 1: Service Delivery and Infrastructure Development;
- KPA 2: Local Economic Development;
- KPA 3: Municipal Financial Viability and Management;
- KPA 4: Institutional Development and Transformation;
- KPA 5: Public Participation and Good Governance.

KPA 2, Local Economic Development, is the most relevance KPA for the proposed development.

3.4 GUIDELINES, POLICIES AND AUTHORITATIVE REPORTS

This section includes relevant Guidelines, Policies and Authoritative reports applicable to the proposed Dyasons Klip 5.

3.4.1 National Protected Area Expansion Strategy (NPAES) for S.A. 2008 (2010)

Considering that South Africa's protected area network currently falls far short of sustaining biodiversity and ecological processes, the NPEAS aims to achieve cost-effective protected area expansion for ecological sustainability and increased resilience to Climate Change. Protected areas, recognised by the National Environmental Management: Protected Areas Act (Act 57 of 2003), are considered formal protected areas in the NPAES. The NPAES sets targets for expansion of these protected areas, provides maps of the most important protected area expansion, and makes recommendations on mechanisms for protected area expansion.

The NPAES identifies 42 focus areas for land-based protected area expansion in South Africa. These are large intact and un-fragmented areas suitable for the creation or expansion of large protected areas. The closest focus area is the Eastern Kalahari Bushveld Focus Area; the proposed Dyasons Klip 5 will not affect this or any other NPAES focus area as it is situated considerable distance from the Eastern Kalahari Bushveld Focus Area.

3.4.2 Critical Biodiversity Area Planning

A Critical Biodiversity Areas (CBA) Map is a spatial plan for ecological sustainability. It identifies a set of biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole.

CBA Maps can be given formal legal status through the National Environmental Management: Biodiversity Act (Act 10 of 2004),

The Northern Cape Critical Biodiversity Area (CBA) Map updates, revises and replaces all older systematic biodiversity plans and associated products for the province.

According to the CBA Map, the proposed Dyasons Klip 5 does not fall within a CBA. The PV facility is predominantly situated in an area classified as "other natural areas" with a small portion extending into a CBA2.

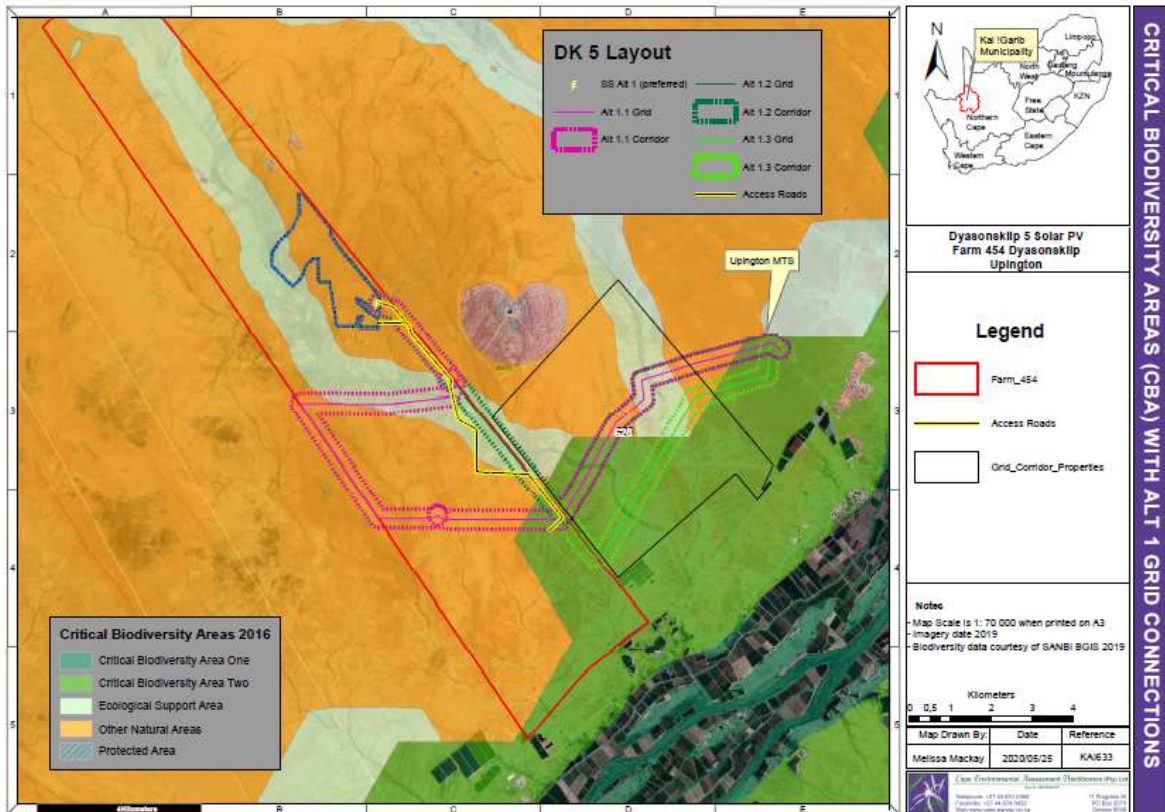


Figure 20: The proposed Dyasons Klip 5 and the alternative grid connections (from sub-station alternative 1) in relation to the Northern Cape Critical Biodiversity Areas (2016).

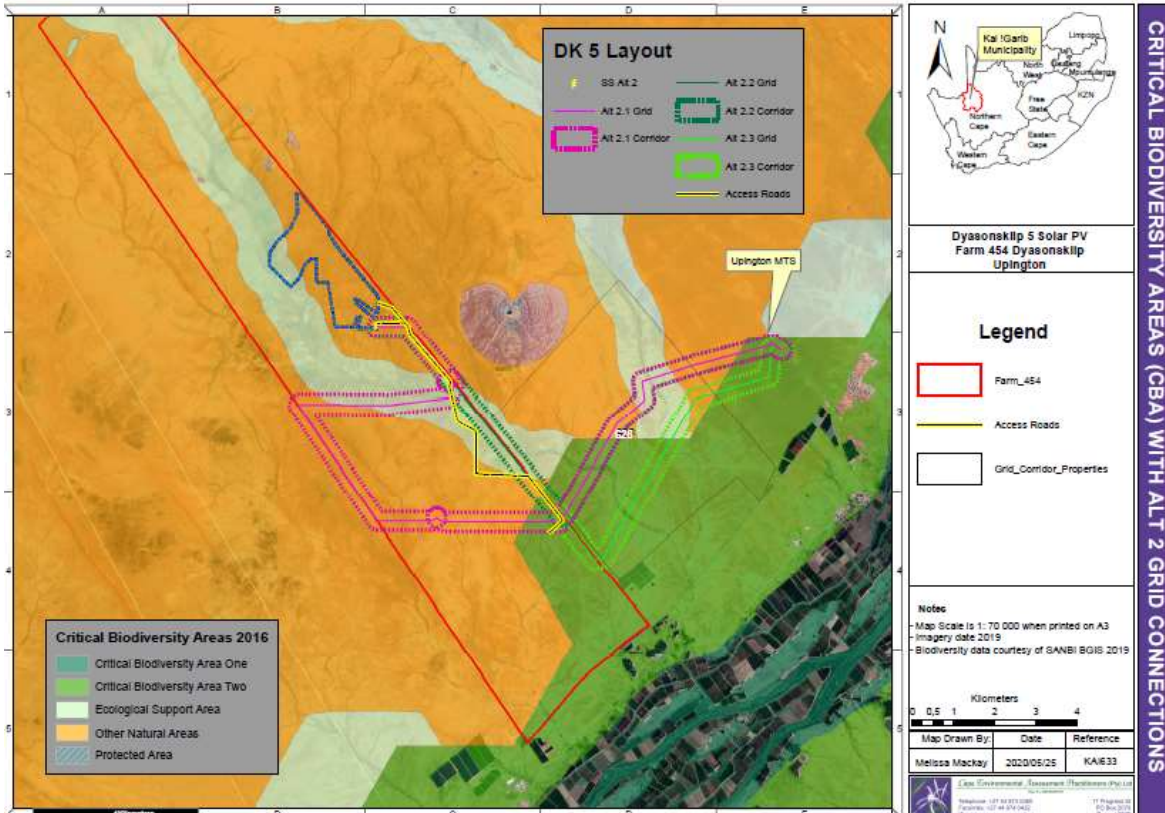


Figure 21: The proposed Dyasons Klip 5 and the alternative grid connections (from sub-station alternative 2) in relation to the Northern Cape Critical Biodiversity Areas (2016).

The following section provides input on the significance and potential impact of the CBA 2 within the study site²² (Please also refer to the Ecological Impact Assessment attached in Appendix E1)

The Northern Cape Critical Biodiversity Area (CBA) Map was published in 2016 and updates, revises and replaces all older systematic biodiversity plans and associated products for the province.

This includes the Namakwa District Biodiversity Sector Plan (Desmet & Marsh 2008), from which the Northern Cape CBA Map derived identified CBA1 and CBA2 areas (and added additional CBA1 and CBA2 areas). This is important, since the rationale for defining the recent (2016) CBA areas is derived from the earlier (2008) product. CBA1 and CBA2 areas in the 2016 map include the following areas:

- Important Bird Areas;
- SKEP expert identified areas;
- Threatened species locations;
- Features from previous conservation plans (including CBA1 and CBA2 areas from the Namakwa District Biodiversity Sector Plan);
- Areas supporting climate change resilience, e.g. areas of high diversity, topographic diversity, strong biophysical gradients, climate refugia, including kloofs, south-facing slopes and river corridors;
- Conservation Plans from adjacent provinces; and
- Landscape structural elements, e.g. rocky outcrops, koppies, dolerite dykes, boulder fields, woody vegetation on outwash plains.

The Northern Cape CBA map classifies the natural vegetation of the province according to conservation value in decreasing value, as follows:

1. Protected;
2. Critical Biodiversity Area One (Irreplaceable Areas);
3. Critical Biodiversity Area Two (Important Areas);
4. Ecological Support Area; and
5. Other Natural Area

This shows features within the study area within three of these classes, as follows:

1. Critical Biodiversity Areas: Portions of the powerline fall within a CBA2 area. There are patches of CBA1 within the floodplain of the Orange River to the south of the site.
2. Ecological Support Areas: There is a section of ESA on the Northwest of the project footprint.
3. Other Natural Areas: Almost the entire footprint of Dyasons Klip 5 – falls within an ONA

The presence of CBA 2 areas in the southern half of the property (as crossed by the Dyasons Klip 5 Powerline) indicate that these areas are considered important for biodiversity conservation. Additionally, the ESAs indicate that the site has importance in a wider ecological context for supporting biodiversity patterns. CBA2 areas in the Northern Cape are assigned on the basis of one of the following five categories:

1. PA Domains & Buffers
2. SKEP Expert Areas
3. Namakwa CBA 2s
4. PUs <65% irreplaceability
5. NFEPA Wetland Clusters

The following is of pertinence to the site under investigation:

1. Protected Areas (PA Domains & Buffers): The closest protected area to the site is the Augrabies Falls National Park, over 50 km away, therefore PA Domains & Buffers do not apply. Note that

²² The impact of Dyasons Klip 5 on the CBA is limited to a portion of the powerline.

there are also no areas close to the site that are within National Park Area Expansion Strategy focus areas.

2. SKEP Expert Areas: The site is outside of the SKEP planning domain area, therefore SKEP expert areas do not apply.
3. Namakwa CBA2s: The site is outside the Namakwa District, therefore Namakwa CBAs do not apply.
4. PU irreplaceability: Irreplaceability of Planning Units is based on a variety of factors, for example, conservation targets for vegetation types, habitat for threatened species, rare habitats in the Province, and threatened ecosystem processes. For those specific locations, processes or targets listed in the Technical Report (Holness & Oosthuysen 2016), none are applicable to the current general area.
5. NFEPA Wetland Clusters: The site falls within a NFEPA Wetland Cluster. It is associated with the Orange River and, according to "Atlas of Freshwater Ecosystem Priority Areas in South Africa", WRC Report No TT500/11", the site is within an area designated as "Fish Support Area and associated sub-quatarnary catchment" with the river at this location designated as "Fish Sanctuary: other threatened" (as opposed to "Fish Sanctuary: critically endangered & endangered". The site is within a FEPA Sub-quatarnary Catchment.

An interpretation of the above information is (1) that the CBA is moderately irreplaceable, and (2) the function of the sub-quatarnary catchment requires protection.

In addition, a regional view of the CBA2 area on site shows the following:

1. The CBA2 area on site is part of a broader CBA2 network associated with the Orange River across its entire length through the Northern Cape. The CBA2 area on site is therefore a very small part of a much larger network. The intention therefore appears to be to preserve representative areas of various ecosystems, as well as preserve aquatic functioning of key ecosystems.
2. The Planning Units are hexagons with an individual area of 1600 ha, which provides little local resolution. On-site observation indicates that there is little difference between the CBA2 areas on site and other areas on site that are outside the CBA2 area. It should therefore be possible to preserve similar habitat nearby with the same overall outcome, even with some minor loss of habitat on site.

The most important objective in considering the CBA2 area on site is to ensure that aquatic function in the landscape is not compromised. In addition to the Ecology Impact Report, please also refer to the Freshwater Impact Report in Appendix E3, where it is confirmed that the aquatic function of the landscape will not likely be compromised by Dyasons Klip 5.

3.4.3 White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)

The White Paper on Renewable Energy Policy of 2003 supplements Government's predominant policy on energy as set out in the White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The policy recognises the potential of RE, and aims to create the necessary conditions for the development and commercial implementation of RE technologies. The position of the White Paper on RE Policy is based on the integrated resource planning criterion of:

"Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options."

The White Paper on Renewable Energy Policy sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing Renewable Energy in South Africa. The country relies heavily on coal to meet its energy needs due to its abundant, and fairly accessible and affordable coal resources. However, massive RE resources that can be sustainable alternatives to fossil fuels, have so far remained largely untapped. The White Paper on Renewable Energy Policy fosters the

uptake of Renewable Energy in the economy and has a number of objectives that include: ensuring equitable resources are invested in renewable technologies; directing public resources for implementation of Renewable Energy technologies; introducing suitable fiscal incentives for Renewable Energy and; creating an investment climate for the development of the RE sector.

The White Paper on Renewable Energy Policy set a target of 10 000GWh to be generated from RE by 2013 to be produced mainly from biomass, wind, solar and small-scale hydro. The target was subsequently reviewed in 2009 during the RE summit of 2009. The objectives of the White Paper on Renewable Energy Policy are considered in six focal areas, namely; financial instruments, legal instruments, technology development, awareness raising, capacity building and education, and market based and regulatory instruments. The policy supports the investment in Renewable Energy facilities as they contribute towards ensuring energy security through the diversification of energy supply, reducing GHG emissions and the promotion of Renewable Energy sources.

3.4.4 White Paper on the Energy Policy of the Republic of South Africa (1998)

The White Paper on Energy Policy places emphasis on the expansion of energy supply options to enhance South Africa's energy security. This can be achieved through increased use of renewable energy and encouraging new entries into the generation market. South Africa has an attractive range of cost effective renewable resources, taking into consideration social and environmental costs. Government policy on renewable energy is thus concerned with meeting the following challenges:

- Ensuring that economically feasible technologies and applications are implemented.
- Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options.
- Addressing constraints on the development of the renewable industry.

The policy states that the advantages of Renewable Energy include; minimal environmental impacts during operation in comparison with traditional supply technologies, generally lower running costs, and high labour intensities. Disadvantages include; higher capital costs in some cases; lower energy densities; and lower levels of availability, depending on specific conditions, especially with sun and wind based systems. Nonetheless, renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future. The White Paper on Energy Policy therefore supports the advancement of Renewable Energy sources and ensuring energy security through the diversification of supply.

3.4.5 Integrated Energy Plan (IEP), 2016

The development of a National Integrated Energy Plan (IEP) was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008 (Act No. 34 of 2008), the Minister of Energy is mandated to develop and, on an annual basis, review and publish the IEP in the Government Gazette. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development.

The IEP notes that South Africa needs to grow its energy supply to support economic **expansion and** in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight key objectives were identified, namely:

- Objective 1: Ensure security of supply;
- Objective 2: Minimise the cost of energy;
- Objective 3: Promote the creation of jobs and localisation;
- Objective 4: Minimise negative environmental impacts from the energy sector;
- Objective 5: Promote the conservation of water;

- Objective 6: Diversify supply sources and primary sources of energy;
- Objective 7: Promote energy efficiency in the economy; and
- Objective 8: Increase access to modern energy.

The IEP provides an assessment of current energy consumption trends within different sectors of the economy (i.e. agriculture, commerce, industry, residential and transport) and uses this information to identify future energy requirements, based on different scenarios. The scenarios are informed by different assumptions on economic development and the structure of the economy and also take into account the impact of key policies such as environmental policies, energy efficiency policies, transport policies and industrial policies, amongst others.

Based on this information the IEP then determines the optimal mix of energy sources and technologies to meet those energy needs in the most cost-effective manner for each of the scenarios. The associated environmental impacts, socio-economic benefits and macroeconomic impacts are also analysed. The IEP is therefore focused on determining the long-term energy pathway for South Africa, taking into account a multitude of factors which are embedded in the eight objectives.

As part of the analysis four key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios:

- The Base Case Scenario assumes that existing policies are implemented and will continue to shape the energy sector landscape going forward. It assumes moderate economic growth in the medium to long term;
- The Environmental Awareness Scenario is characterised by more stringent emission limits and a more environmentally aware society, where a higher cost is placed on externalities caused by the supply of energy;
- The Resource Constrained Scenario in which global energy commodity prices (i.e. coal, crude oil and natural gas) are high due to limited supply;
- The Green Shoots Scenario describes an economy in which the targets for high economic growth and structural changes to the economy, as set out in the National Development Plan (NDP), are met.

The IEP notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of renewable energy the document refers to wind and solar energy. The document does however appear to support solar over wind noting that solar PV and CSP with storage present excellent opportunities to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Solar technologies also present the greatest potential for job creation and localisation. Incentive programmes and special focused programmes to promote further development in the technology, as well as solar roll-out programmes should be pursued.

3.4.6 Integrated Resource Plan for Electricity (2010-2030)

The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 is a subset of the IEP and constitutes South Africa's national electricity plan. The primary objective of the IRP is to determine the long term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing and cost. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation.

The current iteration of the IRP, led to the Revised Balanced Scenario (RBS) that was published in October 2010. Following a round of public participation which was conducted in November / December 2010, several changes were made to the IRP model assumptions. The document outlines the proposed generation new-build fleet for South Africa for the period 2010 to 2030. This scenario was derived based on a cost-optimal solution for new-build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation.

The Policy-Adjusted IRP reflects recent developments with respect to prices for renewables. In addition to all existing and committed power plants, the plan includes 9.6GW of nuclear; 6.25GW of coal; 17.8GW of renewables; and approximately 8.9GW of other generation sources such as hydro, and gas.

3.4.7 National Development Plan 2030 (2012)

The National Development Plan (NDP) 2030 is a plan prepared by the National Planning Commission in consultation with the South African public which is aimed at eliminating poverty and reducing inequality by 2030. The NDP aims to achieve this by drawing on the energies of its people, growing and inclusive economy, building capabilities, enhancing the capacity of the state and promoting leaderships and partnerships throughout society. While the achievement of the objectives of the NDP requires progress on a broad front, three priorities stand out, namely:

- Raising employment through faster economic growth.
- Improving the quality of education, skills development and innovation.
- Building the capability of the state to play a developmental, transformative role.

In terms of the Energy Sectors role in empowering South Africa, the NDP envisages that, by 2030, South Africa will have an energy sector that promotes:

- Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation.
- Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households.
- Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change.

The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The proposed project will assist in reducing carbon emissions targets and creating jobs in the local area as well as assist in creating a competitive infrastructure based on terms of energy contribution to the national grid.

3.4.8 The New Growth Path Framework

The aim of the New Economic Growth Path Framework is to enhance growth, employment creation and equity. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard the framework identifies investments in five key areas namely: energy, transport, communication, water and housing.

The New Growth Path also identifies five other priority areas as part of the programme, through a series of partnerships between the State and the private sector. The Green Economy as one of the five priority areas to create jobs, including expansions in construction and the production of technologies for solar, wind and biofuels. In this regard clean manufacturing and environmental services are projected to create 300 000 jobs over the next decade.

3.4.9 National Infrastructure Plan

The South African Government adopted a National Infrastructure Plan in 2012. The aim of the plan is to transform the economic landscape while simultaneously creating significant numbers of new jobs and strengthen the delivery of basic services. The plan also supports the integration of African economies. In terms of the plan Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure. The aim of the investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, electricity plants, hospitals, schools and dams will contribute to improved economic growth.

As part of the National Infrastructure Plan, Cabinet established the Presidential Infrastructure Coordinating Committee (PICC). The Committee identified and developed 18 strategic integrated projects (SIPs). The SIPs cover social and economic infrastructure across all nine provinces (with an emphasis on lagging regions) and consist of:

- Five geographically-focussed SIPs;
- Three spatial SIPs;
- Three energy SIPs;
- Three social infrastructure SIPs;
- Two knowledge SIPs;
- One regional integration SIP;
- One water and sanitation SIP.

The three energy SIPs that are related to Dyasons Klip 5 are SIP 8, 9 and 10.

Table 14: Strategic Infrastructure applicable to Dyasons Klip 5

SIP	Relevance
SIP 8: Green energy in support of the South African economy	Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010); Support bio-fuel production facilities.
SIP 9: Electricity generation to support socio-economic development	Accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances; Monitor implementation of major projects such as new power stations: Medupi, Kusile and Ingula
SIP 10: Electricity transmission and distribution for all	Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

3.4.10 Strategic Environmental Assessment (SEA) for Wind and Solar PV energy in South Africa

The Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2013) identified eight (8) Renewable Development Zones (REDZs). The REDZs identified areas where large scale renewable energy facilities can be developed in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country. The Dyasons Klip 5 site is located within the Upington REDZ (REDZ 7), which was formally gazetted in 2018. The area has therefore been identified as suitable for the establishment of renewable energy facilities, specifically large-scale solar farms.

3.4.11 Conservation of Migratory Species of Wild Animals

Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention) is an intergovernmental treaty and is the most appropriate instrument to deal with the conservation of terrestrial, aquatic and avian migratory species. The convention includes policy and guidelines with regards to the impact associated with man-made infrastructure. CMS requires that parties (South Africa is a signatory) take measures to avoid migratory species from becoming endangered (Art II, par. 1 and 2) and to make every effort to prevent the adverse effects of activities and obstacles that seriously impede or prevent the migration of migratory species i.e. power lines (Art 111, par. 4b and 4c).

An Avifaunal Specialist has been appointed to consider the impact of the proposed Dyasons Klip 5 as well as the powerline connecting the facility to the Eskom Upington MTS. Birdlife Africa South Africa will be given an opportunity to comment in this regard.

3.4.12 The Agreement on the Convention of African-Eurasian Migratory Water Birds

The Agreement on the Conservation of African-Eurasian Migratory Water birds (AEWA) is an intergovernmental treaty dedicated to the conservation of migratory water birds and their habitat across Africa, Europe, the Middle East Central Asia, Greenland and the Canadian Archipelago. The AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle and is a legally binding agreement by all contracting parties (South Africa included) to guarantee the conservation of migratory water birds within their national boundaries through species and habitat protection and the management of human activities. As mentioned above, an Avifaunal Specialist has been appointed to consider the impact of the proposed Dyasons Klip 5 as well as the powerline connecting the facility to the Eskom Upington MTS (Annexure E1). Birdlife Africa (South Africa) will be given an opportunity to comment in this regard.

3.4.13 Guidelines to minimise the impacts on birds of Solar Facilities and Associated Infrastructure in South Africa

The “Guidelines to minimise the impact on birds of Solar Facilities and Associated Infrastructure in South Africa” (Smit, 2012) is perhaps the most important (although not legally binding) document from an avifaunal impact perspective currently applicable to solar development in South Africa. The guidelines are published by BirdLife South Africa (BLSA) and detail the recommended procedure for conducting an avifaunal specialist study as well as list all of the potential impacts of interactions between birds and solar facilities and associated infrastructure. We are aware of changes to the BLSA best-practise guidelines recently published at the Birds and Renewable Energy Forum in Johannesburg (2015) and although the revised requirements are still a work in progress and have not yet been ratified, they will inform this assessment where applicable. Please refer to Annexure E1 for a copy of the Avifaunal assessment undertaken for this project.

3.4.14 Environmental Impact Assessment Guideline for Renewable Energy Projects

The Minister of Environmental Affairs published the Environmental Impact Assessment Guideline for Renewable Energy in terms of section 24J of the National Environmental Management Act, 1998 (Act No. 107 of 1998) on 16 October 2016.

In pursuit of promoting the country’s Renewable Energy development imperatives, the Government has been actively encouraging the role of Independent Power Producers (IPPs) to feed into the national grid. Through its REIPPPP, the DoE has been engaging with the sector in order to strengthen the role of IPPs in renewable energy development. Launched during 2011, the REIPPPP is designed so as to contribute towards a target of 3 725MW, and towards socio-economic and environmentally sustainable development, as well as to further stimulate the renewable industry in South Africa.

In order to facilitate the development of the first phase of IPPs in South Africa, these guidelines have been written to assist project planning, financing, permitting, and implementation for both developers and regulators. The guideline is principally intended for use by the following stakeholder groups:

- Public Sector Authorities (as regulator and/or competent authority);
- Joint public sector authorities and project funders, e.g., Eskom, IDC, etc.;
- Private Sector Entities (as project funder/developer/consultant);
- Other interested and affected parties (as determined by the project location and/or scope).

This guideline aims to ensure that all potential environmental issues pertaining to renewable energy projects are adequately and timeously assessed and addressed as necessary so as to ensure

sustainable roll-out of these technologies by creating a better understanding of the environmental approval process for renewable energy projects.

The guidelines list the following possible environmental impacts associated with the development of solar energy facilities.

Table 15: Potential environmental impacts of solar energy projects (Adapted from DEFF, 2015) showing where they have been considered in this report

Impact Description	Relevant Legislation	Applicability to this project
Visual Impact	NEMA	Specialist input attached in Annexure E6.
Noise Impact (CSP)	NEMA	Not applicable, as CSP is not considered as a technology alternative.
Land Use Transformation (fuel growth and production)	NEMA, NEMPAA, NHRA	Not Applicable to PV. Agricultural specialist input however attached in Annexure E3
Impacts on Cultural Heritage	NEMA, NHRA	Heritage impact assessment attached in Annexure E4.
Impacts on Biodiversity	NEMA, NEMBA, NEMPAA, NFA	Biodiversity specialist input attached in Annexure E1 and E2 (Ecology and Freshwater respectively)
Impacts on Water Resources	NEMA, NEMICMA, NWA, WSA	The project will obtain water directly from the local municipality. A freshwater ecologist has assessed the potential impacts on freshwater resources (Annexure E2).
Hazardous Waste Generation (CSP and PV)	NEMA, NEMWA, HAS	The EMPr makes provision for damaged and defunct PV infrastructure for dismantling and re-use.
Electromagnetic Interference	NEMA	The nearest SKA station has been identified as Rem-Opt-9, at approximately 50km from the proposed Dyasons Klip 5. SKA have been given an opportunity to provide comment in this regard.
Aircraft Interference	NEMA, MSA	The SA CAA have been automatically registered as an interested and affected party on this environmental process. There are no airports nor landing strips in the vicinity of the proposed site.
Loss of Agricultural Land	SALA	Agricultural specialist input is attached in Annexure E3
Sterilisation of mineral resources	MPRDA	The Department of Mineral Resources has been registered as an I&AP on this environmental process.

Assuming an IPP project triggers the need for BA or S&EIR under the EIA regulations, included in the assessment process is the preparation of an environmental management programme (EMPr). Project-specific measures designed to mitigate negative impacts and enhance positive impacts should be informed by good industry practice and are to be included in the EMPr. Potential mitigation measures for solar energy projects include but are not limited to:

- Conduct pre-disturbance surveys as appropriate to assess the presence of sensitive areas, fauna, flora and sensitive habitats;
- Plan visual impact reduction measures such as natural (vegetation and topography) and engineered (berms, fences, and shades, etc.) screens and buffers;
- Utilise existing roads and servitudes as much as possible to minimise project footprint;
- Site projects to avoid construction too near pristine natural areas and communities;
- Locate developments away from important habitat for faunal species, particularly species which are threatened or have restricted ranges, and are collision-prone or vulnerable to disturbance, displacement and/or habitat loss;
- Fence sites as appropriate to ensure safe restricted access;
- Ensure dust abatement measures are in place during and post construction;
- Develop and implement a storm water management plan;
- Develop and implement waste management plan; and
- Re-vegetation with appropriate indigenous species to prevent dust and erosion, as well as establishment of alien species.

The recommendations of these guidelines have been explicitly considered in this Basic Assessment process and where necessary, additional specialist input has been obtained. Please see Section 6 of this BAR for a full assessment of impacts.

3.4.15 Sustainability Imperative

The norm implicit to our environmental law is the notion of sustainable development (“SD”). SD and sustainable use and exploitation of natural resources are at the core of the protection of the environment. SD is generally accepted to mean development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. The evolving elements of the concept of SD *inter alia* include the right to develop; the pursuit of equity in the use and allocation of natural resources (the principle of intra-generational equity) and the need to preserve natural resources for the benefit of present and future generations. Economic development, social development and the protection of the environment are considered the pillars of SD (the triple bottom line).

“Man-land relationships require a holistic perspective, an ability to appreciate the many aspects that make up the real problems. Sustainable planning has to confront the physical, social, environmental and economic challenges and conflicting aspirations of local communities. The imperative of sustainable planning translates into notions of striking a balance between the many competing interests in the ecological, economic and social fields in a planned manner. The ‘triple bottom line’ objectives of sustainable planning and development should be understood in terms of economic efficiency (employment and economic growth), social equity (human needs) and ecological integrity (ecological capital).”

As was pointed out by the Constitutional Court, SD does not require the cessation of socio-economic development but seeks to regulate the manner in which it takes place. The idea that developmental and environmental protection must be reconciled is central to the concept of SD - it implies the accommodation, reconciliation and (in some instances) integration between economic development,

social development and environmental protection. It is regarded as providing a “conceptual bridge” between the right to social and economic development, and the need to protect the environment.

Our Constitutional Court has pointed out that the requirement that environmental authorities must place people and their needs at the forefront of their concern so that environmental management can serve their developmental, cultural and social interests, can be achieved if a development is sustainable. *“The very idea of sustainability implies continuity. It reflects the concern for social and developmental equity between generations, a concern that must logically be extended to equity within each generation. This concern is reflected in the principles of inter-generational and intra-generational equity which are embodied in both section 24 of the Constitution and the principles of environmental management contained in NEMA.”* [Emphasis added.]

In terms of NEMA sustainable development requires the integration of the relevant factors, the purpose of which is *to ensure that development serves present and future generations.*²³

It is believed that the proposed 100MW Dyasons Klip 5 supports the notion of sustainable development by presenting a reasonable and feasible alternative to the existing vacant land use type within a REDZ, which has limited agricultural potential due the lack of water and infrastructure.

Furthermore, the proposed alternative energy project (reliant on a natural renewable resource – solar energy) is in line with the national and global goal of reducing reliance on fossil fuels, thereby providing long-term benefits to future generations in a sustainable manner.

3.4.16 DEFF Screening Tool and Protocols

A screening tool report was generated for the proposed Dyasons Klip 5. The outcomes of the various environmental themes sensitivities as well as the level of study required by the protocols, are summarised in the table below.

Table 16: Sensitivity of the environmental themes and studies undertake in terms of these sensitivities

Environmental Theme	Sensitivity	Required investigation	Discussion / Compliance
Agriculture Theme	Low	Agricultural Compliance Statement	A more detailed agricultural impact statement was undertaken. This is attached as part of the specialist and technical studies in Appendix E.
Animal Species Theme	Low	Animal Species Compliance statement	This forms part of the detailed ecology Impact Assessment
Aquatic Biodiversity Theme	High	Aquatic Impact Assessment	This was undertaken and is attached in Appendix E
Archaeological and Cultural Heritage Theme	Medium	Heritage Impact Assessment	A detailed Heritage Impact Assessment, encompassing and Archaeology Impact Assessment, Palaeontology Desktop Assessment and Visual Impact Assessment has been undertaken.
Bats Theme	Low	Compliance Statement	Forms part of the detailed ecology impact assessment
Civil Aviation (Solar PV) Theme	Low	Compliance Statement	The South African Civil Aviation Authority will be provided an opportunity to comment in this regard.

²³

Refer to definition of “sustainable development” in section 1 of NEMA.

Environmental Theme	Sensitivity	Required investigation	Discussion / Compliance
Landscape (Solar) Theme	Very High	Visual and Landscape Impact Assessment	This was undertaken and is attached to the BAR in Appendix E
Plant Species Theme	Medium	Compliance Statement	A full botanical Impact Assessment was undertaken.
RFI Theme	Medium	Compliance Statement	The South African Square Kilometre Array SKA-SA will be requested to provide professional comment in this regard.
Terrestrial Biodiversity Theme	Very High	Terrestrial Biodiversity Impact Assessment	A Terrestrial Biodiversity Impact Assessment was undertaken and is attached in appendix 4

The table below reflects the specialist studies recommended in the DEFF Screening tool and whether they have been included in this BAR.

Table 17: Specialist Studies recommended in the DEFF Screening Tool.

Study Recommended	Discussion
Agricultural Impact Assessment	Completed
Landscape/Visual Impact Assessment	Completed
Archaeological and Cultural Heritage Impact Assessment	Completed
Palaeontology Impact Assessment	Completed
Terrestrial Biodiversity Impact Assessment	Completed
Aquatic Biodiversity Impact Assessment	Completed
Avian Impact Assessment	Completed
Civil Aviation Assessment	Not Completed – the South Avian Civil Aviation Authority will be approached to provide input in this regard.
Defence Assessment	Not Completed – the South African National Defence Force will be approached to provide input in this regard.
RFI Assessment	Not Completed – The South African Square Kilometre Array (SA SKA) will be approached to provide comment in this regard.
Geotechnical Assessment	Not Compiled – The South African Council for Geoscience will be requested to provide input
Socio-Economic Assessment	Completed
Plant Species Assessment	Completed
Animal Species Assessment	Completed

4. PLANNING CONTEXT

A Planning specialist will be appointed in order to submit application in terms of the relevant planning legislation for the proposed facility. Please refer to the planning statement attached in Appendix E14 for the detailed planning context from which the following key components are drawn.

- A **land use change application** for the rezoning of approximately 267ha, from **Agricultural Zone I to Special Zone**, will be lodged at the Kai !Garib Local Municipality, in accordance with the Northern Cape Planning and Development Act (Act 7 of 1998).
- If there are restrictive Title Deed conditions burdening the proposed development, an application for the removal thereof will be lodged at the Government of the Northern Cape Province, Department: Corporate Governance and Traditional Affairs, in accordance with the Removal of Title Deed Restriction Act (Act 84 of 1967).

- Parallel to the rezoning application, a **long term lease application will be lodged at the National Department of Agriculture**, in accordance with the Subdivision of Agricultural Land Act (Act 70 of 1970).
- Relevant planning documents, on all spheres of Government, will be evaluated before any land use change application is launched. These documents include, but are not limited to the following: **NSDP** (National Spatial Development Perspective); **PGDS NC** (Provincial Growth and Development Strategy), Northern Cape Province; **IDP** (Integrated Development Plan); **SDF** (Spatial Development Framework).

The planning specialist will furthermore likely engage with the following authorities as part of the planning process.

- Kai !Garib Municipality for approval in terms of the relevant Zoning Scheme;

Where relevant, these authorities will also be engaged with as part of the EIA Process and will be given an opportunity to provide input and comment within this process.

- Northern Cape Department of Agriculture as well as the National Department of Agriculture, Forestry & Fisheries (DAFF) for approval in terms of Act 70 of 70 (SALA) and Act 43 of 83(CARA);
- District Roads Engineer;
- Department of Water and Sanitation (DWS) for comment in terms of the National Water Act;
- Department of Mineral Resources for approval in terms of Section 53 of Act 28 of 2002;
- Department of Transport & Public Works;
- South African Heritage Resource Agency (SAHRA) ;
- Civil Aviation Authority;
- Eskom Northern Cape; and
- Northern Cape Nature Conservation.

5. SITE DESCRIPTION AND ATTRIBUTES

The following sections provide a description of the natural environmental and built environment context of the Remainder of Farm Dyason's Klip 454, with particular focus on the site location for the proposed Dyasons Klip 5.

5.1 LOCATION & BUILT ENVIRONMENT

The property, Remainder of Farm Dyason's Klip 454, is located in the ZF Mgcawu District (previously Siyanda District) of the Northern Cape Province, within the jurisdiction area of the Kai !Garib Local Municipality. The property is approximately 5725.28 ha in size and is located approximately 14km East of Keimoes. The Grid connection crosses a number of additional properties, namely: Remainder of Farm Rooipunt 617, Remainder Tungsten Lodge 638 and Olyvenhouts Drift Settlement Agricultural Holding 1080.

The proposed Dyasons Klip 5 is accessed and is situated directly north of the N14 between Upington and Keimoes.

No buildings, ruins or any other structures were noted on or within the direct proximity of the proposed Dyasons Klip 5 site.

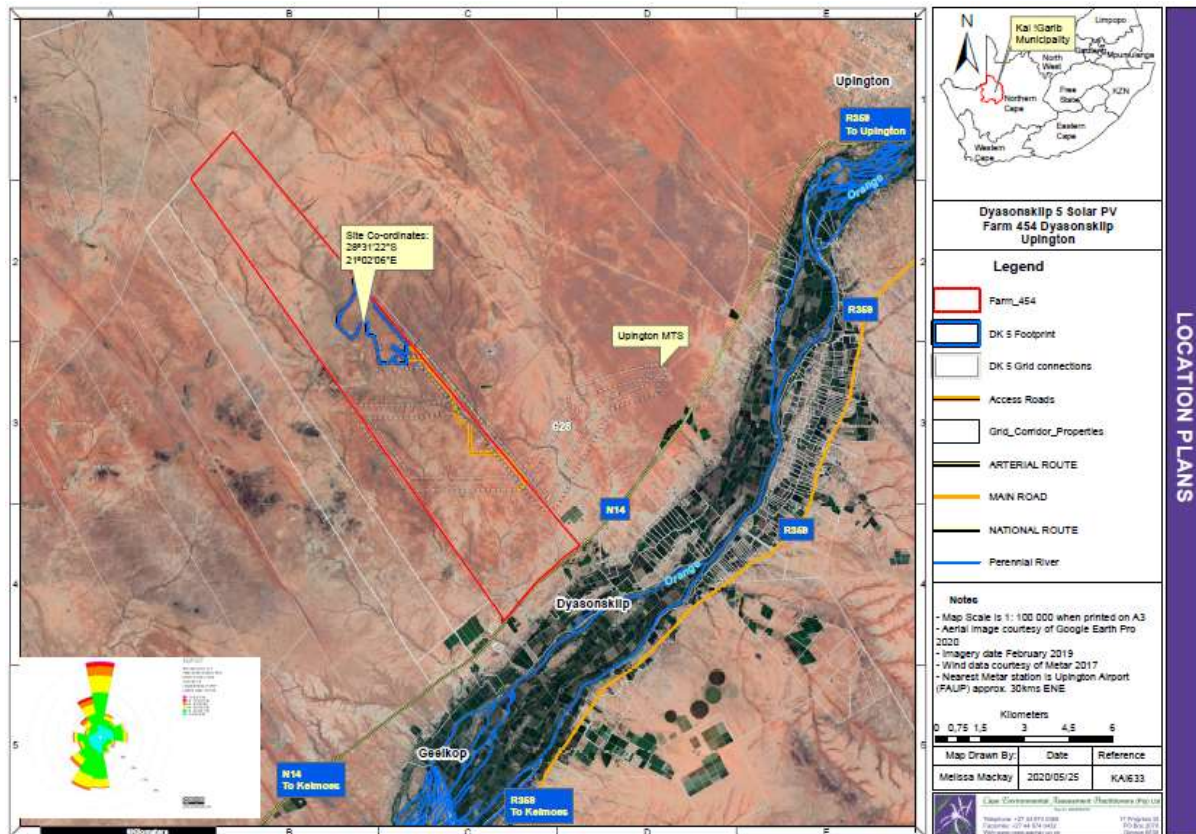


Figure 22: Location of the proposed Dyasons Klip 5.

5.2 GEOLOGY & CLIMATE

The following information relating to geology and climate was obtained from the Agricultural Specialist; please refer to Appendix E4 for a full copy of his report.

5.2.1 Geology & Soils

The area lies in the Kalahari geological group of the Namaqualand metamorphic complex. This is the youngest of the geological groups formed in the past 65 million years. The lithology (mineralogical composition and texture of rocks) of this area consists of:

5.2.1.1 Sand

During a very dry period in Southern Africa some 100 000 years ago sand was transported from the Namib desert by strong and continuous winds and distributed over the Kalahari.

5.2.1.2 Limestone

Limestone is a sedimentary rock consisting largely of calcium-carbonate, which is usually derived from the shells of minute marine or fresh-water animals. Sand, clay and minerals such as magnesia or iron oxide are also present.

Sedimentary and Volcanic rocks (parent material of soils) found in the area include Migmatite, Schist, Gneiss, Kinzigite and granite.

5.2.1.3 Soil

Calcic soils are prone to develop under the climatic conditions and geology of the area.

Calcic soils originate in arid climates with the accumulation of secondary lime, forming a distinctive horizon consisting chiefly of calcite. In calcic soils either hardpan carbonate or a soft carbonate horizon or (rarely) gypsic horizon dominates the morphology of the sub-soil.

AGIS indicates the typical profile for soils in this region as follows:

- Soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils;
- Lime generally present in part or most of the landscape;
- Red and yellow well drained sandy soil with high base status;
- Freely drained, structure less soils;
- Favourable physical properties; and
- Soils may have restricted soil depth, excessive drainage, high erodibility and low natural fertility.

5.2.2 Climate

The region is classified as an arid zone with desert climate. Specific parameters are shown in the table below.

Table 18: Climatic parameters of associated with Dyasons Klip 5.

Rainfall	
Annual rainfall	0-200mm
Summer rainfall	<62.5mm
Winter rainfall	<62.5mm
Variation in rainfall	<62.5mm40 – 50 %
Temperature	
Mean maximum temperature	>35°C
January Temperature	>27.5°C
Mean Minimum Temperature	2-4°C
July Temperature	<7.5°C
Temperature range	>15°C
First frost expected	21-31 May
Last frost expected	01 – 10 September
Hours of sunshine	>80%
Evaporation	>2400mm
Humidity	<30%

5.3 TOPOGRAPHY

The terrain type is labelled as rolling or irregular plains with some relief and Level plains with some relief. The Slope is less than 5%.

5.4 BOTANICAL COMPOSITION OF THE SITE

Mr Simon Todd undertook a Botanical Impact Assessment which formed part of larger Ecological Impact Assessment Report. Please refer to the Ecological Impact Assessment attached in **Annexure E1** from which the following has been drawn.

5.4.1 Broad-Scale Vegetation Patterns

Dyasons Klip 5 is located in the Kalahari Karroid Shrubland²⁴ and Bushmanland Arid Grassland vegetation types. The study area is not located in a threatened ecosystem. The threatened Lower Gariep Alluvial Vegetation is located south of the study area and will not be affected by the development.

Both Kalahari Karroid Shrubland and Bushmanland Arid Grassland are classified as Least Threatened and have been little impacted by transformation and more than 99% of their original extent is still intact. Both vegetation types are considered Hardly Protected within formal conservation areas. Mucina and Rutherford (2006), list 6 endemic species for the Bushmanland Arid Grassland, while no vegetation-type endemic species are known from the Kalahari Karroid Shrubland. The biogeographically important and endemic species known from these vegetation types tend to be widespread within the vegetation type itself and local-level impacts are not likely to be of significance for any of these vegetation types or species concerned. Bushmanland Arid Grassland is widely distributed and is among the most extensive vegetation types in South Africa while the Kalahari Karroid Shrubland is less extensive, but represents a transitional vegetation type between the northern Nama Karoo and Kalahari (Savannah) vegetation types.

In reality, the Vegmap provides a very coarse representation of the vegetation of the site. In the broader study area, Kalahari Karroid Shrubland and Bushmanland Arid Grassland form a mosaic across the area reflecting substrate conditions especially soil depth and texture. Areas of deeper sands such as in the lower-lying areas towards the drainage systems of the site are dominated by grasses typical of Bushmanland Arid Grassland while areas of shallow soils with exposed calcrete or quartzite are dominated by shrubby vegetation typical of Kalahari Karroid Shrubland.

Species observed within the areas of Kalahari Karroid Shrubland include shrubs such as *Leucosphaera bainesii*, *Hermannia spinosa*, *Monoechma genistifolium*, *Salsola rabieana*, *Aptosimum albomarginatum*, *A.spinecens*, *Kleinia longiflora*, *Limeum argute-carinatum*, *Phyllanthus maderaspatensis*, *Zygophyllum dregeanum* and grasses such as *Stipagrostis anomala*, *S.ciliata*, *S.uniplumis*, *S.hochstetteriana* and *Schmidtia kalariensis*.

Species of conservation concern that may be present include *Adenium oleifolium*, *Aloe claviflora* and *Hoodia gordonii*, although none of these species were observed within the development area. The typical state of this vegetation type is illustrated below in the photos below.

²⁴ The facility falls within Kalahari Karroid Shrubland, while portions of the grid connection fall within Bushmanland Arid Thicket.

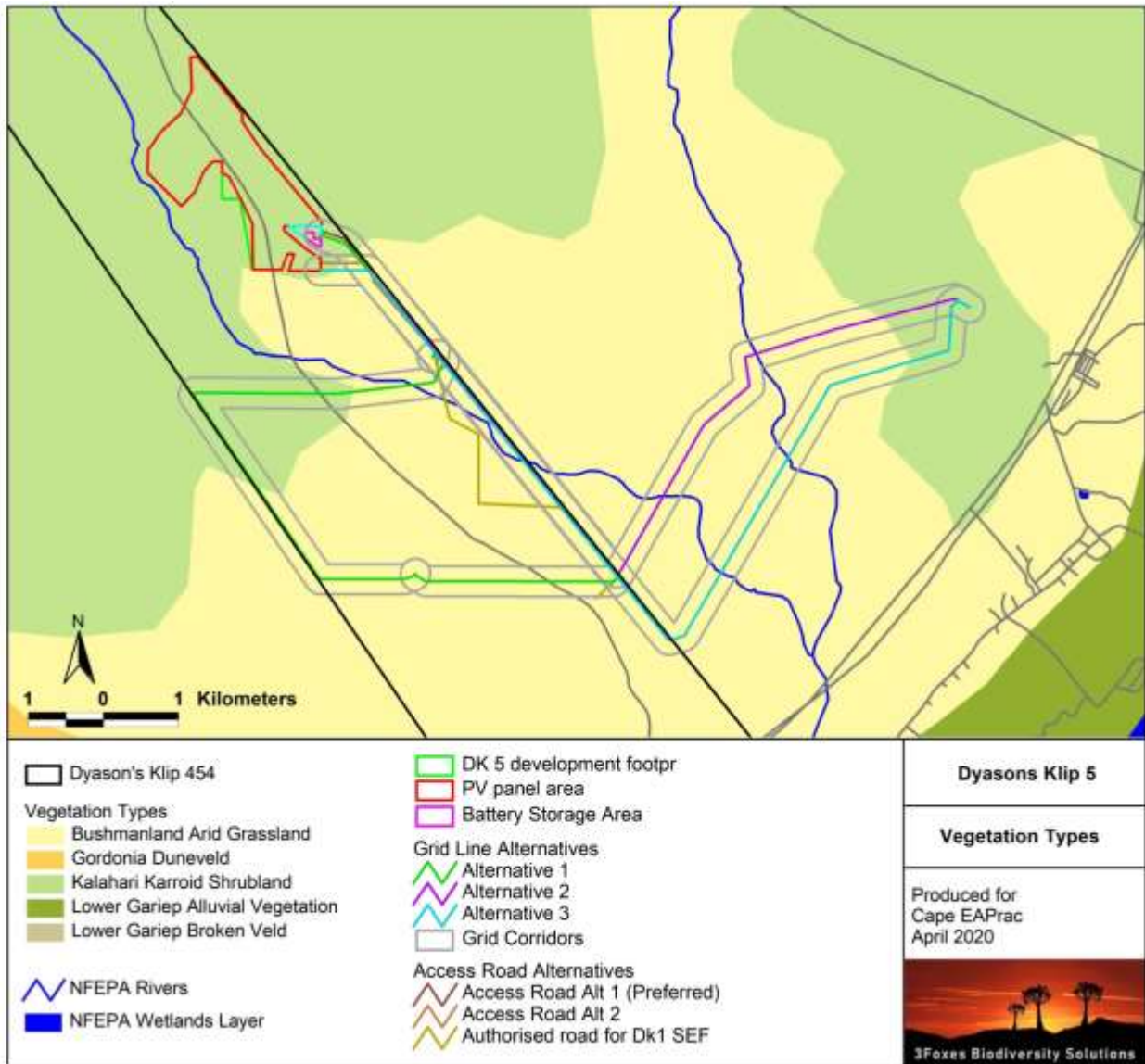


Figure 23. Broad-scale overview of the vegetation in and around the Dyasons Klip 5 PV development area (Todd, 2020)

Table 19: Attributes of the Kalahari Karroid Shrubland vegetation type in which the facility falls.

Name of vegetation type	Kalahari Karroid Shrubland
Code	NKb5
Conservation Target (percent of area) from NSBA	21%
Protected (percent of area) from NSBA	0.1%
Remaining (percent of area) from NSBA	99.2%
Description of conservation status from NSBA	Least threatened
Description of the Protection Status from NSBA	Hardly protected
Area (km ²) of the full extent of the Vegetation Type	8283.90
Name of the Biome	Nama-Karoo

Table 20: Attributes of Bushmanland Arid Grassland vegetation type in which portions of the Grid connection fall.

Name of vegetation type	Bushmanland Arid Grassland
Code	NKb3
Conservation Target (percent of area) from NSBA	21%
Protected (percent of area) from NSBA	0.4%
Remaining (percent of area) from NSBA	99.4%

Name of vegetation type	Bushmanland Arid Grassland
Description of conservation status from NSBA	Least threatened
Description of the Protection Status from NSBA	Hardly protected
Area (km ²) of the full extent of the Vegetation Type	45478.96
Name of the Biome	Nama-Karoo



Figure 24: Kalahari Karroid Shrubland on shallow soils in the north of the Dyasons Klip 5. This habitat is characterised by shallow soils overlying calcrete and is considered low sensitivity.



Figure 25: The south of the Dyasons Klip 5 is located in areas on deeper soils with a dense grass layer



Figure 26: The washes within the Dyasons Klip 5 PV development area are poorly developed and can be recognised by the presence of taller shrubs.



Figure 27. A larger drainage line which occurs along the power line route to the Upington MTS.

Drainage lines such as above must be straddled by the powerline (i.e. pylons to be placed outside of the watercourse).

The current veld condition of the development area can be considered to be fair and while there are some areas that have clearly suffered some degradation in the past, the vegetation cover and composition can be considered typical for the broader study area. There are some localised areas of *Prosopis* invasion within the development area, usually around watering points, but in general there are

few alien species present across most of the development area and it can be considered to be largely intact and in moderate condition.

5.4.2 Listed and Protected Plant Species

Two National Forest Act (Act No. 84 of 1998) of 1998 (NFA) protected tree species occur at the site; *Vachellia (Acacia) erioloba* and *Boscia albitrunca*. Both of these species are associated mostly with the larger drainage lines of the site and few if any individuals of these species would be impacted by the PV field. These species are more common along the larger drainage lines that occur along the power line corridors and it is possible that there would be some minor impact on these species along the power line where larger trees would need to be cleared for construction and safety.

The provincially protected *Boscia foetida* subsp. *foetida* is also confirmed present at the site and is fairly widespread across the development area at a moderate density. There would be some unavoidable impact on this species and it is estimated that the density within the study area is 1-2 trees per hectare resulting in a total loss of approximately 500 individuals or less. *Boscia foetida* is however common in the Upington area and the density within the study area is not exceptional with the result that the local population of this species would not be compromised by the development, either from the Dyasons Klip 5 development alone or cumulatively from the other solar developments planned on the site. Although there are often quartz patches in the area which are home to several local endemics or specialised species, no significant quartz patches home to such species were observed within the development area.

5.5 TERRESTRIAL FAUNAL COMPONENT OF THE SITE

Mr Simon Todd undertook a Faunal Impact Assessment which formed part of larger Ecological Impact Assessment Report. Please refer to the Ecological Impact Assessment attached in **Annexure E1** from which the following has been drawn.

Vertebrate species (mammals, reptiles, amphibians) with a geographical distribution that includes the study area are listed in the Ecology Impact Assessment. All threatened (Critically Endangered, Endangered or Vulnerable) or near threatened vertebrate animals that could potentially occur in the study area and have habitat preference that includes habitats available in the study area, are discussed further below.

5.5.1 Mammals

The site falls within the distribution range of 46 terrestrial mammals, indicating that the mammalian diversity of the area is of moderate potential. The variety of habitats present at the site is however fairly low and the overall mammalian diversity at the site is likely to be lower than the richness of the broader study area. The lack of rocky hills or outcrops within the development area would preclude a variety of species from the affected area. Mammal species that can be confirmed present based on observations or are known from adjacent sites in the immediate area include Black-backed Jackal, African Wildcat, Cape Fox, South African Ground Squirrel, Springhare, Steenbok, Duiker, Springbok, Gemsbok, Cape Porcupine, Yellow Mongoose, Slender Mongoose, Cape Hare and Aardvark. Species such as Cape Clawless Otter and Water Mongoose may also occasionally be present in the rainy season when they apparently make forays from the Orange River to visit some of the larger pans of the area. For such species, the drainage lines represent important movement corridors.

Two listed terrestrial mammals may occur at the site, the Brown Hyaena *Hyaena brunnea* (Near Threatened) and Black-footed cat *Felis nigripes* (Vulnerable). While it is possible that both species occur at the site, it is least likely that the Brown Hyaena *Hyaena brunnea* is present as this species is often purposely or inadvertently persecuted within farming areas. As these two species have a wide national distribution, the development of Dyasons Klip 5 would not create a significant extent of habitat loss for these species.

Overall, there are no significant issues regarding mammals and the development of Dyasons Klip 5 PV. In general, the major impact associated with the development of Dyasons Klip 5 PV for mammals would be habitat loss and the disruption of the broad-scale connectivity of the landscape.

5.5.2 Reptiles

According to the Southern African Reptile Conservation Assessment (SARCA) database, 39 reptile species are known from the broader study area suggesting that the reptile diversity within the site is likely to be moderate to low. As there are no significant rocky outcrops within the development area, only species associated with sandy substrates or trees are likely to be present. Species observed within the development area or in the vicinity include the Namaqua Mountain Gecko *Pachydactylus montanus*, Ground Agama *Agama aculeata aculeata*, Spotted Sand Lizard *Pedioplanis lineocellata*, Rock Monitor *Varanus albigularis albigularis* and the Spotted Desert Lizard *Meroles suborbitalis*. No reptile species of conservation concern are known from the area and there do not appear to be any broad habitats at the site which would be of high significance for reptiles. As with mammals, the development of Dyasons Klip 5 is likely to result in local habitat loss for reptiles but as there are no listed or range-restricted reptiles that are likely to occur within the development area, the impacts are not likely to be of broader significance.

5.5.3 Amphibians

The site lies within the distribution range of 10 amphibian species. The only listed species which may occur at the site is the Giant Bullfrog *Pyxicephalus adspersus* which is listed as Near Threatened. No suitable breeding sites were observed in or near the development area and it is not likely that this species is present or would be affected by the development of Dyasons Klip 5 PV. As there are no natural perennial water sources within the development area, it is likely that amphibian abundance is generally low and restricted largely to those species that are relatively independent of water such as the Karoo Toad *Vandijkophrynus gariepensis*. Overall, given the low likely abundance of amphibians within the area, impacts on amphibians are likely to be localised and of a low significance.

5.6 AVIFAUNAL COMPONENT OF THE STUDY SITE

An Avifaunal Impact Assessment, including pre-construction avifaunal monitoring was undertaken by Chris van Rooyen. Please refer to the Avifaunal Impact Assessment Report attached in Appendix E2 for a full copy of this report. The following details on the avifaunal component of the site are summarised from this specialist report. The section below describes species that could potentially occur on site as well as those physically observed during the pre-construction monitoring.

5.6.1 Southern African Bird Atlas 2

The SABAP 2 data indicate that a total of 203 bird species could potentially occur in the broader area – Appendix 2 in the Avifaunal Impact Assessment provides a comprehensive list of all the species, including those recorded during the pre-construction monitoring. Of the priority species potentially occurring in the broader area, 35 could potentially occur in the study area. Eight (8) of these are South African Red Data species, and 5 are globally Red listed. The probability of a priority species occurring in the study area is indicated in the table below.

Table 21: Priority species which could potentially occur in the study area (Van Rooyen, 2020)

Species	Taxonomic name	Status			Class		Probability of occurrence	Habitat			Impact						
		SABAP2 full protocol reporting rate	Red Data Global	Red Data Regional	Endemic/near endemic - South Africa	Waterbird		Raptor	Recorded during surveys	Arid shrubland and rocky outcrops	Arid grassland	Surface water: Pans	Collision: PV panels	Displacement: Disturbance PV	Displacement: Habitat loss PV	Entrapment in fences	Displacement: Disturbance grid construction
Abdim's Stork	<i>Ciconia abdimii</i>	9.66	LCT	N			Low	x	x		x	x	x	x			
African Sacred Ibis	<i>Threskiornis aethiopicus</i>	51.14				x	Low			x		x					
Barn Owl	<i>Tyto alba</i>	19.89				x	High	x	x						x	x	
Black-eared Sparrowlark	<i>Eremopterix australis</i>	5.68			Near endemic		High	x	x	x	x	x	x				
Black-headed Heron	<i>Ardea melanocephala</i>	29.55				x	High			x	x	x	x				
Black-shouldered Kite	<i>Elanus caeruleus</i>	28.41				x	High	x	x	x		x	x			x	
Blacksmith Lapwing	<i>Vanellus armatus</i>	55.68				x	Medium			x		x					
Booted Eagle	<i>Aquila pennatus</i>	6.25				x	High	x	x	x		x	x			x	
Cattle Egret	<i>Bubulcus ibis</i>	61.36				x	Low	x	x	x		x					
Common Greenshank	<i>Tringa nebularia</i>	3.98				x	Low			x		x					
Common Ostrich	<i>Struthio camelus</i>	1.70					High	x	x	x		x	x			x	
Common Sandpiper	<i>Actitis hypoleucos</i>	2.27				x	Low			x		x					
Egyptian Goose	<i>Alopochen aegyptiacus</i>	59.66				x	High	x		x		x					x
Fiscal Flycatcher	<i>Sigelus silens</i>	15.34			Near endemic		High	x	x	x		x	x				
Greater Kestrel	<i>Falco rupicoloides</i>	3.98				x	High	x	x			x	x			x	x
Hamerkop	<i>Scopus umbretta</i>	31.25				x	Medium			x		x					
Karoo Korhaan	<i>Eupodotis vigorsii</i>	35.23	LCT	N			Very high	x	x	x		x	x	x	x		
Kori Bustard	<i>Ardeotis kori</i>	5.11	N T	N T			High	x	x	x	x	x	x	x	x		
Lanner Falcon	<i>Falco biarmicus</i>	10.80	V LCU			x	High	x	x	x		x	x			x	x
Ludwig's Bustard	<i>Neotis ludwigii</i>	3.41	E N	E N			Medium	x	x			x	x	x	x		
Martial Eagle	<i>Polemaetus bellicosus</i>	2.27	V U	E N		x	High	x	x	x		x	x			x	x
Pearl-spotted Owlet	<i>Glaucidium perlatum</i>	2.27				x	Medium			x		x	x			x	

Species	Taxonomic name	Status			Class		Probability of occurrence	Habitat			Impact						
		SABAP2 full protocol reporting rate	Red Data Global	Red Data Regional	Endemic/near endemic - South Africa	Waterbird		Raptor	Recorded during surveys	Arid shrubland and rocky outcrops	Arid grassland	Surface water: Pans	Collision: PV panels	Displacement: Disturbance PV	Displacement: Habitat loss PV	Entrapment in fences	Displacement: Disturbance grid construction
Pygmy Falcon	<i>Polihierax semitorquatus</i>	7.39				x	High	x	x	x	x	x	x	x			
Rock Kestrel	<i>Falco rupicolus</i>	6.82				x	High	x	x			x	x	x			
Secretarybird	<i>Sagittarius serpentarius</i>	1.14	V U	V U		x	Medium	x	x	x		x	x	x	x		
South African Shelduck	<i>Tadorna cana</i>	22.7 3				x	Medium			x		x					
Southern Pale Chanting Goshawk	<i>Melierax canorus</i>	15.3 4				x	Very high	x	x	x	x	x	x				x
Spotted Eagle-owl	<i>Bubo africanus</i>	2.27				x	High	x	x	x	x	x	x			x	x
Spur-winged Goose	<i>Plectropterus gambensis</i>	18.1 8				x	Medium			x		x					
Steppe Buzzard	<i>Buteo vulpinus</i>	2.27				x	Low	x	x	x		x	x				x
Tawny Eagle	<i>Aquila rapax</i>	0.00	V U	E N		x	High	x	x	x	x	x	x			x	x
Three-banded Plover	<i>Charadrius tricollaris</i>	38.0 7				x	Medium			x		x					
White-faced Duck	<i>Dendrocygna viduata</i>	13.6 4				x	Low			x		x	x				
Wood Sandpiper	<i>Tringa glareola</i>	7.95				x	Low			x		x					
Yellow-billed Duck	<i>Anas undulata</i>	9.66				x	Low			x		x	x				

5.6.2 Avifauna recorded on site

On-site surveys were conducted from 24 - 26 December 2019 and again from 16 - 18 March 2020 (6 days in total).

The abundance of species recorded during the walk transects and focal points are displayed in Figures 5, 6 and 7. A total of 75 individual birds were counted at the two focal points in the course of the surveys.

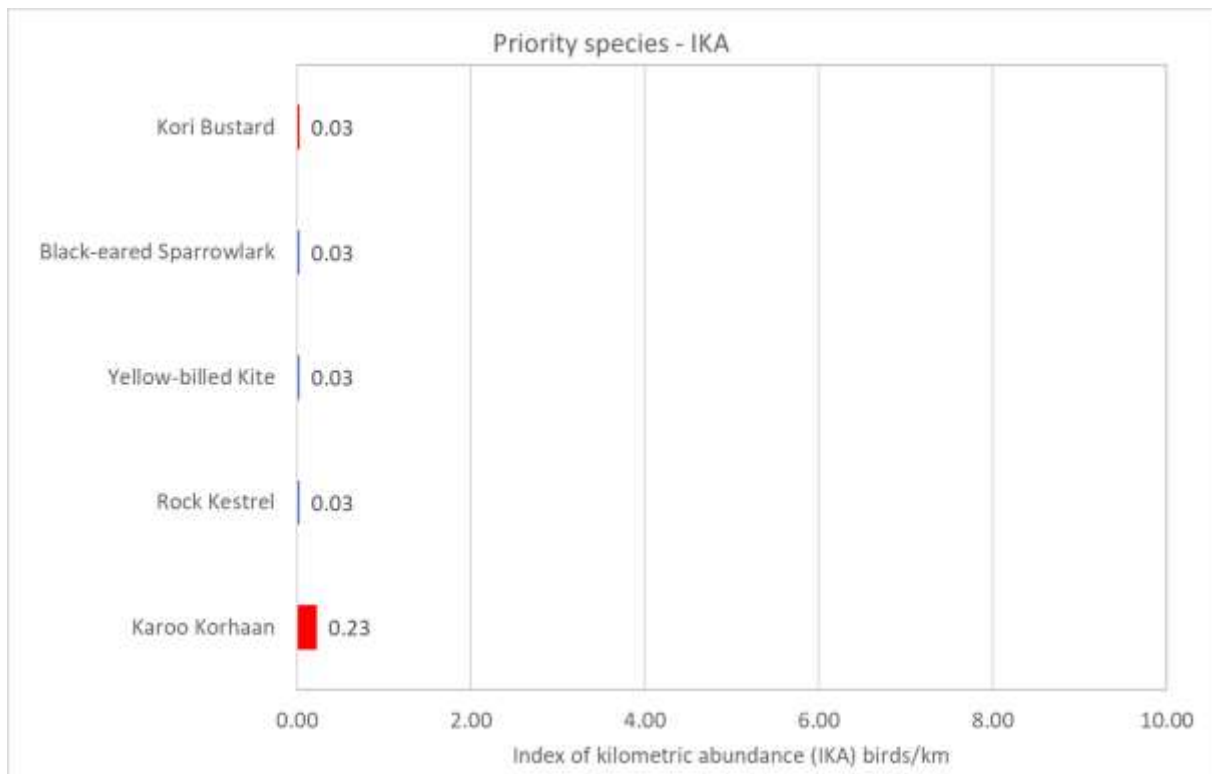


Figure 28: Index of kilometric abundance (IKA) for all priority species recorded. Red Data species are indicated in red bars.



Figure 29: Index of kilometric abundance (IKA) for all non-priority species recorded.

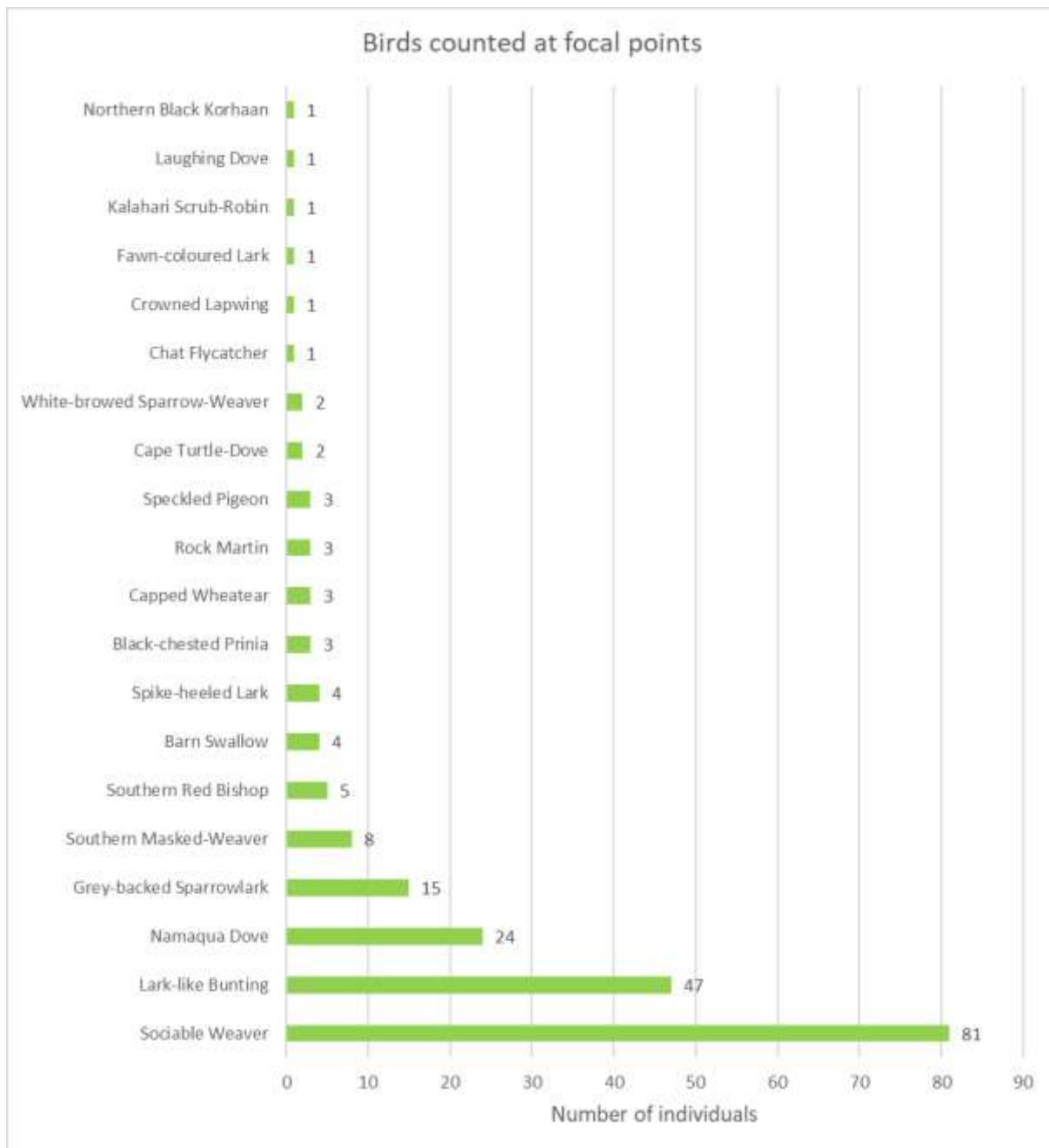


Figure 30: The variety and number of birds counted at focal points in the study area. No priority species were recorded at focal points.

5.7 AQUATIC COMPOSITION OF THE STUDY SITE

Dr Patsy Scherman undertook a freshwater resource assessment for the proposed Dyasons Klip 5. The section below details the aquatic composition of the project area, as determined during her study.

Mapping showed no wetlands within 500m of the proposed development site from either dataset — which was consistent with the ground-truthing exercise conducted. Wetlands found in the study area appear to be either depression wetlands or floodplain wetlands, mostly associated with the Orange River. Note some wetlands associated with the main drainage lines in the area, i.e. D73F-02996: Helbrandleegte, and D73F-03051: Helbrandkloofspruit, were mapped.

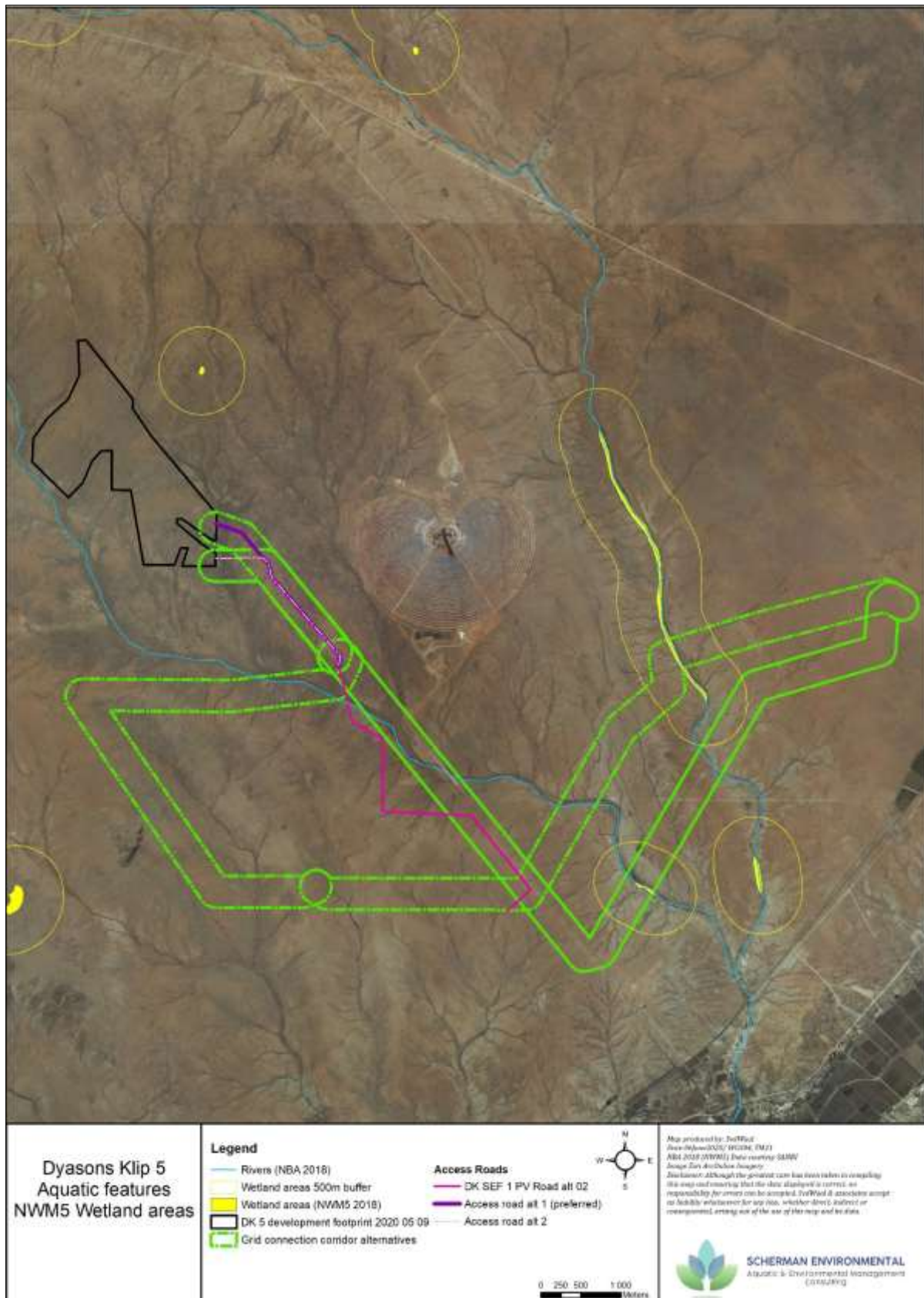


Figure 31: Watercourses as well as NWM5 wetlands in the broader study area with their 500m licensing zones in terms of the NWA (Scherman, 2020)

As the area was dry and drainage lines are ephemeral, instream biota (fish and macroinvertebrates) could not be sampled. Little moisture was seen on site, with no flowing water visible despite vegetation showing evidence of good recent rainfall.

A number of points on and outside the Dyasons Klip 5 site were evaluated during the early March 2020 field survey, as indicated in the figure below. Most floodout or drainage line points seen on site had been mapped, with a few added as part of ground-truthing. No wetland areas were identified on site by mapping or through ground-truthing.

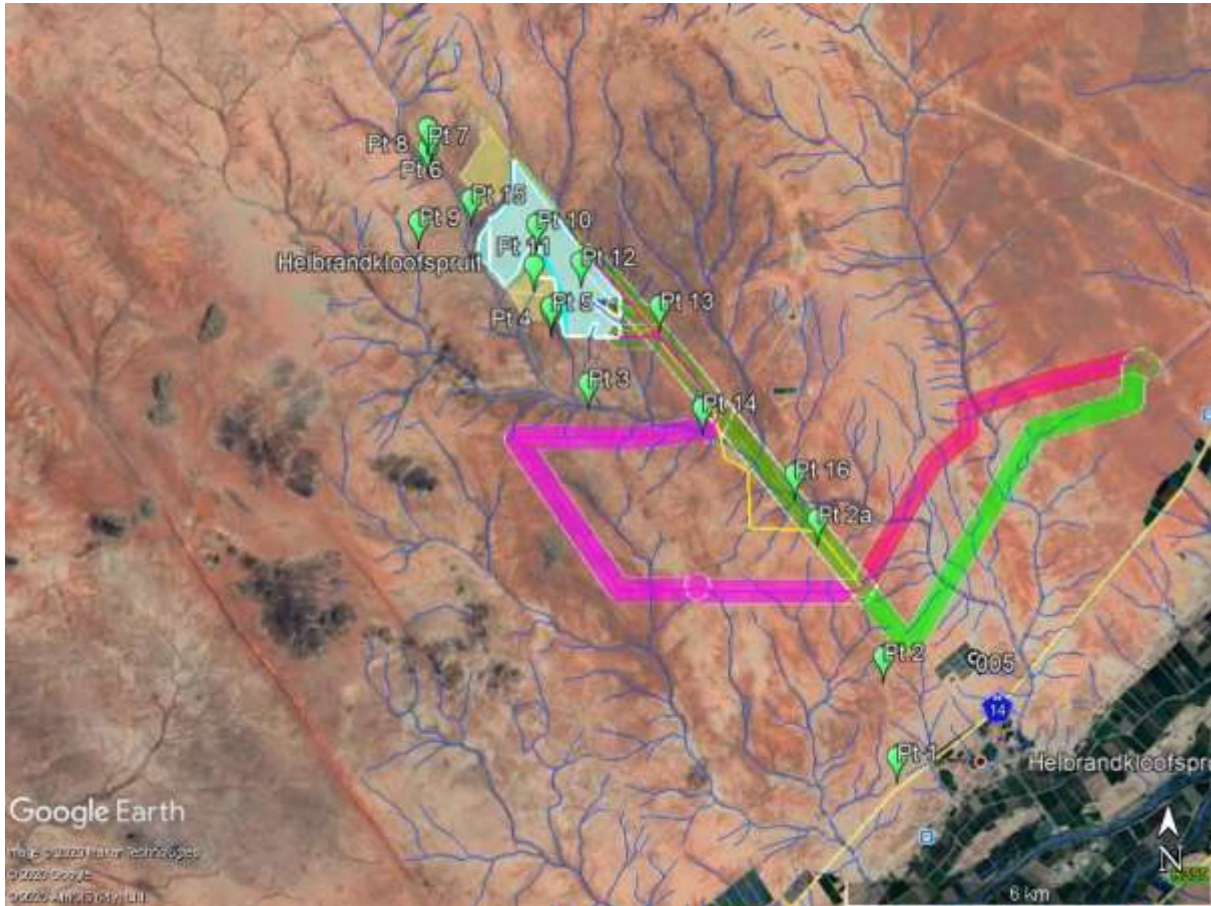


Figure 32: Points assessed during the site survey of March 2020

The proposed development occurs within the D73F catchment associated with alluvial systems of the Nama Karoo ecoregion. These mainstem watercourses are short tributaries of the Orange River (ca. 3 km from the development area), which are ephemeral in nature and did not contain any wetland elements within the development footprint (nonetheless, they still constitute as water resources in terms of the National Water Act). This lack of wetlands is an important consideration, as the study area has been highlighted in the DEFF Screening Tool.

5.8 SOCIO ECONOMIC CONTEXT

This section is summarised from the Social Impact Assessment undertaken by Mr Tony Barbour (Appendix E8) and provides an overview of the spatial context of the Province, District Municipality, and Local Municipality within which Dyasons Klip 5 is proposed for development, and provides the socio-economic basis against which potential issues can be identified.

5.8.1 Spatial Context of the Northern Cape Province

The Northern Cape Province is located in the north-western extent of South Africa and comprises South Africa's largest province; occupying an area 372 889km² in extent, equivalent to nearly a third (30.5%) of the country's total land mass. It is also South Africa's most sparsely populated province with a population of 1 145 861, and a population density of 3.1/km². It is bordered by the Provinces of Western Cape, and Eastern Cape Provinces to the south, and south-east; Free State, and North West Provinces to the east; Botswana and Namibia, to the north; and the Atlantic Ocean to the west. The Northern Cape is the only South African province which borders Namibia, and therefore plays an important role in terms of providing linkages between Namibia and the rest of South Africa. The Orange River is a significant feature, and is also the main source of water in the Province, while also constituting the international border between the Northern Cape and Namibia.

The Northern Cape offers unique tourism opportunities including wildlife conservation destinations, natural features, historic sites, festivals, cultural sites, stars gazing, adventure tourism, agricultural tourism, ecotourism, game farms, and hunting areas, etc. The Province is home to the Richtersveld Botanical and Landscape World Heritage Site, which comprises a United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Site under the World Heritage Convention. The Northern Cape is also home to 2 Transfrontier National Parks, namely the Kgalagadi Transfrontier Park, and the Richtersveld /Ai-Ais Transfrontier Park, as well as 5 national parks, and 6 provincial reserves.

The Northern Cape also plays a significant role in South Africa's science and technology sector, as it is home to the SKA, the SALT, and the MeerKAT.

The Northern Cape makes the smallest contribution to South Africa's economy (contributing only 2% to South Africa's Gross Domestic Product per region (GDP-R) in 2007). At 26% the mining sector is the largest contributor to the provincial GDP. The Northern Cape's mining industry is of national and international importance, as it produces approximately 37% of South Africa's diamond output, 44% of its zinc, 70% of its silver, 84% of its iron-ore, 93% of its lead and 99% of its manganese.

In 2007 the agricultural sector contributed 5.8% to the Northern Cape GDP per region which was equivalent to approximately R1.3 billion. The agricultural sector also employs approximately 19.5% of the total formally employed individuals (LED Strategy). The sector is experiencing significant growth in value-added activities, including game-farming; while food production and processing for the local and export market is also growing significantly (PGDS, July 2011). Approximately 96% of the land is used for stock farming; including beef cattle and sheep or goats, as well as game farming; while approximately 2% of the province is used for crop farming, mainly under irrigation in the Orange River Valley and Vaalharts Irrigation Scheme (LED Strategy).

5.8.2 Spatial Context of the District²⁵

The ZF Mgcawu District Municipality (ZFMDM) consists of six Local Municipalities namely, Dawid Kruiper; Kai !Garib; //Khara Hais; Tsantsabane, !Kheis and Kgatelopele, and covers an area of more than 100 000 km² (almost 30% of the Northern Cape Province). Of this total, 65% (65 000 km²) is made up of the Kalahari Desert, Kgalagadi Transfrontier Park and the former Bushman Land. The largest town in the region is Upington, which also functions as the district municipal capital. Following the municipal elections in 2011, Riemvasmaak (Sending and Vredesvallei) were included within the KGLM. The Riemvasmaak Community is located ~ 60 km west of Kakamas. Based on the Household Community Survey data the population of the ZFMDM was 252 692 in 2016 compared to 236 763 in 2011. The DLKM and KGLM are home to ~ 70 % of the ZFMDM population.

Table 22: Population of Local Municipalities within the ZFMDM

Local Municipality	Population	Percentage
Dawid Kruiper	107 161	42.4%
Kai !Garib	68 929	27.3%

²⁵ ZF Mccawu District Municipality

Tsantsabane	39 345	15.6%
!Kheis	16 566	7.5%
Kgatelopele	20 691	8.2%

The Coloured population group make up the dominant group in the ZFMDM, DKLM and KGLM, followed by Black Africans and Whites. In terms of language, Afrikaans, followed by Setswana and IsiXhosa are the three main languages spoken in the area.

The ZFMDM accounts for ~ 30% of the Northern Cape economy. Agriculture plays a key role in the local economy and is strongly linked to irrigation along the Gariep River (Orange River). The Orange River is perennial with a flow which varies between 50 and 1800 cubic meter per second (cum/s) depending on the season. The flow of the river is largely controlled by the releases of the dams upstream, like the Bloemhof, Gariep and Van der Kloof dams. Agriculture in the ZFMDM is dominated by grape production for table grapes, which is mainly exported to Europe, as well as livestock and game farming.

The Orange River over area delivers a major part is that South Africa's table grape production. More than 90% of Africa's total dried vine fruit production is produced in the Northern Cape. The Orange River Wine Cellars Co-op, based in Upington, is the second largest winemaking cooperative in the world and has wine cellars in Groblershoop, Grootdrink, Upington, Keimoes and Kakamas.

Livestock farming occurs mainly on large farms where farming is extensive. The majority of the farms are privately owned. The central parts of the region consist mainly of semi-desert areas and are therefore, with few exceptions, mainly suitable for extensive livestock farming. In terms of employment, the most important economic sectors are Agriculture, followed by Community, Social and Personal, and Private Households.

Tourism represents one of the most important economic sectors in the Northern Cape as well as within the ZFMDM. In this regard the ZFMDM IDP indicates that tourism is the fastest growing component of the economy. Key tourism assets include the world renowned Kgalagadi Transfrontier Park, Au-grabies National Park and Pitskop Nature Reserve near Upington.

Minerals and mining also play an important role in the local economy of the ZFMDM. Key mining activities include copper and zinc of Areachap north of Upington. Various small concentrations of calcite, lead, fluorspar, barite, wolfram and amethyst. Salt is also being mined at two pans, namely Groot Witpan, 95 km northwest of Upington and at Witpan, 115km northwest of Upington. In terms of social well-being the ZFMDM's greatest social challenges are illiteracy, poverty and low education levels.

5.8.3 Spatial context of the Local Municipality²⁶

The proposed facility is located in the KGLM, a category-B municipality²⁷. The municipality is approximately 7 445 km² in size (~7.2% of the ZFMDM) and is bordered to the north, south and west by a District Management Area (NCDMA08) and in the east by the //Khara Hais and !Kheis Local Municipalities. In terms of land use, the Kai !Garib Local Municipality is largely rural and agricultural with three urban/semi-urban nodes at Kakamas, the designated administrative centre of the municipality, Keimoes and Kenhardt.

The Orange River (Gariep River) plays a key role in the day to day life of most of the inhabitants in the KGLM and is critical to the area's economic well-being. The main towns of Kakamas and Keimoes are situated in the midst of an intensive irrigation farming community stretching from Groblershoop in the east up to Blouputs in the west. Farming includes crops such as vineyards, pecan nut- and citrus

²⁶ Kai !Garib

²⁷ A category-B municipality is defined as a municipality that shares executive and legislative authority in its area with a category- C municipality within whose area it falls.

plantations. Local areas within the KGLM where intensive irrigation is undertaken include Blouputs, Eksteenskuil, Riemvasmaak and Cannon Island.

The KGLM also has two unique trust communities that in many ways functions differently than other communities. The first is Riemvasmaak which is located ~ 60 km west from Kakamas and falls with Ward 1 of the municipality. The Riemvasmaak community consists of ~ 250 households and were forcefully removed from their land in 1973 and returned in 1994. The Riemvasmaak Community Trust is divided in two sections namely Vredesvallei and Mission.

Of relevance to the proposed development is the second Trust community, the Blocuso Trust Community, which consists of 3 farms, namely, Bloemsmond, Curriescamp and Soverby. These farms are located in Ward 8, ~ 10 km north east of Keimoes. The community of Bloemsmond is located immediately to the south of the site. The farms were handed over to the three families by Queen Victoria in 1886. However, the properties were forcefully resold to white farmers in 1914 and the previous owners became farm workers. The Independent church of Gordonia under the leadership of Ds Saul Damon bought back the farms between 1914 and 1934. In 2000 the government assisted the 466 families on the three farms to buy the farms from the church. The communities established the Blocuso Trust and used the government subsidies to buy the farms and provide basic services like electricity and clean water. Since the Blocuso Trust was established the government have provided the trust with great assistance in terms of infrastructure projects.

The Municipal Area is divided into 9 wards. The proposed PV Facility is located in Ward 8.

Table 23: List of Wards in the KGLM

Ward	Areas
1	Augrabies, Noudonsies, Zeekoeisteek, Blouput Riemvasmaak
2	Cillie, Marchand, Perde-eiland, Omdraai
3	Kakamas Dorp, Alheit, Bloukamp, Truterkamp
4	Kromhout Boerdery, Kakamas Oos (Langverwag), Neus
5	Lennertsville, Koms, Keimoes Dorp, Akasia Park
6	Gardenia, Whalsig, Noodkamp, Vaaldriehoek
7	Lutzburg, Friersdale, Warmsand, Eenduin, Swartbooisberg, Bloemsmond,
8	Eksteenskuil Eilande, Soverby, McTaggerscamp, Curriescamp, Blaauwsekop, Kanoneiland
9	Kenhardt, Southern Farms

5.9 VISUAL CONTEXT

Mr Stephen Stead of VRMA undertook a Visual Impact Assessment of the proposed Dyasons Klip 5. The following visual context was determined from this study.

5.9.1 Regional Landscape Character

A broad-brush regional landscape survey was undertaken to identify key features that define the landscape context within the project approximate viewshed area. The following landmarks were identified as significant in defining the surrounding areas characteristic landscape as indicated in the landmark locality map on the previous page:

- Orange River;
- Khi Solar 1 Facility and Other Solar Energy Facilities;
- Existing 132 Kv distribution Line;
- Agricultural areas;
- N14 National Road.

These landmarks are described below.

5.9.1.1 Orange River Viniculture Cultural Landscape



Figure 33: View of Orange River town of Keimoes (Stead, 2020)

The main landscape feature in the area is the Orange River valley. This landscape includes the river and residential and agricultural developments along the valley. Landform is fairly undulating and hilly, with rocky outcrops scattered along the banks where the river has eroded down creating a slight valley. In the Northern Cape context where much of the terrain is fairly flat, this landform and hence, scenic quality, is rated as *moderate to high* as it does offer some variation and visual interest. Due to the proximity to water, vegetation is more prolific along the riverbank and is predominantly associated with cultivated vineyards and small-scale agriculture, although there are some larger residential developments that do detract from the overall landscape character. The cultural landscapes of this area are primarily associated with agricultural activities and vineyards on the more fertile lands along the Orange River and they add value to the overall vista. The types of receptors making use of the Orange River visual resources are mostly related to agriculture, tourism and residential. It is likely that maintaining the existing sense of place would be important to these receptors. The area is also strongly associated with the 'vineyard' cultural landscape and hence attractive to landscape based tourism. Receptor sensitivity to change in landscape character in these areas would likely be *moderate to high*.

5.9.1.2 Khi Solar One Facility and Other Solar Energy Facilities



Figure 34: View of Khi Solar One as seen from the N14 (Stead, 2020)

The site is situated in close proximity to the Khi Solar One Concentrated Solar Power (CSP) tower project. This creates a large vertical feature in the landscape. It is likely that the area will become a solar

energy hub as within the surrounding landscape there are other proposed and approved CSP towers and large scale PV projects as well as the Eskom Upington MTS substation. Other directly adjacent PV projects already constructed include the Sirius and Dyasons Klip 1 and 2. The Khi Solar One, with the other PV developments and associated infrastructure all generate a strong renewable energy sense of place. These landscape modifications also increase the local visual absorption capacity.

5.9.1.3 Agricultural areas



Figure 35: View of the farming in the areas north of the proposed site which are typical of the characteristic landscape

The majority of the surrounding landscape to the south and north of the proposed site is associated with rural agriculture and PV projects already constructed. The intensity of the farm practice is very low. As a result, the farming activities seen are mainly gravel roads, tracks and farm fencing. Isolated farmsteads also occur which are often surrounded by garden trees for shade. The flat, uniform landform offers little diversity or interest. The texturing and variety of Kalahari grasses, the red sands and the red rocky hills in the background add value to the landscape. The scenic quality of these areas is *moderate to high*. The remoteness of the area results in a particular sense of place and it is likely that farmer and worker receptors would be sensitive to landscape change. However, due to the remoteness and moderate use, it is likely that public interest in protecting these areas would be limited. Typically agricultural areas do allow for moderate levels of modification without resulting in a significant change to the landscape.

5.9.1.4 N14 National Road

The N14 is an important tourist view corridor and it is recommended that a suitable visual buffer along the road is set in place to ensure that views of the proposed PV facilities are set back and do not detract from the viniculture sense of place found in this section of the N14 and the Orange River Valley. As depicted in the photograph above, the Khi Solar One CSP tower, is clearly visible from the N14. This would increase the probability that public interest in maintaining visual quality would be low. It is important to ensure that the proposed Solar Energy projects do not detract from the tourism associated with the viniculture cultural landscape along the Orange River.



Figure 36: Typical view from the N14 road to the north depicting the telephone lines, the distribution line and Khi Solar One in the background

5.9.2 Project Visibility

Graphical representation of the terrain was also implemented with two profile lines cutting through the study area and extending beyond the area approximately 15km on either side of the proposed development area.

As can be seen on the two profile drawings below, the site is characterised by flat open terrain covered with Bushmanland Grass. The west to east profile reflects little topographic undulation an eastern aspect. The raised ground to the east and west significantly contains the visibility of the proposed PV. The north to south profile reflects more variation with the site having a southern aspect. A network of shallow drainage lines drain the proposed site to the south, creating some shallow undulations. A slopes analysis indicated that there are no steep slopes areas on the site.

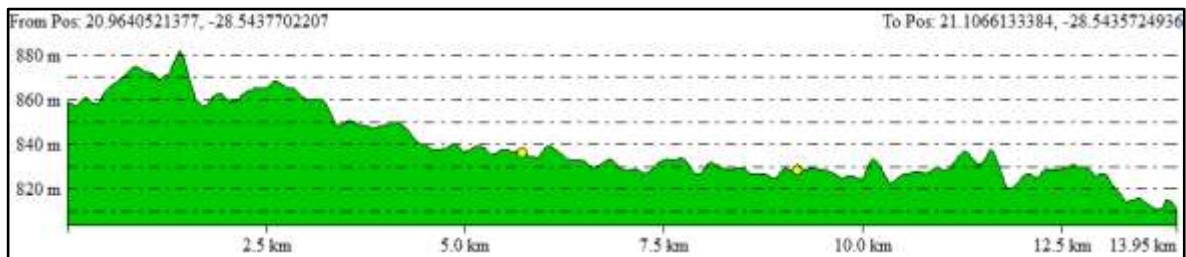


Figure 37: West to East Profile through Dyasons Klip 5.

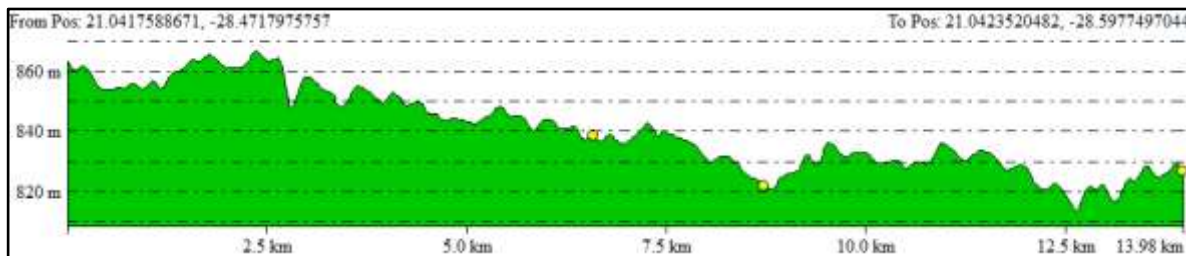


Figure 38: North to South Profile through Dyasons Klip 5

The visible extent, or viewshed, is ‘the outer boundary defining a view catchment area, usually along crests and ridgelines’. This reflects the area, or extent, where a landscape modification of a specified height would probably be seen. In order to define the extent of the possible influence of the proposed

project, a viewshed analysis is undertaken from the proposed sites at a specified height above ground level. The extent of the viewshed analysis was restricted to a defined distance that represents the approximate zone of visual influence (ZVI) of the proposed activities. The maps are informative only as visibility tends to diminish exponentially with distance, which is well recognised in visual analysis literature.

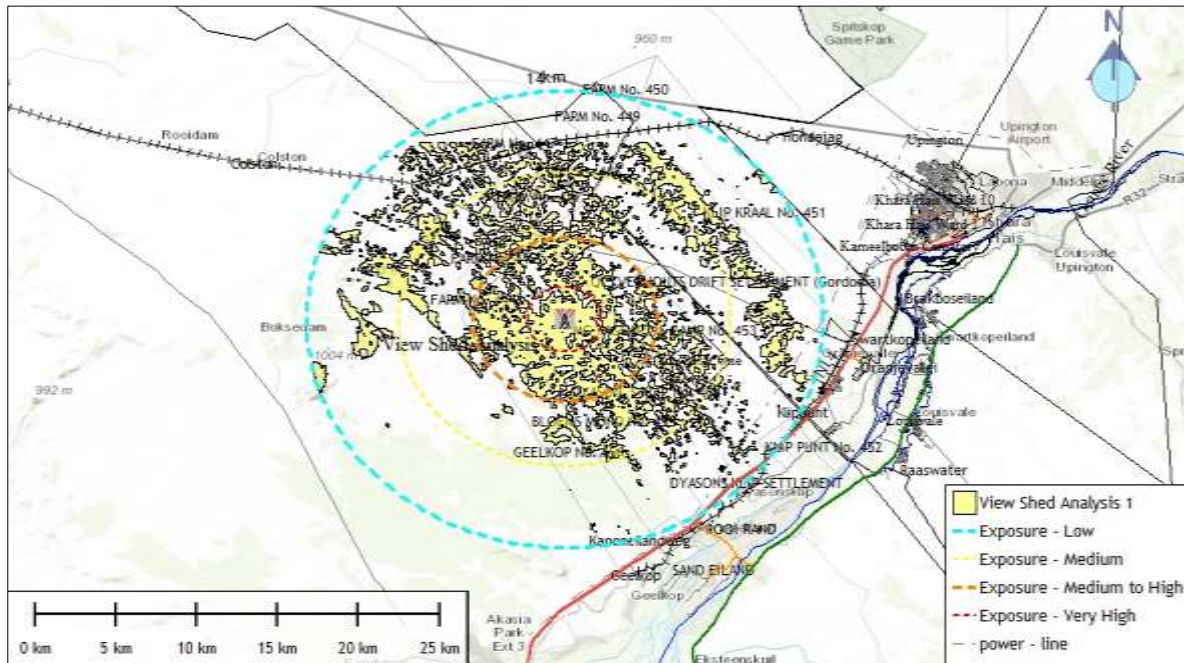


Figure 39: Approximate visibility map for Dyasons Klip 5 (Stead, 2020)

The viewshed analysis undertaken for the project depicts a fairly contained visual extent, mainly centred around the project site within the Medium to High Exposure areas. Outside of the Foreground areas, the viewshed becomes increasingly fragmented and does not extend beyond the 14km background region. The Zone of Visual Influence is defined as Local in extent.

6. IMPACT ASSESSMENT

This section of the report was completed with input from the following specialists:

- Terrestrial Ecology (Mr Simon Todd, 2020);
- Avifauna (Mr Chris van Rooyen, 2020);
- Botany (Mr Simon Todd, 2020);
- Freshwater Ecology (Dr Patsy Scherman, 2020);
- Agricultural (Mr Christo Lubbe, 2020, peer reviewed by Dr Hendrik Smith, 2020);
- Palaeontology (Dr John Almond, 2020);
- Archaeology and Heritage (Mr Jaco van der Walt, 2020);
- Visual (Mr Stephen Stead, 2020);
- Socio Economic (Mr Tony Barbour, 2020);
- Traffic Impact Assessment (JG Afrika, 2020).

The impacts will firstly be discussed per specialist discipline and then summarised in the impact summary and statement below²⁸.

²⁸ The assessment tables reflected in this section are those of the preferred site alternative. Please see the discussion in Section 2.4 above for impacts associated with alternatives.

6.1 ASSESSMENT METHODOLOGY

All possible impacts need to be assessed – the **direct, in-direct as well as cumulative impacts**. Impact criteria should include the following:

- **Nature of the impact:** impacts associated with the proposed Dyasons Klip 5 have been described in terms of whether they are negative or positive and to what extent.
- **Duration of impacts: Impact were assessed in terms of their anticipated duration:**
 - Short term (e.g. during the construction phase)
 - Medium term (e.g. during part or all of the operational phase)
 - Permanent (e.g. where the impact is for all intents and purposes irreversible)
 - Discontinuous or intermittent (e.g. where the impact may only occur during specific climatic conditions or during a particular season of the year)
- **Intensity or magnitude: The size of the impact (if positive) or its severity (if negative):**
 - Low, where the receiving environment (biophysical, social, economic, cultural etc) is negligibly affected or where the impact is so low that the remedial action is not required;
 - Medium, where the receiving environment (biophysical, social, economic, cultural etc) is altered, but not severely affected, and the impact can be remedied successfully; and
 - High, where the receiving environment (biophysical, social, economic, cultural etc) would be substantially (i.e. to a very large degree) affected. If a negative impact, could lead to irreplaceable loss of a resource and/or unacceptable consequences for human wellbeing.
- **Probability: Should describe the likelihood of the impact actually occurring indicated as:**
 - Improbable, where the possibility of the impact is very low either because of design or historic experience;
 - Probable, where there is a distinct possibility that the impact will occur;
 - Highly probable, where it is most likely that the impact will occur; or
 - Definite, where the impact will occur regardless of any prevention measures.
- **Significance: The significance of impacts can be determined through a synthesis of the assessment criteria. Significance can be described as:**
 - Low, where it would have negligible effect on the receiving environment (biophysical, social, economic, cultural etc), and on the decision;
 - Medium, where it would have a moderate effect on the receiving environment (biophysical, social, economic, cultural etc), and should influence the decision;
 - High, where it would have, or there would be a high risk of, a large effect on the receiving environment (biophysical, social, economic, cultural etc). These impacts should have a major influence on the decision;
 - Very high, where it would have, or there would be a high risk of, an irreversible negative impact on the receiving environment (biophysical, social, economic, cultural etc) and irreplaceable loss of natural capital/resources or a major positive effect on human well-being. Impacts of very high significance should be a central factor in decision-making.
 - Provision should be made for with and without mitigation scenarios.
- **Confidence: The level of confidence in predicting the impact can be described as:**

- Low, where there is little confidence in the prediction, due to inherent uncertainty about the likely response of the receiving ecosystem, or inadequate information;
- Medium, where there is a moderate level of confidence in the prediction, or
- High, where the impact can be predicted with a high level of confidence
- **Consequence: What will happen if the impact occurs**
 - Insignificant, where the potential consequence of an identified impact will not cause detrimental impact to the receiving environment;
 - Significant, where the potential consequence of an identified impact will cause detrimental impact to the receiving environment.
 - Provision must be made for with and without mitigation scenarios.

The impacts should also be assessed in terms of the following aspects:

- **Status of the impact**

The specialist should determine whether the impacts are negative, positive or neutral (“cost – benefit” analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.

- **Cumulative impact**

Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments planned and already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.

Care must be taken to ensure that where cumulative impacts can occur that these impacts are considered and categorised as **additive** (incremental or accumulative); **interactive**, **sequential** or **synergistic**.

Based on a synthesis of the information contained in the above-described procedure, the specialists assessed the potential impacts in terms of the following significance criteria:

- **No significance:** The impacts do not influence the proposed development and/or environment in any way.
- **Low significance:** The impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance:** The impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance:** The impacts will have a major influence on the proposed development and/or environment.

6.2 IDENTIFICATION OF IMPACTS ASSESSED

This section simply lists the potential key impacts identified and assessed by the various specialists (more details on the significance and ratings of these impacts are provided in Section 6.4 – 6.11 below and in the specialist reports attached in Appendix E).

6.2.1 Ecological Impacts Assessed

6.2.1.1 Construction Phase Impacts

Direct impacts

- Loss and/or fragmentation of indigenous natural vegetation due to clearing;
- Loss of individuals of plant species of conservation concern and/or protected plants;
- Loss of faunal habitat and refugia;
- Direct mortality of fauna due to machinery, construction and increased traffic;
- Displacement and/or disturbance of fauna due to increased activity and noise levels;
- Effects on physiological functioning of vegetation due to dust deposition;
- Increased poaching and/or illegal collecting due to increased access to the area.

Indirect impacts

- Indirect impacts during the construction phase include the following:
- Establishment and spread of alien invasive plants due to the clearing and disturbance of indigenous vegetation;
- Changes to behavioural patterns of animals, including possible migration away or towards the project area;
- Increased runoff and erosion due to clearing of vegetation, construction of hard surfaces and compaction of surfaces, leading to changes in downslope areas.

6.2.1.2 Operational Phase Impacts

Direct impacts

- Ongoing direct impacts will include the following:
- Continued disturbance to natural habitats due to general operational activities and maintenance;
- Direct mortality of fauna through traffic, illegal collecting, poaching and collisions and/or entanglement with infrastructure;

Indirect impacts

- These will include the following:
- Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors;
- Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape;
- Changes to behavioural patterns of animals, including possible migration away or towards the project area;
- Positive potential impact on climate change due to generation of electricity without the need for coal mining or burning of coal, currently the main form of power generation in South Africa.

6.2.1.3 Decommissioning Phase Impacts

Direct impacts

- These will include the following:
- Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites;
- Direct mortality of fauna due to machinery, construction and increased traffic;
- Displacement and/or disturbance of fauna due to increased activity and noise levels;
- Effects on physiological functioning of vegetation due to dust deposition;

Indirect impacts

- These will occur due to renewed disturbance due to decommissioning activities, as follows:
- Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors;

- Continued runoff and erosion due to the presence of hard surfaces that change the infiltration and runoff properties of the landscape;
- Changes to behavioural patterns of animals, including possible migration away or towards the project area;

Cumulative impacts

- Loss and/or fragmentation of indigenous natural vegetation due to clearing;
- Loss of individuals of plant species of conservation concern and/or protected plants;
- Changes to ecological processes at a landscape level;
- Mortality, displacement and/or disturbance of fauna;
- General increase in the spread and invasion of new habitats by alien invasive plant species;
- Reduction in the opportunity to undertake or plan conservation, including effects on CBAs and ESAs, as well as on the opportunity to conserve any part of the landscape;
- Loss of the wilderness character of the area;
- Positive cumulative impact on climate change.

6.2.2 Avifaunal Impacts Assessed

- Displacement due to disturbance associated with the construction of the Dyasons Klip 5 and associated infrastructure.
- Displacement due to habitat transformation associated with the construction of the Dyasons Klip 5 and associated infrastructure
- Collisions with the solar panels
- Entrapment in perimeter fences
- Electrocutions in the onsite substation and inverter station
- Displacement due to disturbance associated with the decommissioning of the Dyasons Klip 5 and associated infrastructure

6.2.3 Freshwater Impacts Assessed

- Loss of Very High Sensitivity systems, namely the mainstem alluvial water course through physical disturbance (the proposed layout will avoid \ these systems)
- Impact on secondary alluvial water courses, through physical disturbance
- Impact on all riparian and wetland systems through the possible increase in surface water runoff on riparian form and function through hydrological changes
- Increase in sedimentation and erosion
- Risks on the aquatic environment due to water quality impacts
- Cumulative impacts

6.2.4 Heritage Impacts Assessed

Construction Phase

- Impact on scenic routes during construction

Operational Phase

- Impacts on the heritage resources.
- Impact on scenic routes.
- Impact of new structures on cultural landscape and character.

Cumulative impacts

- Change to the rural character.
- Socio-economic upliftment.

6.2.5 Archaeological Impacts Assessed

Construction Phase

- Disturbance to surface and sub-surface sediments

Operational Phase

- None

Cumulative Impacts

- No cumulative impacts will arise

6.2.6 Visual Impacts Assessed

Construction Phase

- Visual scarring as a result of new development, clearing vegetation and construction works.
- Change of local and surrounds visual resources due to the construction and operation of the proposed (3.5m high) PV structures, and buildings.
- Change of local and surrounds visual resources due to the construction and operation of the proposed road access.

Operational Phase

- Change in the rural visual character of the site.
- Visual impact on key visual receptors and secondary visual receptors.
- Potential visual.
- Visibility from sensitive receptors.
- Visual intrusion of lighting at night.

6.2.7 Socio-Economic Impacts Assessed

Construction Phase

- Creation of business and employment opportunities
- Impacts associated with the presence of construction workers on site;
- Security and safety impacts associated with the presence of construction workers;
- Noise, dust and safety impacts associated with construction related activities and the movement of heavy vehicles.

Operational Phase

- Creation of employment and business opportunities;
- Impact on rural sense of place and character of the area;
- Crime levels and pressure on local services.

6.2.8 Traffic Impacts Assessed

- Traffic Congestion
- Noise pollution due to increased traffic.
- Air quality affected by dust pollution

6.3 SITE SENSITIVITY CONSTRAINTS AND POTENTIAL RISKS & IMPACTS

The following spatial site-specific constraints were identified by various specialists and the EAP during the initial stage of the environmental process.

Table 24: Summary of potential site constraints identified during the initial phase of the BAR Process and which are assessed in the section below.

Specialist Discipline	Site Constraints
Flora:	Sensitive vegetation associated with the watercourses.
Fauna	Sensitive habitat associated with the watercourses.
Avifauna	Habitat and Avifaunal Flight paths associated with the koppies (outside of the study area)
Agricultural	No specific spatial constraints identified.
Heritage	None
Visual	Scenic Receptors

Kindly refer to Section 2.9 and Section 2.10 above and the detailed layout plan in Appendix D for details as to how the preferred alternative incorporated these sensitive features.

All high and very high sensitive features were avoided and excluded from the preferred layout. Impacts on the remainder of the features were able to be effectively mitigated (See Section 7 for detailed mitigation measures).

6.4 TERRESTRIAL ECOLOGY IMPACTS

An Ecological Assessment (encompassing Terrestrial Fauna, Avifauna and Botany) was undertaken by Mr Simon Todd. A copy of this assessment is attached in **Annexure E1**. The following impact descriptions, tables with assessment of the impacts and concluding statement was provided by the specialist. Because the ecological impacts between the PV Facility and the Powerline differ significantly, these are discussed separately below.

6.4.1 Construction Phase Terrestrial Ecology Impacts – PV Facility

Table 25: Impacts on vegetation and listed or protected plant species resulting from construction activities – PV Facility

Impact Nature: Impacts on vegetation will occur due to disturbance and vegetation clearing associated with the construction of the facility. In addition, it is likely that some loss of individuals of protected trees will occur.		
	Without Mitigation	With Mitigation
Spatial Extent	Local	Local
Duration	Long-term	Long-term
Intensity	Moderate	Low
Probability	Definite	Definite
Reversibility	Low	Low
Significance	Medium	Medium
Status	Negative	Negative
Confidence Level	High	High
Can impacts be mitigated?	This impact cannot be well mitigated because the loss of vegetation is unavoidable and is a certain outcome of the development.	
Mitigation	<ul style="list-style-type: none"> Pre-construction walk-through of the facility's final layout in order to locate species of conservation concern that can be translocated as well as comply with the Northern Cape Nature Conservation Act and DENC/DEFF permit conditions. Search and rescue for identified species of concern before construction. Vegetation clearing to commence only after the walk-through and the search and rescue has been conducted and necessary permits obtained. 	

	<ul style="list-style-type: none"> • Pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas etc. • Contractor’s Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities within sensitive areas such as near the pans. • Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. • All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area. • Temporary laydown areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.
Cumulative Impacts	The development will contribute to cumulative impacts on habitat loss and transformation in the area.
Residual Risks	As the loss of currently intact vegetation is an unavoidable consequence of the development, the habitat loss associated with the development remains a moderate residual impact even after mitigation and avoidance of more sensitive areas.

Table 26: Direct Faunal Impacts Due to Construction Activities

Impact Nature: Disturbance, transformation and loss of habitat will have a negative effect on resident fauna during the construction phase. Due to noise and operation of heavy machinery, faunal disturbance will extend well beyond the footprint and extend into adjacent areas. This will however be transient and restricted to the construction phase.		
	Without Mitigation	With Mitigation
Spatial Extent	Local	Local
Duration	Short-term	Short-term
Intensity	Low to Medium	Low
Probability	Highly Probable	Highly Probable
Reversibility	Moderate	Moderate
Significance	Medium	Low
Status	Negative	Negative
Confidence Level	High	High
Can impacts be mitigated?	Although the large amount of noise and disturbance generated within the development area during the construction phase is largely unavoidable, impacts such as those resulting from the presence of construction personnel within the development area can be easily mitigated.	
Mitigation	<ul style="list-style-type: none"> • All personnel should undergo environmental induction with regards to fauna and, in particular, awareness about not harming or collecting species such as snakes, tortoises and owls, which are often persecuted out of superstition. • Any fauna threatened by the construction activities should be removed to safety by an appropriately qualified environmental officer. • All construction vehicles should adhere to a low speed limit (40km/h for light vehicles and 30k/h for heavy vehicles) to avoid collisions with susceptible species such as snakes and tortoises. • All hazardous materials should be stored in the appropriate manner to prevent contamination of the development area. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. • If trenches need to be dug for electrical cabling, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches that are standing open should have places where there are soil ramps 	

	allowing fauna to escape the trench. Larger fauna can be excluded with barrier nets.
Cumulative Impacts	During the construction phase, the activity would contribute to cumulative fauna disturbance and disruption in the area, but there are still large tracts of intact habitat in the area, it is likely that displaced fauna will have space to move about the site to avoid areas of high activity.
Residual Risks	It is probable that some individuals of susceptible species will be lost to construction-related activities despite mitigation. However, this is not likely to impact the viability of the local population of any fauna species.

6.4.2 Operational Phase Terrestrial Ecology Impacts – PV Facility

Table 27: Faunal Impacts due to Operation – PV Facility

Impact Nature: The operation and presence of the facility may lead to disturbance or persecution of fauna within or adjacent to the facility.		
	Without Mitigation	With Mitigation
Spatial Extent	Local	Local
Duration	Long-term	Long-term
Intensity	Low	Low
Probability	Probable	Probable
Reversibility	High	High
Significance	Low	Low
Status	Negative	Negative
Confidence Level	High	High
Can impacts be mitigated?	To a large extent, but some low-level residual impact due to noise and human disturbance during maintenance is likely.	
Mitigation	<ul style="list-style-type: none"> Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. If the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attract insects. All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. All vehicles accessing the site should adhere to a low speed limit (30km/h max for heavy vehicles and 40km/h for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises. If the facility is to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences because they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the fence and not the outside as is the case on the majority of already constructed PV plants. 	
Cumulative Impacts	The development would contribute to cumulative disturbance for fauna, but the contribution would be low for most species and is not considered highly significant.	
Residual Risks	Disturbance from maintenance activities will occur at a low level with the result that disturbance would be largely restricted to the site.	

Table 28: Habitat Degradation due to Erosion and Alien Plant Invasion – PV Facility

Impact Nature: Disturbance created during the construction phase will leave the development area vulnerable to erosion and alien plant invasion for several years into the operation phase.

	Without Mitigation	With Mitigation
Spatial Extent	Local	Local
Duration	Long-term	Long-term
Intensity	Moderate	Low
Probability	Definite	Unlikely
Reversibility	Medium	High
Significance	Medium	Low
Status	Negative	Negative
Confidence Level	High	High
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level.	
Mitigation	<ul style="list-style-type: none"> Erosion management within the development area should take place according to the Erosion Management Plan and Rehabilitation Plan. Access roads should have run-off control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. Regular monitoring for erosion during operation to ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. There should be follow-up rehabilitation and re-vegetation of any remaining bare areas with indigenous perennial shrubs and succulents from the local area. Alien management at the site should take place in accordance with the Alien Invasive Management Plan. Regular monitoring for alien plant proliferation during the operation phase to ensure that no erosion problems have developed as result of the disturbance, as per the Alien Management Plan for the project. Woody alien plant species should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present. 	
Cumulative Impacts	Erosion and alien plant invasion would contribute to degradation in the area, but as this can be well-mitigated, the contribution can be minimised.	
Residual Risks	Some erosion and alien plant invasion is likely to occur even with the implementation of control measures, but would have a low impact.	

6.4.3 Decommissioning Phase Terrestrial Ecology Impacts – PV Facility

Table 29: Habitat Degradation due to Erosion and Alien Plant Invasion – PV Facility

Impact Nature: Disturbance created during decommissioning will leave the development area vulnerable to erosion and alien plant invasion for several years.		
	Without Mitigation	With Mitigation
Spatial Extent	Local	Local
Duration	Long-term	Long-term
Intensity	Moderate	Low
Probability	Definite	Unlikely
Reversibility	Medium	High
Significance	Medium	Low
Status	Negative	Negative

Confidence Level	High	High
Can impacts be mitigated?	<ul style="list-style-type: none"> Yes, with proper management and avoidance, this impact can be mitigated to a low level. 	
Mitigation	<ul style="list-style-type: none"> Erosion management within the development area should take place in accordance with the Erosion Management and Rehabilitation Plan. This should make provision for monitoring of the development area for at least 5 years after the decommissioning phase. All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs, grasses and trees from the local area. Alien management at the site should take place according to the Alien Invasive Management Plan. This should make provision for alien monitoring and management for at least 5 years after decommissioning. Regular (annual) monitoring for alien plants during operation to ensure that no erosion problems have developed as result of the disturbance, as per the Alien Management Plan for the project. Woody aliens should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present. This might include the use of herbicides where no practical manual means are available. 	
Cumulative Impacts	Erosion and alien plant invasion would contribute to degradation in the area, but as this can be well-mitigated, the contribution can be minimised.	
Residual Risks	Some erosion and alien plant invasion is likely to occur even with the implementation of control measures, but would have a low impact if effectively managed.	

Table 30: Direct Faunal Impacts Due to Decommissioning Activities – PV Facility

Impact Nature: Due to disturbance, noise and the operation of heavy machinery, faunal disturbance due to decommissioning will extend beyond the footprint and impact adjacent areas to some degree. This will however be transient and restricted to the period while machinery is operational. In the long term, decommissioning should restore the ecological functioning and at least some habitat value to the affected areas.		
	Without Mitigation	With Mitigation
Spatial Extent	Local	Local
Duration	Short-term	Short-term
Intensity	Low	Low
Probability	Likely	Unlikely
Reversibility	Medium	High
Significance	Low	Low
Status	Negative	Negative
Confidence Level	High	High
Can impacts be mitigated?	Although the noise and disturbance generated at the site during decommissioning is probably largely unavoidable, this will be transient and ultimately the habitat should be restored to something useable by the local fauna.	
Mitigation	<ul style="list-style-type: none"> All personnel should undergo environmental induction with regards to fauna and, in particular, awareness about not harming or collecting species such as snakes, tortoises and owls, which are often persecuted out of superstition. Any fauna threatened by the decommissioning activities should be removed to safety by an appropriately qualified environmental officer. All vehicles should adhere to a low speed limit (30km/h for heavy vehicles and 40km/h for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises. 	

	<ul style="list-style-type: none"> All hazardous materials should be stored in the appropriate manner to prevent contamination of the site and ultimately removed from the site as part of decommissioning. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. The site should be rehabilitated with locally occurring species to restore ecosystem structure and function.
Cumulative Impacts	During the decommissioning, the associated disturbance would contribute to cumulative fauna disturbance and disruption in the area, but this would be transient and not of long-term impact.
Residual Risks	Although some components of disturbance cannot be avoided, the site itself would have low faunal abundance at decommissioning and no significant residual impacts are likely.

6.4.4 Cumulative Terrestrial Ecology Impacts – PV Facility

The following are the cumulative impacts assessed as being a likely consequence of the development of the Dyasons Klip 5 PV facility. This is assessed in context of the extent of the proposed development area, other developments in the area, as well as general habitat loss and transformation resulting from agriculture and other activities in the area.

Table 31: Reduced ability to meet conservation obligations & targets due to cumulative habitat loss – PV Facility

Nature: The development of Dyasons Klip 5 PV will potentially contribute to cumulative habitat loss and other cumulative impacts in the wider Upington area.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Spatial Extent	Local	Local
Duration	Long-term	Long-term
Intensity	Low	Low
Probability	Improbable	Probable
Reversibility	Moderate	Moderate
Significance	Low	Medium
Status	Negative	Negative
Confidence Level	High	Moderate
Can impacts be mitigated	To some degree, but the majority of the impact results from the presence of the facility which cannot be entirely mitigated.	
Mitigation:		
<ul style="list-style-type: none"> Ensure that sensitive habitats such as drainage features, pans and quartz patches are not within the development footprint. Ensure that the fencing around each facility is friendly with fauna and avifauna. This includes not having any electrified strands within 30cm of the ground as well as implementing a design that prevents fauna and avifauna from becoming trapped between the inner and out layer of the fence as this has been demonstrated to be a common impact associated with existing PV plants. Ensure that an alien management plan and erosion management plan compiled for each project are effectively implemented at the site. 		

Table 32: Negative impact on broad-scale ecological processes – PV Facility

Impact Nature: Development of Dyasons Klip 5 PV may impact on broad-scale ecological processes such as the ability of fauna to disperse.		
	Without Mitigation	With Mitigation
Spatial Extent	Local	Local
Duration	Long-term	Long-term
Intensity	Low	Low
Probability	Likely	Unlikely

Reversibility	Medium	High
Significance	Low	Low
Status	Negative	Negative
Confidence Level	High	High
Can impacts be mitigated?	Only partly as a significant proportion of the impact results from the presence and operation of the facility which cannot be entirely mitigated.	
Mitigation	<ul style="list-style-type: none"> • Ensure that faunal movement corridors such as drainage lines are not developed, but if these are fenced into the facility that the fence should be adequately permeable to fauna so as to reduce impacts on faunal habitat loss and movement. • Ensure that the mitigation hierarchy is applied with a particular emphasis on reducing the development footprint, rehabilitating disturbed areas and minimising degradation around the site. • An open space management plan should be developed for the development area, which should include management of biodiversity within the affected areas, as well as that in the adjacent veld. 	
Cumulative Impacts	The development would potentially contribute to habitat degradation and the loss of landscape connectivity and ecosystem function within the area, but this is likely to be relatively low as most species are likely to be able to avoid the facility as there are still relatively large intact corridors present in the area.	
Residual Risks	The presence of the facility will represent an obstacle for some fauna which would contribute to fragmentation in the area.	

6.4.5 Construction Phase Terrestrial Ecology Impacts – Grid Connection

Table 33: Impacts on vegetation and listed or protected plant species resulting from power line construction activities

Impact Nature: Impacts on vegetation will occur due to disturbance and vegetation clearing associated with the construction of the power line and association infrastructure.		
	Without Mitigation	With Mitigation
Spatial Extent	Local	Local
Duration	Short-term	Short-term
Intensity	Low	Low
Probability	Likely	Unlikely
Reversibility	High	High
Significance	Low	Low
Status	Negative	Negative
Confidence Level	High	High
Can impacts be mitigated?	This impact cannot be well mitigated because some loss of vegetation is unavoidable and is a certain outcome of the development.	
Mitigation	<ul style="list-style-type: none"> • Pre-construction walk-through of the final layout and corridor in order to locate species of conservation concern that can be translocated as well as comply with the Northern Cape Nature Conservation Act and DENC/DAFF permit conditions. • Search and rescue for identified species of concern before construction. • Vegetation clearing to commence only after walk-through has been conducted and necessary permits obtained. • Pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, 	

	<p>avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas etc.</p> <ul style="list-style-type: none"> • Contractor's Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities within sensitive areas such as near the pans. • Vegetation clearing along the power line route should be kept to a minimum. • All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area. • Temporary laydown areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.
Cumulative Impacts	The Solar Grid Connection will contribute to cumulative impacts on habitat loss and transformation in the area, but the contribution would be very low.
Residual Risks	The loss of currently intact vegetation is an unavoidable consequence of the development and cannot be entirely mitigated. The residual impact would however be low.

Table 34: Direct Faunal Impacts Due to Construction Activities – Grid Connection

Impact Nature: Disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction. This will however be transient and restricted to the construction phase.		
	Without Mitigation	With Mitigation
Spatial Extent	Local	Local
Duration	Short-term	Short-term
Intensity	Low	Low
Probability	Likely	Unlikely
Reversibility	High	High
Significance	Low	Low
Status	Negative	Negative
Confidence Level	High	High
Can impacts be mitigated?	Partly, although noise and disturbance cannot be well mitigated, impacts on fauna due to human presence such as poaching can be mitigated.	
Mitigation	<ul style="list-style-type: none"> • All personnel should undergo environmental induction with regards to fauna and, in particular, awareness about not harming or collecting species such as snakes, tortoises and owls, which are often persecuted out of superstition. • Any fauna threatened by the construction activities should be removed to safety by an appropriately qualified environmental officer. • All construction vehicles should adhere to a low speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises. • All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. • If holes or trenches need to be dug for pylons or electrical cabling, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Holes should only be dug when they are required and should be used and filled shortly thereafter. 	
Cumulative Impacts	During the construction phase the activity would contribute to cumulative fauna disturbance and disruption in the area, but this would be short lived and little long-term impact would be generated.	
Residual Risks	It is probable that some individuals of susceptible species will be lost to construction-related activities despite mitigation. However, this is not likely to impact the viability of the local population of any fauna species.	

6.4.6 Operational Phase Terrestrial Ecology Impacts – Grid Connection

Table 35: Faunal Impacts due to Operation – Grid Connection

Impact Nature: The operation and maintenance of the Solar Grid Connection may lead to disturbance or persecution of fauna in the vicinity of the development.		
	Without Mitigation	With Mitigation
Spatial Extent	Local	Local
Duration	Long-term	Long-term
Intensity	Low	Low
Probability	Unlikely	Unlikely
Reversibility	High	High
Significance	Low	Low
Status	Negative	Negative
Confidence Level	High	High
Can impacts be mitigated?	To a large extent, but some low-level residual impact due to noise and human disturbance may occur during maintenance activities.	
Mitigation	<ul style="list-style-type: none"> Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. If the substation must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attract insects. All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. All vehicles accessing the site should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises. If the substation perimeter is to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences because they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the fence and not the outside. 	
Cumulative Impacts	The development would contribute to cumulative disturbance for fauna, but the contribution would be very low and is not considered significant.	
Residual Risks	Disturbance from maintenance activities will occur at a low and infrequent level with the result that no long-term impacts are expected to occur.	

Table 36: Habitat Degradation due to Erosion and Alien Plant Invasion – Grid Connection

Impact Nature: Disturbance created during the construction phase will leave the development area vulnerable to erosion and alien plant invasion for several years into the operation phase.		
	Without Mitigation	With Mitigation
Spatial Extent	Local	Local
Duration	Medium-term	Short-term
Intensity	Low	Low
Probability	Likely	Unlikely
Reversibility	Medium	High
Significance	Low	Low
Status	Negative	Negative

Confidence Level	High	High
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level.	
Mitigation	<ul style="list-style-type: none"> Erosion management within the development area should take place according to the Erosion Management Plan and Rehabilitation Plan. Access roads should have run-off control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. Regular monitoring for erosion during operation to ensure that no erosion problems have developed as a result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. There should be follow-up rehabilitation and re-vegetation of any remaining bare areas with indigenous perennial shrubs and succulents from the local area. Alien management at the site should take place in accordance with the Alien Invasive Management Plan. Regular monitoring for alien plant proliferation during the operation phase to ensure that no erosion problems have developed as result of the disturbance, as per the Alien Management Plan for the project. Woody alien plant species should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present. 	
Cumulative Impacts	Erosion and alien plant invasion would contribute to degradation in the area, but as this can be well-mitigated, the contribution can be minimised.	
Residual Risks	Some erosion and alien plant invasion is likely to occur even with the implementation of control measures, but would have a low impact.	

6.4.7 Decommissioning Phase Terrestrial Ecology Impacts – Grid Connection

Table 37: Habitat Degradation due to Erosion and Alien Plant Invasion – Grid Connection

Impact Nature: Disturbance created during decommissioning will leave the development area vulnerable to erosion and alien plant invasion for several years.		
	Without Mitigation	With Mitigation
Spatial Extent	Local	Local
Duration	Long-term	Short-term
Intensity	Low	Low
Probability	Likely	Unlikely
Reversibility	Medium	High
Significance	Low	Low
Status	Negative	Negative
Confidence Level	High	High
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level.	
Mitigation	<ul style="list-style-type: none"> Erosion management within the development area should take place in accordance with the Erosion Management and Rehabilitation Plan. This should make provision for monitoring of the development area for at least 3 years after the decommissioning phase. All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs, grasses and trees from the local area. 	

	<ul style="list-style-type: none"> • Alien management at the site should take place according to the Alien Invasive Management Plan. This should make provision for alien monitoring and management for at least 3 years after decommissioning. • Regular (annual) monitoring for alien plants during operation to ensure that no erosion problems have developed as result of the disturbance, as per the Alien Management Plan for the project. • Woody aliens should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present. This might include the use of herbicides where no practical manual means are available.
Cumulative Impacts	Erosion and alien plant invasion would contribute to degradation in the area, but as this can be well-mitigated, the contribution can be minimised.
Residual Risks	Some erosion and alien plant invasion is likely to occur even with the implementation of control measures, but would have a low impact if effectively managed.

Table 38: Direct Faunal Impacts Due to Decommissioning Activities – Grid Connection

Impact Nature: Due to disturbance, noise and the operation of heavy machinery, faunal disturbance due to decommissioning will extend beyond the footprint and impact adjacent areas to some degree. This will however be transient and restricted to the period while machinery is operational. In the long term, decommissioning should restore the ecological functioning and at least some habitat value to the affected areas.		
	Without Mitigation	With Mitigation
Spatial Extent	Local	Local
Duration	Short-term	Short-term
Intensity	Low	Low
Probability	Likely	Unlikely
Reversibility	Medium	High
Significance	Low	Low
Status	Negative	Negative
Confidence Level	High	High
Can impacts be mitigated?	Although the noise and disturbance generated at the site during decommissioning is probably largely unavoidable, this will be transient and ultimately the habitat should be restored to something useable by the local fauna.	
Mitigation	<ul style="list-style-type: none"> • All personnel should undergo environmental induction with regards to fauna and, in particular, awareness about not harming or collecting species such as snakes, tortoises and owls, which are often persecuted out of superstition. • Any fauna threatened by the decommissioning activities should be removed to safety by an appropriately qualified environmental officer. • All vehicles should adhere to a low speed limit (30km/h for heavy vehicles and 40km/h for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises. • All hazardous materials should be stored in the appropriate manner to prevent contamination of the site and ultimately removed from the site as part of decommissioning. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. • The site should be rehabilitated with locally occurring species to restore ecosystem structure and function. 	
Cumulative Impacts	During the decommissioning, the associated disturbance would contribute to cumulative fauna disturbance and disruption in the area, but this would be transient and not of long-term impact.	
Residual Risks	Although some components of disturbance cannot be avoided, the site itself would have low faunal abundance at decommissioning and no significant residual impacts are likely.	

6.4.8 Cumulative Terrestrial Ecology Impacts – Grid Connection

The following are the cumulative impacts assessed as being a likely consequence of the development of the Dyasons Klip 5 Grid Connection. This is assessed in context of the extent of the proposed development area, other developments in the area, as well as general habitat loss and transformation resulting from agriculture and other activities in the area.

Table 39: Impact on CBAs and broad-scale ecological processes – Grid connection

Nature: The development of Dyasonsklip 5 Grid Connection will potentially contribute to cumulative habitat loss and other cumulative impacts in the wider Upington area.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
e	e	Local
Duration	Long-term	Long-term
e	Low	Low
Probability	Unlikely	Unlikely
e	Medium	High
Significance	Low	Low
Status	Negative	Negative
e	High	High
Can impacts be mitigated	To some degree, but the majority of the impact results from the presence of the various facilities which cannot be well mitigated.	
Mitigation:		
<ul style="list-style-type: none"> • Ensure that sensitive habitats such as drainage features, pans and quartz patches are not within the development footprint. • Ensure that the fencing around substation faunal friendly. This includes not having any electrified strands within 30cm of the ground as well as implementing a design that prevents fauna and avifauna from becoming trapped between the inner and out layer of the fence or between the fence and electrified strands. • Ensure that an alien management plan and erosion management plan compiled for each project are effectively implemented at the site. 		

6.4.9 Concluding Statement – Terrestrial Ecology Impacts

The development area identified for the establishment of Dyasons Klip 5 is restricted largely to low sensitivity habitat typical of the Upington area. The affected area is considered suitable for development and there are no impacts associated with the establishment of Dyasons Klip 5 PV that cannot be mitigated to a medium or low significance. Access Road Alternative 2 is identified as the preferred access road alternative due to its slightly shorter length, however both access road alternatives are deemed acceptable from a terrestrial ecology point of view. Although cumulative impacts in the area are a concern due to the high density of renewable energy developments in the area, the proximity of Dyasons Klip 5 PV to existing PV developments is seen as a positive aspect of the development and overall cumulative impacts associated with the Dyasons Klip 5 PV development are considered acceptable. As such, there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layout provided for the assessment, Dyasons Klip 5 PV can be supported from a terrestrial ecology point of view.

There are no ecological impacts associated with the Dyasons Klip 5 Grid Connection that cannot be mitigated to a low level. Of the six grid connection alternatives assessed, four are considered acceptable (1.2/2.2/1.3/2.3), while there are no preferences with regards to the two substation alternatives as both are considered acceptable. The grid connection is therefore considered acceptable from an ecological standpoint.

6.5 AVIFAUNAL IMPACTS

An Avifaunal Assessment (inclusive of pre-construction monitoring) was undertaken by Chris van Rooyen of Chris van Rooyen Consulting. A copy of this assessment is attached in Annexure E1. The

following impact descriptions, tables with assessment of the impacts and concluding statement was determined by the specialist.

6.5.1 Construction Phase Avifaunal Impacts

Table 40: Avifaunal Impacts associated with disturbance during the construction phase

Aspect/Activity	Construction of the Dyasons Klip 5 plant and associated infrastructure
Type of Impact (i.e. Impact Status)	Direct
Potential Impact	The noise and movement associated with the construction activities at the development footprint will be a source of disturbance which would lead to the displacement of avifauna from the area. Priority species potentially affected are: All priority species
Status	Negative
Mitigation Required	<ul style="list-style-type: none"> • Activity should as far as possible be restricted to the footprint of the infrastructure. • Measures to control noise and dust should be applied according to current best practice in the industry. • Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical. • Access to the rest of the property must be restricted. • The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint is concerned.
Impact Significance (Pre-Mitigation)	Moderate (Level 3)
Impact Significance (Post-Mitigation)	Low (Level 4)
I&AP Concern	No

6.5.2 Operational Phase Avifaunal Impacts

Table 41: Avifaunal Impacts associated with displacement due to Habitat Transformation

Aspect/Activity	The vegetation clearance and presence of the solar arrays and associated infrastructure amounts to habitat transformation in the development footprint
Type of Impact (i.e. Impact Status)	Direct
Potential Impact	Total or partial displacement of avifauna due to habitat transformation associated with the vegetation clearance and the presence of the Dyasons Klip 5 plant and associated infrastructure. Priority species potentially affected are the following: <ul style="list-style-type: none"> • Lanner Falcon • Spotted Eagle-owl • Martial Eagle • Tawny Eagle • Greater Kestrel • Secretarybird • Abdim's Stork • Karoo Korhaan • Kori Bustard • Ludwig's Bustard • Pygmy Falcon • Black-shouldered Kite • Booted Eagle • Common Ostrich • Pearl-spotted Owlet • Rock Kestrel • Southern Pale Chanting Goshawk • Steppe Buzzard

	<ul style="list-style-type: none"> • Black-eared Sparrowlark • Fiscal Flycatcher • Black-headed Heron
Status	Negative
Mitigation Required	The recommendations of the botanical specialist must be strictly implemented, especially as far as limiting the vegetation clearance to what is absolutely necessary, and rehabilitation of transformed areas are concerned.
Impact Significance (Pre-Mitigation)	High (Level 2)
Impact Significance (Post-Mitigation)	Moderate (Level 3)
I&AP Concern	No

Table 42: Avifaunal Impacts associated with collisions

Aspect/Activity	The presence of the PV solar arrays will lead to collisions with the reflective solar panels in the PV footprint
Type of Impact (i.e. Impact Status)	Direct
Potential Impact	Birds will get killed or injured through collisions with the solar panels. Priority species potentially affected are: <ul style="list-style-type: none"> • Lanner Falcon • Spotted Eagle-owl • Pygmy Falcon • Southern Pale Chanting Goshawk • Black-eared Sparrowlark • Fiscal Flycatcher
Status	Negative
Mitigation Required	No mitigation is required due to the very low expected magnitude.
Impact Significance (Pre-Mitigation)	Very Low (Level 5)
Impact Significance (Post-Mitigation)	Very Low (Level 5)
I&AP Concern	No

Table 43: Avifaunal Impact associated with entrapment in perimeter fences.

Aspect/Activity	The presence of a double perimeter fence could lead to entrapment of birds between the fences
Type of Impact (i.e. Impact Status)	Direct
Potential Impact	Entrapment of medium and large terrestrial birds between the perimeter fences, leading to mortality. Priority species that could potentially be affected are: <ul style="list-style-type: none"> • Secretarybird • Abdim's Stork • Karoo Korhaan • Kori Bustard • Ludwig's Bustard
Status	Negative
Mitigation Required	A single perimeter fence should be used ²⁹ .
Impact Significance (Pre-Mitigation)	Low (Level 4)
Impact Significance (Post-Mitigation)	Very Low (Level 5)
I&AP Concern	No

Table 44: Avifaunal Impacts associated with the electrocution of priority species.

²⁹ In this instance, according to the design specifications, a fence will be used consisting of an outer diamond mesh fence and inner electric fence with a separation distance of approximately 100mm. This should not pose any risk of entrapment for large terrestrial species and can be considered a single fence.

Aspect/Activity	Electrocution in the onsite substation and inverter station
Type of Impact (i.e. Impact Status)	Direct
Potential Impact	Electrocution of priority species. Potential priority species which could be affected are: <ul style="list-style-type: none"> • Lanner Falcon • Spotted Eagle-owl • Southern Pale Chanting Goshawk • Martial Eagle • Tawny Eagle • Greater Kestrel • Steppe Buzzard • Barn Owl • Egyptian Goose
Status	Negative
Mitigation Required	With regards to the infrastructure within the substation yard and inverter station, the hardware is too complex to warrant any mitigation for electrocution at this stage. It is rather recommended that if any impacts are recorded once operational, site specific mitigation be applied reactively.
Impact Significance (Pre-Mitigation)	Low (Level 4)
Impact Significance (Post-Mitigation)	Very Low (Level 5)
I&AP Concern	No

6.5.3 Decommissioning Phase Avifaunal Impacts

Table 45: Avifaunal impacts associated with disturbance during the decommissioning phase

Aspect/Activity	Decommissioning of the solar PV plant and associated infrastructure
Type of Impact (i.e. Impact Status)	Direct
Potential Impact	The noise and movement associated with the activities at the study area will be a source of disturbance which would lead to the displacement of avifauna from the area. Priority species potentially affected are: <ul style="list-style-type: none"> • All priority species
Status	Negative
Mitigation Required	<ul style="list-style-type: none"> • Activity should as far as possible be restricted to the footprint of the infrastructure. • Measures to control noise and dust should be applied according to current best practice in the industry. • Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical. • Access to the rest of the property must be restricted. • The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the activity footprint is concerned.
Impact Significance (Pre-Mitigation)	Moderate (Level 3)
Impact Significance (Post-Mitigation)	Low (Level 4)
I&AP Concern	No

6.5.4 Cumulative Impacts on Avifauna

Table 46: Cumulative Avifaunal Impacts

Aspect/Activity	The incremental impact of the proposed PV facility and grid connection on priority avifauna, added to the impacts of other past, present or reasonably foreseeable future activities.
Type of Impact (i.e. Impact Status)	Direct
Potential Impact	<ul style="list-style-type: none"> • Displacement due to disturbance associated with the construction of the solar PV plant and associated infrastructure

	<ul style="list-style-type: none"> • Displacement due to habitat transformation associated with the construction of the Dyasons Klip 5 plant and associated infrastructure • Collisions with the solar panels • Entrapment in perimeter fences • Electrocutions in the onsite substation yard and inverter station.
Status	Negative
Mitigation Required	Please refer to all the proposed mitigation measures as listed in the preceding tables in Section 7 for all the impacts and all the phases
Impact Significance (Pre-Mitigation)	Low (4)
Impact Significance (Post-Mitigation)	Very Low (5)
I&AP Concern	None to date

6.5.5 Concluding Statement – Avifauna

In terms of an average, the pre-mitigation significance of all potential impacts identified in the avifaunal specialist study are assessed as halfway between Low and Moderate, and the post-mitigation significance is assessed as Low to Very Low, leaning more towards Very Low. The avifaunal specialist therefore recommended that the activity is authorised, on condition that the proposed mitigation measures as detailed in the EMP are strictly implemented.

6.6 AGRICULTURAL IMPACTS

Mr Christo Lubbe undertook a specialist assessment of the potential impacts of Dyasons Klip 5 on the agricultural environment. A copy of this assessment is attached in Annexure E3.

The agricultural specialist identified the following potential impacts associated with the Dyasons Klip 5:

- Loss of agricultural land
- Erosion and change of drainage patterns
- Pollution

An assessment of these impacts for the various phases of the development are included below.

6.6.1 Construction Phase Agricultural Impacts

The agricultural impacts during the construction phase of Dyasons Klip 5 are assessed in the table below:

Table 47: Assessment of agricultural Impacts during the construction of Dyasons Klip 5.

Nature: Soil pollution with contaminants during the construction phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the construction of all facets of the facility: laydown area, concrete foundations of the auxiliary buildings, inverter stations subterranean cabling, main access and internal service roads.		
	Without mitigation	With mitigation
Extent	Local	Local
Duration	Medium Term	Very short
Magnitude	Low	Minor
Probability	Probable	Probable
Significance	Low	Low
Status (Positive or negative)	Negative	Negative
Reversibility	Partly reversible	Fully reversible
Irreplaceable loss of Resources	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation:	See Section 7 of this BAR for a summary of mitigation measures.	
Cumulative impacts:	No, site-bound	
Residual Risks:	Yes, it is impossible to clear the affected area completely.	

Nature: The establishment of the Dyasons Klip 5 facility will be done at the expense of agricultural land. The area to be lost for agricultural development would be 267 ha in size. This includes the area under PV panels, internal service roads and temporary laydown area.		
	Without mitigation	With mitigation
Extent	Local – Regional	Local
Duration	Long-term	Long-term
Magnitude	Moderate	Low
Probability	Probable	Improbable
Significance	Medium	Low
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation:	See Section 7 of this BAR for a summary of mitigation measures.	
Cumulative impacts:	Impact is low due to agricultural potential of the locally. With increasingly adding of facilities, the impact will become more of significance if not mitigated. .	
Residual Risks:	No, after decommissioning this impact will be reversed when rehabilitation has been completed.	
Nature: The construction of a PV solar facility will cause impairment of the land capability with the potential risk of erosion		
	Without mitigation	With mitigation
Extent	Local	Local
Duration	Short term	Short term
Magnitude	Low	Low
Probability	Probable	Probable
Significance	Medium	Low
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation:	See Section 7 of this BAR for a summary of mitigation measures.	
Cumulative impacts:	No cumulative impacts are expected to occur, as all impacts will be site bounded.	
Residual Risks:	No. Effected areas will be rehabilitated, as the impact will only be applicable during construction phase.	
Nature: The establishment of the PV solar facility may alter drainage patterns with construction and cause erosion		
	Without mitigation	With mitigation
Extent	Local	Local
Duration	Long term	Long term
Magnitude	Low	Low
Probability	Probable	Probable
Significance	Low	Low
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation	See Section 7 of this BAR for a summary of mitigation measures.	
Cumulative impacts:	No, all impacts will be site bounded.	
Residual Risks:	No. Effected areas will be rehabilitated when operation has ceased.	

6.6.2 Operational Phase Agricultural Impacts

The agricultural impacts during the operational phase of Dyasons Klip 5 are assessed in the table below:

Table 48: Assessment of agricultural Impacts during the operation of Dyasons Klip 5

Nature: Soil pollution with contaminants during the operational phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the maintenance of the facility.		
	Without mitigation	With mitigation

Extent	Local	Local
Duration	Long Term	Long Term
Magnitude	Low	Minor
Probability	Probable	Probable
Significance	Low	Low
Status (Positive or negative)	Negative	Negative
Reversibility	Partly reversible	Fully reversible
Irreplaceable loss of Resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation:	See Section 7 of this BAR for a summary of mitigation measures	
Cumulative impacts:	No, site-bound	
Residual Risks:	Yes, It is impossible to clear the affected area completely.	
Nature: The establishment of the PV solar facility will be done at the expense of agricultural land. Area to be lost for agricultural development would be 267 ha in size. This includes the area under PV panels, internal service roads and temporary laydown area.		
	Without mitigation	With mitigation
Extent	Local – Regional	Local
Duration	Long-term	Long-term
Magnitude	Moderate	Low
Probability	Probable	improbable
Significance	Medium	Low
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation:	See Section 7 of this BAR for a summary of mitigation measures	
Cumulative impacts:	Impact is low due to agricultural potential of the locally. With increasingly adding of facilities, the impact will become more of significance if not mitigated. .	
Residual Risks:	No, after decommissioning this impact will be reversed when rehabilitation has been completed.	

6.6.3 Decommissioning Phase Agricultural Impacts

The agricultural impacts during the closure and decommissioning phase of Dyasons Klip 5 are assessed in the table below:

Table 49: Assessment of agricultural Impacts during the closure and decommissioning of Dyasons Klip 5

Nature: Soil pollution with contaminants during the decommissioning phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the decommissioning of all facets of the facility: laydown area, demolished concrete foundations of the auxiliary buildings, inverter stations subterranean cabling, main access and internal service roads.		
	Without mitigation	With mitigation
Extent	Local	Local
Duration	Medium Term	Very short
Magnitude	Low	Minor
Probability	Probable	Probable
Significance	Low	Low
Status (Positive or negative)	Negative	Negative
Reversibility	Partly reversible	Fully reversible
Irreplaceable loss of Resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation:	See Section 7 of this BAR for a summary of mitigation measures	
Cumulative impacts:	No, site-bound	
Residual Risks:	Yes, It is impossible to clear the affected area completely	

6.6.4 Cumulative agricultural impacts

Table 50: Assessment of cumulative agricultural Impacts of Dyasons Klip 5

Nature: The quantity of available soil for agricultural production decreases as result of the footprints of these facilities. The quality of soil decreases in the way the construction of these structures alters the workability of the soil. This includes the physical deformation in the soil profile.		
	Overall impact of proposed project considered in isolation	Cumulative impact of the projects in the area
Extent	Local – Regional	Regional
Duration	Long Term	Long Term
Magnitude	Low	Moderate
Probability	Probable	Probable
Significance	Low	Medium
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation:	See Section 7 of this BAR for a summary of mitigation measures	
Nature: Clearing of vegetation increases flow speed and a lower infiltration tempo increases silt transport.		
	Overall impact of proposed project considered in isolation	Cumulative impact of the projects in the area
Extent	Local	Regional
Duration	Long Term	Long Term
Magnitude	low	Low
Probability	Improbable	Probable
Significance	Low	Medium
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation:	See Section 7 of this BAR for a summary of mitigation measures	
Nature: Chemicals, hazardous substances and waste used or generated during live span of the facility accumulate and pollute soil will become contaminated		
	Overall impact of proposed project considered in isolation	Cumulative impact of the projects in the area
Extent	Local	Regional(2)
Duration	Long Term (4)	Long Term (4)
Magnitude	low (4)	Low (4)
Probability	Improbable (2)	Probable (3)
Significance	Low (18)	Medium (30)
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation:	See Section 7 of this BAR for a summary of mitigation measures	

6.6.5 Concluding Statement - Agriculture

With reference to applicable sections of the Regulations for renewable energy in terms of Act 70 of 1970 and Act 43 of 1983, it can be stated that the proposed site will not suffer major agricultural impacts by the proposed Dyasons Klip 5 development. The reasons include aspects such as soil potential, geology, climate, loss of cultivating land and stock farming and other possible impacts.

The site does not have high potential soil because of the low annual rainfall, high evaporation rate and extreme temperatures. Soils formed under these conditions have little movement of soluble nutrients

and insoluble clay particles in the soil profile, restricting the adsorption of nutrients that would be available to plants. The soil is thus low in nutrient availability and has a low response to fertilizer input.

The land is currently used for game and livestock farming. The internal fencing is in the process of demolition, which indicates that farming with game would be the primary activity.

With a farm size of 5725.28 ha and carrying capacity of 32 ha per large stock unit (LSU), only 150 LSU can be carried on this farming unit. This is not considered to be an economically viable farming unit.

6.7 HERITAGE IMPACTS

A detailed Heritage impact Assessment was undertaken by HCAC. A copy of this assessment is attached in **Annexure E4** and is summarised below.

The study area is characterised by Aeolian sand and a few low ridges with knee-high grass cover and shrubs underlain by a calcrete substrata that protrudes through the sand cover in certain areas. Assessments conducted in the area indicated that a suite of Stone Age artefacts mostly dating to the MSA and LSA can be expected within the study area. Some of these assessments were conducted on the Remainder of the Farm Dyason’s Klip 454 (Morris 2013 b and c) who recorded similar widespread occurrences of MSA and LSA material. In his report Morris (2013 c) refers to sites recorded by Webley and Halkett (2012) on the same property consisting of Stone Age scatters and stone cairns of unknown purpose (that although unlikely, could indicate graves).

Similar widespread occurrences of background scatter of mainly MSA artefacts and to a lesser extent LSA flakes and cores were recorded during the current assessment and these observations are plotted in relation to known features from the above-mentioned reports.

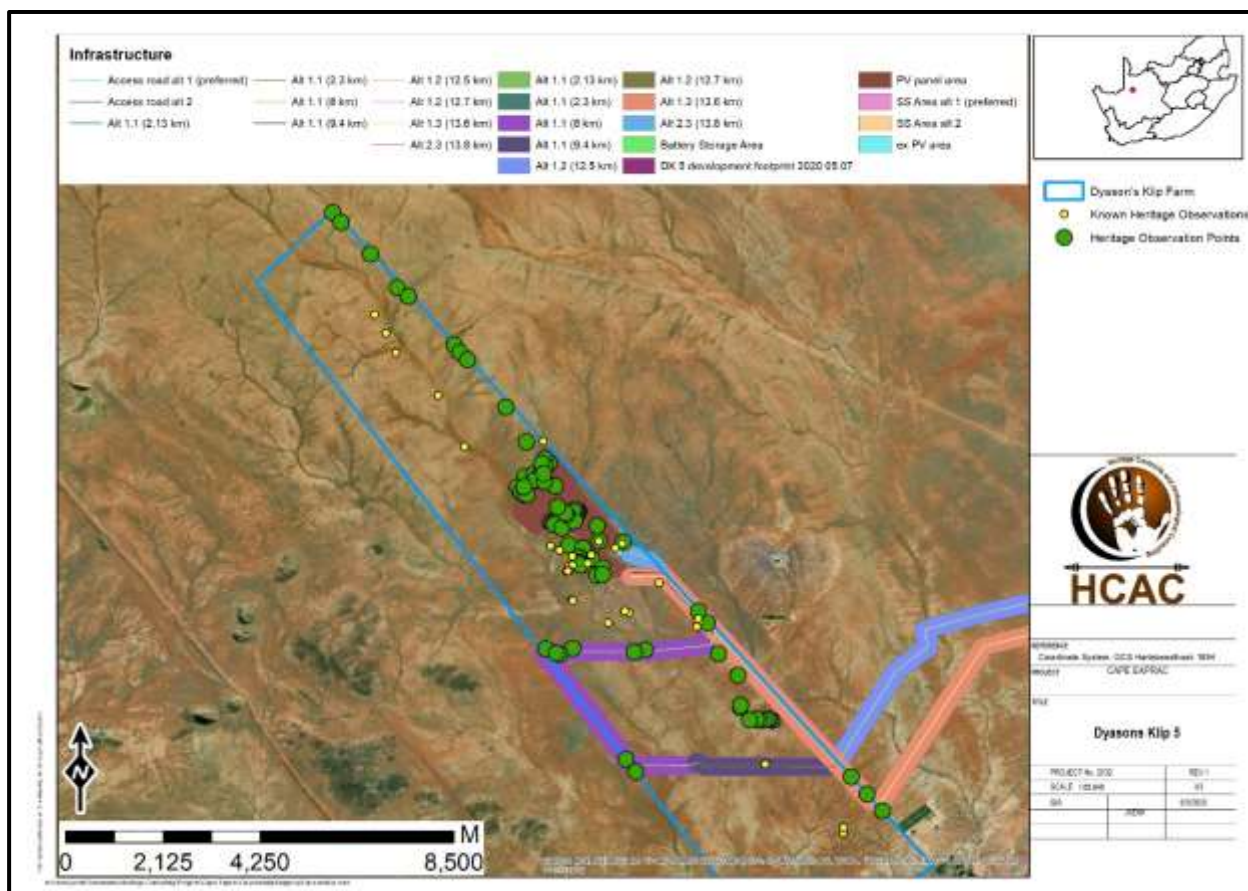


Figure 40: Observation points recorded on the Remainder of Farm Dyason’s Klip 454 (Van Der Walt, 2020)

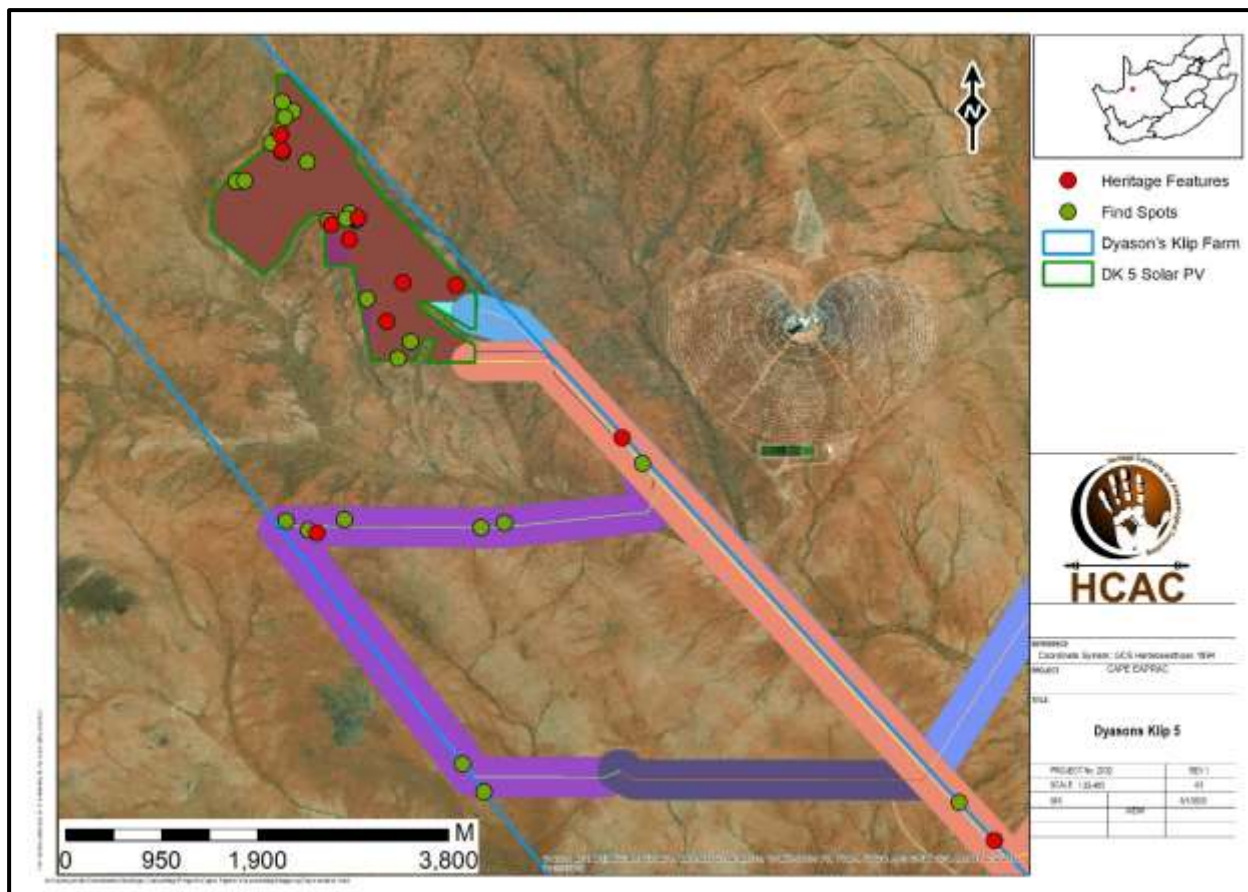


Figure 41: Site distribution map (van Der Walt, 2020)

6.7.1 Pre-Construction and Construction Phase Heritage Impacts:

It is assumed that the pre-construction phase involves the removal of topsoil (particularly at the laydown area and Hard surfaced areas (such as Substation, O&M buildings and Battery Energy Storage System and vegetation as well as the establishment of infrastructure needed for the construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

Table 51. Construction phase impacts on archaeological resources

Nature:	During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological material or objects	
e	Without mitigation	With mitigation (Preservation/excavation of site)
Extent	Site specific (1)	Site specific (1)
Duration	e	Permanent (5)
Magnitude	Low (3)	Low (3)
Probability	Probable (3)	Probable (2)
Significance	27 (Low)	27 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible

Irreplaceable loss of resources?	yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation:		
A Chance Find Procedure and Heritage Management plan should be implemented for the project during the pre-construction and construction phase. The area should be monitored during construction by the ECO.		
Residual Impacts:		
If sites are destroyed this results in the depletion of archaeological record of the area and even though surface features can be avoided or mitigated, there is a chance that completely buried sites would still be impacted but this cannot be quantified. However, if sites are recorded and preserved or mitigated this adds to the record of the area.		

6.7.2 Operation Phase Heritage Impacts

No impact is envisaged for the recorded heritage resources during this phase.

6.7.3 Cumulative Impacts on Heritage

Considering the existing impacts by renewable energy developments in the wider area and the addition of six other planned PV facilities, the cumulative impact on resources is higher, but this can be mitigated to an acceptable level. In order to mitigate the loss of large-scale low-density Stone Age lithics it is recommended that a surface sample of the artefacts should be collected and analysed in the field to accurately describe the typology of the various lithic industries. Cumulative impacts occur from the combination of effects of various impacts on heritage resources. The importance of identifying and assessing cumulative impacts is that the whole is greater than the sum of its parts. The area is rich in terms of the number of archaeological features present and taking in consideration existing impacts by renewable energy developments in the wider area and the addition of six other planned PV facilities on the farm the cumulative impact is regarded as of medium significance, but can be mitigated to an acceptable level.

Table 52. Cumulative impacts of the project

Nature:	The development of the project and other renewable energy developments within the area may result in disturbance of surfaces and/or sub-surfaces and may destroy, damage, alter, or remove from its original position archaeological material or objects.	
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local (1)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (3)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	27 (Low)	Medium (39)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Confidence in findings	High	High

6.7.4 Concluding Statement - Heritage

The Remainder of Farm Dyason's Klip 454 is located approximately 20 km north-east of Keimoes and to the north-west of the Orange River. There are various shallow drainage lines draining the study area that will be avoided by the PV facility. The drainage lines are mostly flowing in a south easterly direction to the Helbrandskloofspruit that flows into the Orange River.

Several previous heritage studies were conducted in the general study area for renewable energy projects indicating that a suite of Stone Age sites can be expected in the study area mostly dating to the MSA and LSA. Some of these assessments were conducted on the Remainder of the Farm Dyason's

Klip 454 (Morris 2013 b and c) who recorded similar widespread occurrences of MSA and LSA material. In his report Morris (2013 c) refers to sites recorded by Webley and Halkett (2012) on the same property consisting of Stone Age scatters and stone cairns of unknown purpose (that although unlikely, could indicate graves).

Similar widespread occurrences of background scatter of mainly MSA artefacts and to a lesser extent LSA flakes and cores were recorded during the current assessment and these observations are plotted in relation to known features from the above-mentioned reports. During the survey 37 localities were recorded that characterise the heritage signature of the study area and are briefly outlined below.

- Twenty Stone Age find spots were recorded. No further mitigation is required for these find spots as they are scattered too sparsely to be of significance apart from noting their presence in this report;
- Five Archaeological features with a higher density of artefacts were recorded and sampling is recommended at more distinct archaeological features (Waypoint 58);
- Two features including trenches relating to Tungsten mining were recorded. These sites are of low significance;
- 10 Stone Cairns that could represent graves were recorded. More graves can occur anywhere on the landscape and if any additional graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation;
- According to the SAHRA paleontological sensitivity map the area is of moderate paleontological sensitivity and an independent study was conducted by John Almond (2019). The study recommended that pending the discovery of significant new fossils remains before or during construction, exemption from further specialist palaeontological studies and mitigation be granted for the proposed project.

The impact of the proposed project on heritage resources is considered acceptable for all project components and alternatives with the correct mitigation measures in place such as *in-situ* preservation. It is therefore recommended that the proposed project can commence based on the following recommendations as part of the EMP and based on the approval of SAHRA.

The following recommendations were made by the Heritage Specialist.

- Compilation of a development heritage management plan for the Remainder of the farm Dyasons Klip 454 prior to construction;
- In order to mitigate the cumulative impact on Stone Age background scatter by several PV facilities in the area it is recommended that a surface sample of the artefacts should be analysed in the field to accurately describe the typology of the various lithic industries prior to construction at Waypoint 58;
- Although unlikely the stone cairns at Waypoint 65, 66, 67, 68, 69, 70, 386, 387,390 and 392 could represent graves and it is therefore recommended that these are tested by non-intrusive methods like Ground Penetrating Radar (GPR) to inform the heritage management plan;
- Implementation of a chance find procedure for both the archaeological and palaeontological components;
- Heritage walkdown of the final power line alignment

6.8 PALAEOLOGICAL IMPACTS

Dr John Almond undertook a desktop paleontological assessment of the proposed Dyasons Klip 5. A copy of this assessment is included in **Annexure E6**. The potential impacts on Palaeontological resources identified in the specialist study are summarised below.

Table 53: Impact on Palaeontological Resources

Severity/Nature	Low	Volcanic rocks do not preserve fossils, Sands of the Gordonia Fm might cover palaeo-pans or palaeo-springs. To date there are no records from this site and none is visible on Google Earth so it is very unlikely that fossils occur on the site. The impact would be very unlikely.
Duration	Permanent	Where manifest, the impact will be permanent.
Spatial scale	Localised	Since only the possible fossils within the area would be fossils from any pans or springs, if present. The spatial scale will be localised within the site boundary.
Probability	Unlikely	It is extremely unlikely that any fossils would be found in the loose sand or stabilised dunes close to the site. Nonetheless, a Fossil Chance Find protocol should be added to the eventual EMPr.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are either much too old and of volcanic origin to contain fossils, in this locality, the Vyfbeker Metamorphic suite granitic gneiss. The Gordonia Formation or Kalahari sands do not preserve fossils but might cover palaeo-pans or palaeo-springs, however, none is visible from imagery. Since there is an extremely small chance that fossils might be below the sands, a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

6.8.1 Concluding Statement - Palaeontology

Based on experience and the lack of any previously recorded fossils from the area, no fossils occur in the volcanic Vyfbeker Metamorphic Suite. It is extremely unlikely that any fossils would be preserved in the Aeolian sands of the Quaternary Gordonia Formation. There is a very small chance that fossils may occur beneath the sands, if any have been trapped in palaeo-pans or palaeo-dunes, although no such feature is evident. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr: if fossils are found once excavations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample.

6.9 VISUAL IMPACTS

Mr Stephen Stead undertook a detailed visual impact assessment of the proposed Dyasons Klip 5. A copy of this assessment is attached in Annexure E7 of the BAR and a summary thereof is provided below.

6.9.1 Visual Impacts of the PV facility and Associated Infrastructure Visual Impacts

The following landscape impacts were identified as having a likelihood of occurring during the construction and operation of the proposed PV Facility project.

- Construction Phase
 - Loss of site landscape character from the removal of vegetation and the construction of the PV structures and associated infrastructure;
 - Wind-blown dust due to the removal of large areas of vegetation;
 - Possible soil erosion from temporary roads crossing drainage lines;
 - Windblown litter from the laydown and construction sites.
- Operation Phase
 - Light spillage making a glow effect that would be clearly noticeable to the surrounding dark sky night landscapes to the north of the proposed site;
 - Massing effect on the landscape from a large-scale modification;
 - On-going soil erosion;

- On-going windblown dust.
- Decommissioning Phase
 - Movement of vehicles and associated dust;
 - Windblown dust from the disturbance of cover vegetation / gravel;
- Cumulative Impacts
 - A long-term change in land use setting a precedent for other similar types of solar and wind energy projects;
 - Loss of scenic resources located on the adjacent property to the west that could influence future eco-tourism opportunities in this area.

Table 54: Assessment of Visual Impacts of Dyasonsklip 5 – PV Facility

Nature: Change of local and surrounds visual resources due to the construction and operation of the proposed (3.5m high) PV structures, and buildings.		
	Without mitigation	With mitigation
Extent	Local	Local
Duration	Long-term	Long-term
Magnitude	Medium	Low
Probability	Probable	Probable
Significance	Medium to Low	Low
Status (positive or negative)	Negative	Negative
Reversibility	Possible	Possible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Impact Motivation:		
<ul style="list-style-type: none"> ● The proposed PV development footprint area does not contain any significant visual resources or topographic prominence. ● The area is remote with limited receptors and is located adjacent to the already constructed PV and CSP landscape modifications. 		
Mitigation:		
<ul style="list-style-type: none"> ● The laydown area should be sited away from the N14 road as well as the viticulture areas, and preferably not located on portions of the site that have local prominence. ● Light spillage reduction management should be implemented (refer to Annexure). ● Dust management during the lifetime of the project 		
Cumulative impacts:		
Excessive lights at night could reduce the current dark sky sense of place that could detract from tourism opportunities in the area.		
Residual Risks:		
<ul style="list-style-type: none"> ● Should the mitigations be implemented, the residual risks to the dark sky sense of place would be similar to the solar PV precedent of the adjacent eastern projects (currently under construction), and with mitigation, would be similar to the nighttime lighting precedents of the cultivated areas along the Orange River. ● On decommissioning, the limited earthworks required for the construction of the PV panels, would allow for effective rehabilitation of the impacted area back to the current agricultural land use and associated rural sense of place. 		

6.9.2 Visual Impacts of the Grid Connection

The Nature of the Visual Impact of the proposed power line routings is rated Negative, as all these landscape modifications will require the removal of vegetation or have the potential to be visually discordant with the surrounding rural landscape to some degree. Although the power lines do follow an existing Eskom power line routing, the multi-lines will create a visual massing effect which will degrade the local landscape character.

The following visual impacts could take place during the lifetime of the proposed **distribution line**:

Construction Phase

- Loss of site landscape character due to the removal of vegetation and the construction of the power line structures and temporary access road.
- Possible soil erosion from temporary roads crossing drainage lines.
- Possible windblown litter from the lay-down and construction sites.

Operation Phase

- On-going soil erosion.
- On-going windblown dust.
- Sunlight glint off cables and structures.

Decommissioning Phase

- Movement of vehicles and associated dust.
- Windblown dust from the disturbance of cover vegetation/gravel.

Cumulative Effects

- Massing effects from numerous power lines converging on the substations.
- Cluttering effects from ad-hoc routings that are not aligned with existing Eskom power line corridors.

Reversibility

Due to the small footprint of the structure, all the alternatives were defined as **Reversible**. The monopoles can be removed, and existing vegetation would grow back, but only after a long period of time. Rehabilitation and restoration would be required.

Confidence

Confidence for the PV grid connection was rated **Sure** as sufficient information was provided regarding the nature of the proposed landscape modification.

Table 55: Assessment of visual impacts of the Grid Connection.

Nature: Change of local and surrounds visual resources due to the construction and operation of the proposed power line mono pole structures.		
	Without mitigation	With mitigation
Extent	Local	Local
Duration	Long-term	Long-term
Magnitude	Medium to Low	Low
Probability	Probable	Probable
Significance	Medium to Low	Low
Status (positive or negative)	Negative	Negative
Reversibility	Possible	Possible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Impact Motivation		
<ul style="list-style-type: none"> • The proposed development footprint area does not contain any significant visual resources or topographic prominence. • The area is remote with limited receptors and is located adjacent to existing renewable energy projects that also include power lines. • The alignments of both proposed power lines are along existing road and existing power line infrastructure corridors. • The average distance of 2.5km from these lines to the N14 National Highway reduce the visual exposure to the proposed landscape change. • The area already has a higher Visual Absorption Capacity due to the renewable energy development node within the REDZ 7 area. 		
Mitigation:		
<ul style="list-style-type: none"> • The laydown area should be sited away from the N14 road as well as the viticulture areas, and preferably not located on portions of the site that have local prominence. • Dust management during the lifetime of the project. 		

Cumulative impacts:
<ul style="list-style-type: none"> Visual massing effects created by multiple lines from multiple projects, congregating in a single location that has the potential to generate strong levels of visual intrusion.
<ul style="list-style-type: none"> Residual Risks:
<ul style="list-style-type: none"> Should the mitigations be implemented, the residual risks from soil erosion and intrusion from massing effects in prominent locations would be limited.

6.9.3 Concluding Statement - Visual

Due to the relative remoteness of the locality and some topographic screening, no sensitive receptors were identified for the site, and as such Visual Exposure and Sensitivity to landscape change for both PV sites is defined as **Low**. Based on the VRM methodology, the Scenic Quality of the area is defined as **Medium to Low**.

There is a good policy fit for the PV project (located within the REDZ7) with the existing solar PV and CSP projects clearly in view, and with the further development of the area as a renewable energy node.

PV Visual Impact Significance: **Low with Mitigation** (both Alternatives)

- The proposed PV development footprint area does not contain any significant visual resources or topographic prominence.
- The area is remote with limited receptors and is located adjacent to the already constructed PV and CSP landscape modifications.

Grid Connection Alternative 1.1 Visual Impact Significance: **Medium with Mitigation**

- The proposed development footprint area does not contain any significant visual resources or topographic prominence.
- The area is remote with limited receptors and is located adjacent to existing renewable energy projects that also include power lines.
- The visual exposure to the proposed landscape modification is Low.
- The area already has a higher Visual Absorption Capacity due to the renewable energy development node within the REDZ 7 area.
- Although not a fatal flaw, the extra length of the power line routed around the Dyasonsklip PV 1 to PV 3 is likely to increase the visual cluttering in the vicinity.

Grid Connection Alternative 1.2 and 1.3 Visual Impact Significance: **Low with Mitigation**

- The proposed development footprint area does not contain any significant visual resources or topographic prominence.
- The area is remote with limited receptors and is located adjacent to existing renewable energy projects that also include power lines.
- The alignments of both proposed power lines are along existing road and existing power line infrastructure corridors.
- The average distance of 2.5km from these lines to the N14 National Highway reduce the visual exposure to the proposed landscape change. The area already has a higher Visual Absorption Capacity due to the renewable energy development node within the REDZ 7 area.

Southern Access Alternative Visual Impact Significance: **Low with Mitigation**

- The proposed southern access road is an extension on an existing PV access road;
- The area has a high visual absorption capacity due to the existing PV and CSP projects located in the vicinity.

6.10 FRESHWATER ECOLOGY IMPACTS

Dr Patsy Scherman, undertook a detailed freshwater ecology assessment of the proposed Dyasons Klip 5. A copy of this assessment is attached in **Annexure E3** of the BAR and a summary thereof is provided below. The freshwater impacts below are generally applicable to the construction phase.

Table 56: Impact of Loss of Very High Sensitivity systems

Nature		
Loss of Very High Sensitivity systems, namely the mainstem alluvial water course through physical disturbance (although the proposed layout will avoid any of these systems).		
	Without mitigation	With mitigation
Extent	High (3)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	High (7)	Low (4)
Probability	Definite (5)	Probable (3)
Significance	High (70)	Low (27)
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	
Mitigation:		
<ul style="list-style-type: none"> The most significant form of mitigation would be to select development options that avoided all aquatic features that were rated with a Very High sensitivity, which is being proposed by the layout. All alien plant re-growth must be monitored and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor. It is further recommended that a comprehensive rehabilitation / monitoring plan be implemented from the project onset to ensure a net benefit to the environment within all areas that will remain undisturbed. 		
Cumulative impacts:		
None – no direct connection between this and other systems, such as the Orange River, exist.		
Residual impacts:		
Possible impact on the remaining catchment due to changes in run-off characteristics in the development area.		

Table 57: Assessment of Impacts on secondary alluvial water courses

Nature		
Impact on secondary alluvial water courses (Moderate Sensitivity),.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low (4)
Probability	Definite (5)	Probable (3)
Significance	Medium (45)	Low (27)
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	
Mitigation:		
<ul style="list-style-type: none"> The most significant form of mitigation would be to select a development area, which contained no drainage lines. The proposed layout has been developed to avoid the important systems, thus requiring only crossings or footprints within areas rated as having a Moderate sensitivity to physical disturbance, although hydrological function (surface flows) would still remain. Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Suitable dust and erosion control mitigation measures should be included in the EMP to mitigate these impacts. 		
Cumulative impacts:		
The increase in surface run-off velocities and the reduction in the potential for groundwater infiltration is likely to occur, considering that the development area is near the main drainage channels, however the annual rainfall figures are low.		
Residual impacts:		
Diversion of run-off away from downstream systems is unlikely to occur as the annual rainfall figures are low. Therefore negligible residual impacts area expected.		

Table 58: Assessment of Impact on riparian systems through the possible increase in surface water runoff

Nature		
Impact on riparian systems through the possible increase in surface water runoff on riparian form and function <ul style="list-style-type: none"> Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within the riparian systems, which are currently ephemeral, i.e. riparian systems species composition changes, which then results in habitat change / loss. 		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Low (2)
Probability	Definite (5)	Probable (3)
Significance	Medium (35)	Low (21)
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	
Mitigation:		
<ul style="list-style-type: none"> Any stormwater within the development area must be handled in a suitable manner, i.e. separate clean and dirty water streams around the plant, and install stilling basins to capture large volumes of run-off, trap sediments, and reduce flow velocities (e.g. water used when washing the panels). The project should also try to capture and recycle any form of run-off created by the daily operations. This would minimise the amount of water required by the project, but also serve to limit the downstream impacts on the riparian systems through an increase in run-off, a situation that these systems are currently unaccustomed too. 		
Cumulative impacts:		
Downstream alteration of hydrological regimes due to the increased run-off from the area.		
Residual impacts:		
Possible impact on the remaining catchment due to changes in run-off characteristics in the development area.		

Table 59: Increase in sedimentation and erosion within the development footprint

Nature		
Increase in sedimentation and erosion within the development footprint <ul style="list-style-type: none"> An increase in hard surface areas, and or roads that require stormwater management increases runoff from a site through the concentration of surface water flows. These higher volume flows, with increased velocity can result in downstream erosion and sedimentation if not managed. 		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Low (1)
Probability	Definite (5)	Probable (3)
Significance	Medium (35)	Low (18)
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	
Mitigation:		
<ul style="list-style-type: none"> Any stormwater within the development area must be handled in a suitable manner, i.e. separate clean and dirty water streams around the plant, and install stilling basins to capture large volumes of run-off, trap sediments and reduce flow velocities (e.g. water used when washing the PV Panels). Suitable stormwater management features with erosion control measures (gabions) should also be installed in areas where concentrated flows are anticipated as indicated in the stormwater management plan 		
Cumulative impacts:		
Downstream erosion and sedimentation of the downstream systems and farming operations. During flood events, the unstable banks (eroded areas) and sediment bars (sedimentation downstream) already deposited downstream will be washed into the Orange River, although currently no direct connections with the Orange River, extreme high flows do enter the river from the development area.		
Residual impacts:		
Possible impact on the remaining catchment due to changes in run-off characteristics in the development area.		

Table 60: Assessment of Impact on localised water quality

Nature		
Impact on localised surface water quality		
<ul style="list-style-type: none"> During both preconstruction, construction and to a limited degree the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction activities, as well as maintenance activities, could be washed downslope via the ephemeral systems. 		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Low (1)
Probability	Definite (5)	Probable (3)
Significance	Medium (35)	Low (18)
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes (high)	
Mitigation:		
<ul style="list-style-type: none"> Strict use and management of all hazardous materials used on site. Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / bunded areas Containment of all contaminated water by means of careful run-off management on site. Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. These must be situated outside of any delineated water courses or the buffers shown Strict control of the behaviour of construction workers. Appropriate waste management. Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced. 		
Cumulative impacts:		
None as no direct connection between the development area and Orange River remains		
Residual impacts:		
Residual impacts will be negligible after appropriate mitigation.		

Table 61: Assessment of Cumulative Freshwater Impacts

Nature		
Cumulative Impacts		
<ul style="list-style-type: none"> In the assessment of this project, a number of projects have been assessed by the report author within a 35km radius and or other sites were accessed during the course of travelling between the various projects. Of these potential projects, this report author has been involved in the initial EIA aquatic assessments or has managed / assisted with the WUL process for several of these projects. All of the projects have indicated that their intention with regard to mitigation, i.e. selecting the best possible sites to minimise the local and regional impacts, or improving the drainage or hydrological conditions within these rivers, the cumulative impact could be seen as a net benefit. However, the worse-case scenario has been assessed below, i.e. only the minimum of mitigation be implemented by the other projects such as stormwater management, and that flows within these systems are sporadic. 		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (1)	Low (2)
Probability	Probable (3)	Definite (5)
Significance	Low (18)	Medium (35)
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes (high)	

Mitigation:
Improve the current stormwater and energy dissipation features not currently found along the tracks and roads within the region by local landowners / public works entities where possible Install properly sized culverts with erosion protection measures at the present road / track crossings are already installed by local landowners / public works entities
Residual impacts:
Residual impacts will be negligible after appropriate mitigation.

6.10.1 Concluding Statement – Freshwater Ecology.

It is expected that all potential impacts can be reduced to Low significance with the application of the recommended mitigation measures. Due to the dearth of data regarding the aquatic systems in the area, it is critical that any development be undertaken on a precautionary basis with as little disturbance of the natural environment as possible. As so little is known of the area regarding aquatic features, e.g. temporary wetlands that may develop after rainfall events, it is suggested that the ECO or other on-site staff take additional records of any features that appear on site, and that this data be forwarded to the SANBI on an annual basis for data curation and interpretation.

6.11 SOCIAL IMPACTS

Mr Tony Barbour undertook a Social Impact Assessment of the proposed Dyasons Klip 5. A copy of this assessment is included in **Annexure E7** and the following summary is provided in this regard.

The social specialist divided his assessment into the following sections which are discussed separately below.

- Assessment of compatibility with relevant policy and planning context;
- Assessment of social issues associated with the construction phase;
- Assessment of social issues associated with the operational phase;
- Assessment of social issues associated with the decommissioning phase;
- Assessment of the no-go alternative; and
- Assessment of cumulative impacts.

6.11.1 Social impacts associated with policy and planning.

The findings of the review indicate that renewable, including solar energy, is strongly supported at a national, provincial and local level.

6.11.2 Social impacts associated with the construction phase

The social specialist identified both positive and negative impacts associated with the construction phase, these impacts were identified as follows:

- Creation of employment and business opportunities, and opportunity for skills development and on-site training (Positive Impact);
- Impacts associated with the presence of construction workers on local communities;
- Impacts related to the potential influx of job-seekers;
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site;
- Increased risk of grass fires associated with construction related activities;
- Noise, dust and safety impacts of construction related activities and vehicles; and
- Impact on productive farmland.

An assessment of these identified social impacts during construction are included in the tables below.

Table 62: Assessment of positive social impacts during the construction phase

Nature: Creation of employment and business opportunities during the construction phase
--

	Without Mitigation	With Enhancement
Extent	Local – Regional (3)	Local – Regional (4)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	High (8)
Probability	Highly probable (4)	Highly probable (4)
Significance	Medium (44)	Medium (56)
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impact be enhanced?	Yes	
Enhancement:	see Section 7 of the BAR dealing with suggested mitigation measures	
Cumulative impacts:	Opportunity to up-grade and improve skills levels in the area.	
Residual impacts:	Improved pool of skills and experience in the local area.	

Table 63: Assessment of negative social impacts during the construction phase

Nature: Potential impacts on family structures and social networks associated with the presence of construction workers		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Short term for community as a whole (2)	Short term for community as a whole (2)
Magnitude	Moderate for the community as a whole (6)	Low for community as a whole (4)
Probability	Probable (3)	Probable (3)
Significance	Medium for the community as a whole (30)	Low for the community as a whole (21)
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	
Mitigation:	See mitigation measures reflected in Section 7 of the BAR.	
Cumulative impacts:	Impacts on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.	
Residual impacts:	Same as cumulative impacts assessed above	
Assessment of no-go option	There is no impact as the current status quo would be maintained. The potential positive impacts on the local economy associated with the additional spending by construction workers in the local economy will also be lost.	

Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Permanent (5) (For job seekers that stay on the town)	Permanent (5) (For job seekers that stay on the town)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (24)
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	
Mitigation:	See Section 7 of the BAR for a summary of the mitigation measures.	
Cumulative impacts:	Impacts on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.	
Residual impacts:	Same as cumulative impacts assessed above	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	

Nature: Potential risk to safety of scholars, farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site

	Without Mitigation	With Mitigation
Extent	Local (3)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (33)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock losses and damage to farm infrastructure etc.	Yes, compensation paid for stock losses and damage to farm infrastructure etc.
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation:	See Section 7 of the BAR for a summary of the Mitigation Measures.	
Cumulative impacts:	No, provided losses are compensated for.	
Residual impacts:	See cumulative impacts above.	

Assessment of No-Go option	There is no impact as it maintains the current status quo.	
Nature: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires		
	Without Mitigation	With Mitigation
Extent	Local (4)	Local (2)
Duration	Short term (2)	short term (2)
Magnitude	Moderate due to reliance on agriculture for maintaining livelihoods (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (36)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock and crop losses etc.	Yes, compensation paid for stock and crop losses etc.
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation:	See Section 7 of the BAR for a summary of mitigation measures.	
Cumulative impacts:	No, provided losses are compensated for.	
Residual impacts:	See cumulative impacts.	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	
Nature: Potential noise, dust and safety impacts associated with movement of construction related traffic to and from the site		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Short Term (2)	Short Term (2)
Magnitude	Medium (6)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Medium (30)	Low (15)
Status	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation:	See Section 7 of the BAR for a summary of Mitigation measures	
Cumulative impacts:	If damage to local farm roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were not responsible for the damage. Dust impacts to vineyards could also impact on future contracts.	
Residual impacts:	See cumulative impacts above.	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	

Nature: The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the PV facility and power lines will damage farmlands and result in a loss of farmlands for grazing.		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Long term-permanent if disturbed areas are not effectively rehabilitated (5)	Short term if damaged areas are rehabilitated (2)
Magnitude	Medium (6)	Minor (2)
Probability	Probable (3)	Highly Probable (4)
Significance	Medium (36)	Low (20)
Status	Negative	Negative
Reversibility	Yes, disturbed areas can be rehabilitated.	Yes, disturbed areas can be rehabilitated.
Irreplaceable loss of resources?	Yes, loss of farmland. However, disturbed areas can be rehabilitated	Yes, loss of farmland. However, disturbed areas can be rehabilitated
Can impact be mitigated?	Yes, however, loss of farmland cannot be avoided	
Mitigation:	See below	
Cumulative impacts:	Overall loss of farmland could affect the livelihoods of the affected farmers, their families, and the workers on the farms and their families. However, disturbed areas can be rehabilitated.	
Residual impacts:	See cumulative impacts.	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	

6.11.3 Social Impacts Associated with the operational phase.

The social specialist identified both positive and negative impacts associated with the operational phase of the development, these impacts were identified as follows:

- The establishment of renewable energy infrastructure (positive);
- Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training (positive);
- Generation of additional income for the landowner (positive);
- Benefits associated with the establishment of a Community Trust (positive);
- The visual impacts and associated impact on sense of place; and
- Potential impact on tourism.

An assessment of both these positive and negative impacts are included in the tables below.

Table 64: Assessment of positive social impacts during the operational phase.

Nature: Development of infrastructure to generate clean, renewable energy		
	Without Mitigation	With Mitigation
Extent	Local, Regional and National (4)	Local, Regional and National (5)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Highly Probable (4)	Definite (5)
Significance	High (64)	High (85)

Status	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	Reduced CO ₂ emissions and impact on climate change
Can impact be mitigated?	Yes	
Enhancement:	See Section 7 of the BAR for a summary of mitigation measures (these measures include the relative enhancement opportunities)	
Cumulative impacts:	Overall reduction in CO ₂ emission, reduction in water consumption for energy generation, contribution to establishing an economically viable commercial renewables generation sector in the Northern Cape and South Africa.	
Residual impacts:	See cumulative impacts above	
Assessment of No-Go option	The No-Development option would represent a lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy.	
Nature: Creation of employment and business opportunities associated with the operational phase		
	Without Mitigation	With Enhancement
Extent	Local and Regional (1)	Local and Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Definite (5)
Significance	Low (27)	Medium (50)
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	No	No
Can impact be enhanced?	Yes	
Enhancement:	See Section 7 of the BAR for a summary of mitigation measures (these measures include the relative enhancement opportunities)	
Cumulative impacts:	Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area	
Residual impacts:	See cumulative impacts above	
Assessment of No-Go option	There is no impact as it maintains the current status quo. However, the potential opportunity costs in terms of the loss of employment and skills and development training would be lost.	
Nature: Establishment of a community trust funded by revenue generated from the sale of energy. The revenue can be used to fund local community development		
	Without Mitigation	With Enhancement
Extent	Local and Regional (2)	Local and Regional (3)
Duration	Long term (4)	Long term (4)
Intensity	Low (4)	Moderate (6)
Likelihood	Probable (3)	Definite (5)
Significance	Medium (30)	High (65)
Status	Positive	Positive

Reversibility	Yes	Yes
Can impact be enhanced?	Yes	
Enhancement:	See Section 7 of the BAR for a summary of mitigation measures (these measures include the relative enhancement opportunities)	
Cumulative impacts:	Promotion of social and economic development and improvement in the overall well-being of the community	
Residual impacts:	See cumulative impacts	
Assessment of No-Go option	There is no impact as it maintains the current status quo. However, the potential opportunity costs in terms of the supporting the social and economic development in the area would be lost. This would also represent a negative impact.	
Nature: The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc. (+)		
	Without Mitigation	With Enhancement
Extent	Local (1)	Local (3)
Duration	Long term (4)	Long term (4)
Intensity	Low (4)	Moderate (6)
Likelihood	Probable (3)	Definite (5)
Significance	Low (27)	Medium (53)
Status	Positive	Positive
Reversibility	Yes	Yes
Can impact be enhanced?	Yes	
Enhancement:	See Section 7 of the BAR for a summary of mitigation measures (these measures include the relative enhancement opportunities)	
Cumulative impacts:	Support for local agricultural sector and farming	
Residual impacts:	See cumulative impacts	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	

Table 65: Assessment of negative social impacts during the operational phase of the development.

Nature: ³⁰ Visual impact associated with the proposed solar facility and the potential impact on the area's rural sense of place.		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (4)	Highly Probable (4)
Significance	Medium (32)	Low (28)
Status	Negative	Negative
Reversibility	Yes, solar facility can be removed.	

³⁰ This assessment includes visual impacts from a social perspective. Please also refer to the detailed standalone Visual Impact Assessment that was undertaken.

Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation:	See Section 7 of the BAR for a summary of the suggested mitigation measures.	
Cumulative impacts:	Potential impact on current rural sense of place	
Residual impacts:	See cumulative impacts	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	
Nature: Potential impact of the PV Facility on local tourism		
	Without Mitigation	With Enhancement / Mitigation
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	Low (24) (Applies to both – and +)	Low (24) (Applies to both – and +)
Status	Negative (Potential to distract from the tourist experience of the area) Positive (Potential to attract people to the area)	Negative (Potential to distract from the tourist experience of the area) Positive (Potential to attract people to the area)
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impact be enhanced?	Yes	
Enhancement:	See Section 7 of the BAR for a summary of mitigation measures (including opportunities for enhancement)	
Cumulative impacts:	The proposed PV Facility is one of a number of facilities proposed in the KGLM area. Due to size and height of PV Facilities the cumulative impacts are not rated significant.	
Residual impacts:	See cumulative impacts	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	

6.11.4 Social impacts associated with the decommissioning phase

The social specialist identified negative impacts associated with loss of jobs after the decommissioning of the development. These impacts are assessed in the table below.

Table 66: Assessment of social Impacts associated with the decommissioning of the facility.

Nature: Social impacts associated with retrenchment including loss of jobs, and source of income		
	Without Mitigation	With Mitigation
Extent	Local and regional (2)	Local and regional (1)
Duration	Medium Term (2)	Very Short Term (1)
Magnitude	Moderate (6)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (40)	Low (24)
Status	Negative	Negative
Reversibility	Yes, assumes retrenchment packages are paid to all affected employees	

Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation:	See Section 7 of the BAR for a summary of the suggested mitigation measures.	
Cumulative impacts:	Loss of jobs and associated loss of income etc. can impact on the local economy and other businesses. However, decommissioning can also create short term, temporary employment opportunities associated with dismantling etc.	
Residual impacts:	See cumulative impacts	

6.11.5 Cumulative Social Impacts.

The social specialists identified a number of cumulative impacts associated with sense of place, accommodation availability and local economics. An assessment of these potential cumulative impacts are included in the table below.

Table 67: Assessment of cumulative social impacts associated with the development.

Nature: Visual impacts associated with the establishment of more than one PV Facility and the potential impact on the area's rural sense of place and character of the landscape.		
	Without Mitigation	With Mitigation
Extent	Local and regional (2)	Local and regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Medium (30)	Low (24)
Status	Negative	Negative
Reversibility	Yes. Solar energy plant components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Enhancement:	See Section 7 of the BAR	
Cumulative impacts:	Impact on other activities whose existence is linked to rural sense of place and character of the area, such as tourism, bird watching, and hunting.	
Residual impacts:	See cumulative impacts	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	
Nature: The establishment of a number of renewable energy facilities in the KGLM and ZFMDM will place pressure on local services, specifically medical, education and accommodation		
	Without Mitigation	With Mitigation
Extent	Local and regional (3)	Local and regional (1)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (52)	Low (28)
Status	Negative	Negative
Reversibility	Yes. Solar energy plant components and other infrastructure can be removed.	

Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Enhancement:	See below	
Cumulative impacts:	Negative impact on the local services	
Residual impacts:	See cumulative impacts	
Comment on No-Go option	There is no impact as it maintains the current status quo.	
Nature: The establishment of a number of solar energy facilities in the KGLM and ZFMDM will create employment, skills development and training opportunities, creation of downstream business opportunities.		
	Without Mitigation	With Mitigation
Extent	Local and regional (3)	Local and regional (4)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Highly Probable (4)	Definite (5)
Significance	Medium (44)	High (70)
Status	Positive	Positive
Reversibility	Yes. Solar energy plant components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Enhancement:	See Section 7 of the BAR	
Cumulative impacts:	Positive impact on the local and regional economy through the creation of downstream opportunities and wage spend in the local economy	
Residual impacts:	See cumulative impacts	
Assessment of No-Go option	There is no impact as it maintains the current status quo. This would represent a lost socio-economic opportunity for the KGLM.	

6.11.6 Assessment of social impacts of the no-go alternative.

The social specialist assessed the impacts associated with lost opportunities, should the no-go alternative be implemented. The outcome of this assessment is included in the table below.

Table 68: Assessment of social impacts associated with the no-go alternative.

Nature: The no-development option would result in the lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy		
	Without Mitigation	With Mitigation
Extent	Local-International (4)	Local-International (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Moderate (56)	Moderate (56)
Status	Negative	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	N/A	N/A

Can impact be mitigated?	Yes
Enhancement:	See Section 7 of the BAR
Cumulative impacts:	Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change
Residual impacts:	See cumulative impacts

6.11.7 Conclusion and recommendation of social specialist

The findings of the Social Impact Assessment indicate that the development of the proposed Dyasons Klip 5 will create employment and business opportunities for locals during both the construction and operational phase of the project.

The establishment of a Community Trust will also benefit the local community. The enhancement measures listed in the report should be implemented in order to maximise the potential benefits. The significance of this impact is rated as High Positive. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the negative environmental and socio-economic impacts associated with a coal based energy economy and the challenges created by climate change, represents a significant positive social benefit for society as a whole. The findings of the Social Impact Assessment also indicate that the REIPPPP has resulted in significant socio-economic benefits, both at a national level and at a local, community level. These benefits are linked to foreign Direct Investment, local employment and procurement and investment in local community initiatives. The establishment of the proposed Dyasons Klip 5 is therefore supported by the findings of the Social Impact Assessment.

Due the number of other renewable energy projects proposed in the local municipal area, it is recommended that the Kai !Garib Local Municipality liaise with the proponents to investigate how best the Community Trusts can be established and managed so as to promote and support local, socio-economic development in the region as a whole.

6.12 TRAFFIC IMPACTS

An independent specialist, JG Afrika undertook a Traffic impact assessment of the proposed Dyasons Klip 5. The section below, summarises the impacts identified in this study.

6.12.1 Construction phase traffic impacts

The tables below summarise the traffic impacts associated with the construction phase of Dyasons Klip 5.

Table 69: Impacts of traffic congestion during construction

Environmental Parameter	Traffic Congestion	
Issue/Impact/Environmental Effect/Nature	Transport of equipment, material and staff to site will lead to congestion.	
Reversibility	Completely reversible	
Irreplaceable loss of resources	No loss	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	Local (2)	Local (1)
Probability	Highly probable (4)	Improbable (2)
Duration	Very Short (1)	Very Short (1)
Magnitude	Moderate (6)	Low (4)
Significance rating	Medium (36)	Low (12)

Mitigation measures	<ul style="list-style-type: none"> • Stagger component delivery to site • Reduce the construction period • The use of mobile batch plants and quarries in close proximity to the site • Staff and general trips should occur outside of peak traffic periods. • Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase.
Residual Risks:	None, Traffic will return to normal levels after construction is completed.

Table 70: Impacts on Air Quality as a result of dust from construction traffic.

Environmental Parameter	Air quality will be affected by dust pollution	
Issue/Impact/Environmental Effect/Nature	Traffic on roads will generate dust.	
Reversibility	Completely reversible	
Irreplaceable loss of resources	No loss	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	Local (2)	Local (1)
Probability	Highly probable (4)	Improbable (2)
Duration	Very Short (1)	Very Short (1)
Magnitude	Moderate (5)	Minor (2)
Significance rating	Medium (32)	Low (8)
Mitigation measures	<ul style="list-style-type: none"> • Dust Suppression of gravel roads during the construction phase, as required. • Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase. 	
Residual Risks:	Dust pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. Dust pollution is limited to the construction period.	

Table 71: Impacts of noise pollution due to increased traffic

Environmental Parameter	Noise pollution due to increased traffic.	
Issue/Impact/Environmental Effect/Nature	Traffic on roads will generate noise.	
Reversibility	Completely reversible	
Irreplaceable loss of resources	No loss	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	Local (2)	Local (1)
Probability	Highly probable (4)	Improbable (2)
Duration	Very Short (1)	Very Short (1)
Magnitude	Moderate (5)	Minor (2)
Significance rating	Medium (32)	Low (8)
Mitigation measures	<ul style="list-style-type: none"> • Stagger component delivery to site • Reduce the construction period as far as possible • The use of mobile batch plants and quarries in close proximity to the site • Staff and general trips should occur outside of peak traffic periods 	
Residual Risks:	Noise pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. Noise pollution is limited to the construction period.	

6.12.2 Operational Phase Traffic Impacts

The specialist concluded that the traffic generated during the operational phase will be negligible and will not have any impact on the surrounding road network.

6.12.3 Decommissioning Phase Traffic Impacts

The tables below summarise the traffic impacts associated with the decommissioning phase of Dyasons Klip 5. It must be noted that the decommissioning impacts as well as their associated mitigations are the same as those for the construction phase.

Table 72: Impacts of traffic congestion during decommissioning

Environmental Parameter	Traffic Congestion	
Issue/Impact/Environmental Effect/Nature	Transport of equipment, material and staff to site will lead to congestion.	
Reversibility	Completely reversible	
Irreplaceable loss of resources	No loss	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	Local (2)	Local (1)
Probability	Highly probable (4)	Improbable (2)
Duration	Very Short (1)	Very Short (1)
Magnitude	Moderate (6)	Low (4)
Significance rating	Medium (36)	Low (12)
Mitigation measures	<ul style="list-style-type: none"> Stagger component removal to site Reduce the construction period The use of mobile batch plants and quarries in close proximity to the site Staff and general trips should occur outside of peak traffic periods. Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase. 	
Residual Risks:	None, Traffic will return to normal levels after decommissioning is completed.	

Table 73: Impacts on Air Quality as a result of dust from decommissioning traffic.

Environmental Parameter	Air quality will be affected by dust pollution	
Issue/Impact/Environmental Effect/Nature	Traffic on roads will generate dust.	
Reversibility	Completely reversible	
Irreplaceable loss of resources	No loss	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	Local (2)	Local (1)
Probability	Highly probable (4)	Improbable (2)
Duration	Very Short (1)	Very Short (1)
Magnitude	Moderate (5)	Minor (2)
Significance rating	Medium (32)	Low (8)
Mitigation measures	<ul style="list-style-type: none"> Dust Suppression of gravel roads during the decommissioning phase, as required. Regular maintenance of gravel roads by the Contractor during the decommissioning phase and by Client/Facility Manager during operation phase. 	
Residual Risks:	Dust pollution during the decommissioning phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. Dust pollution is limited to the decommissioning period.	

Table 74: Impacts of noise pollution due to increased traffic

Environmental Parameter	Noise pollution due to increased traffic.	
Issue/Impact/Environmental Effect/Nature	Traffic on roads will generate noise.	
Reversibility	Completely reversible	
Irreplaceable loss of resources	No loss	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	Local (2)	Local (1)
Probability	Highly probable (4)	Improbable (2)
Duration	Very Short (1)	Very Short (1)
Magnitude	Moderate (5)	Minor (2)
Significance rating	Medium (32)	Low (8)
Mitigation measures	<ul style="list-style-type: none"> • Stagger component removal from site • Reduce the decommissioning period as far as possible • The use of mobile batch plants and quarries in close proximity to the site • Staff and general trips should occur outside of peak traffic periods 	
Residual Risks:	Noise pollution during the operational phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. Noise pollution is limited to the decommissioning period.	

6.12.4 Cumulative Impacts on Traffic

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

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

Table 75: Assessment of Cumulative Traffic Impacts

Nature:		
Traffic generated by the proposed development and the associated noise and dust pollution.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Low (2)	Moderate (3)
Duration	Very Short (1)	Short (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Definite (5)
Significance	Medium (36)	Medium (55)
Status (positive/negative)	Negative	Negative
Reversibility	High	High
Loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation:		
<ul style="list-style-type: none"> • Stagger component delivery to site • Dust suppression • Reduce the construction period • The use of mobile batch plants and quarries in close proximity to the site • Staff and general trips should occur outside of peak traffic periods 		

6.12.5 Concluding Statement - Traffic

The construction and decommissioning phases of a development are the only significant traffic generators and therefore noise and dust pollution will be higher during these phases. The duration of the phases is short term, i.e. the impact of the traffic on the surrounding road network is temporary and solar energy facilities, when operational, do not add any significant traffic to the road network.

Access point 1 (the existing Dyasonsklip Access) is deemed the preferred access route as it allows direct access to the proposed site. The development is supported from a transport perspective provided that the recommendations and mitigations contained in this report are adhered to.

The impacts associated with Dyasons Klip 5 Development are acceptable from a traffic perspective and with the implementation of the recommended mitigation measures can be considered for authorisation.

6.13 CUMULATIVE IMPACT ASSESSMENT

This section is summarised from the cumulative impact assessments that took place by each of the participating specialists. For further details in this regard, the reader is referred to the specialist assessments contained in **Appendix E**.

Where appropriate, certain specialists did include a cumulative assessment of a much wider area than the accepted 30km radius.

No potentially fatal flaws have been identified associated with cumulative impacts.

The 2014 EIA Regulations (as amended) (GNR 326) define a cumulative impact as follows:

“Cumulative impact in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.”

There are a number of other renewable energy facilities in the vicinity of the proposed Dyasons Klip 5 as detailed in the table below.

A Strategic Environmental Assessment process was undertaken by the CSIR in order to identify geographical areas most suitable for the rollout of Renewable Energy projects and the supporting electricity grid network. The aim of the assessment was to designate REDZs within which such development will be incentivised and streamlined. Subsequent to the SEA, these REDZ have been gazetted. Dyasons Klip 5 is within one of these Gazetted REDZ and as such deemed more suitable for such development on a cumulative scale.

Cumulative impacts that could occur due to the development of solar energy facilities and associated infrastructure in close proximity to each other include impacts such as:

- Visual impacts
- Socio-economic impacts
- Loss of vegetation and the inability to achieve conservation targets
- Impacts to soil and agricultural potential
- Impacts on heritage resources (in this area particularly relating to Archaeology resources)
- Surface water resources

In terms of possible cumulative impacts, one needs to look at the presence of similar facilities on the farm portion as well as the greater landscape.

- Cumulative impacts due to the cumulative effects of Dyasons Klip 5 added to all other renewable energy facilities in the Upington area. These impacts need to be managed through strategic spatial planning documents such as a SEA and SDF and not through individual EIA processes.
- Cumulative impacts due to the cumulative effects of the 5 Solar Facilities proposed to be located on one site i.e. Remainder of Farm Dyason's Klip 454

The table below reflects the other renewable energy facilities in close proximity to the proposed Dyasons Klip 5.

Table 76: Renewable Energy Facilities in proximity to Dyasons Klip 5 and their status

#	Project	Property	Status
1	Khi Solar 1 (CSP)	Portion 3 of the Farm McTaggarts Camp 453	Operational
2	Uppington CSP tower 2 and 3 (CSP)	Portion 3 of the Farm McTaggarts Camp 453	Authorised
3	Rooipunt Solar Park (PV)	Remainder farm Rooipunt 617	Authorised
4	Sasol CSP Phase 1 and 2 (CSP)	Portions 443 and 450 of 450 van roois vley	Authorised
5	Sirius Solar One (PV)	Remainder of Farm Tungsten Lodge	Operational
6	Sirius Solar 2 (PV)	Remainder of Farm Tungsten Lodge	Authorised
7	Sirius Solar 3 (PV)	Remainder of Farm Tungsten Lodge	EIA in Process
8	Sirius Solar 4 (PV)	Remainder of Farm Tungsten Lodge	EIA in Process
9	S-Kol (PV)	Farm Geel Kop 456	Authorised / Lapsed
10	Ofir ZX (PV)	Remainder of Farm 616	Authorised
11	Sonneberg PV Facility	Portion 11 of 474	Authorised
12	Dyasonsklip 1	Farm Dyasonsklip 454	Operational
13	Dyasonsklip 2	Farm Dyasonsklip 454	Operational
14	Dyasonsklip 3 (RE Capital 3C)	Farm Dyasonsklip 454	Authorised
15	Dyasonsklip SEF 1	Farm Dyasonsklip 454	Authorised
16	Bloemsmond 1	Portion 5 and 14 of Bloemsmond 455	Authorised
17	Bloemsmond 2	Portion 5 and 14 of Bloemsmond 455	Authorised
18	Bloemsmond 3	Portion 5 and 14 of Bloemsmond 455	Authorised
19	Bloemsmond 4	Portion 5 and 14 of Bloemsmond 455	Authorised
20	Bloemsmond 5	Portion 5 and 14 of Bloemsmond 455	Authorised
21	Bushmanland PV	RE Geel Kop 456	Authorised
22	Duneveld PV	RE Geel Kop 456	Authorised
23	Hari PV	RE Geel Kop 456	Authorised
24	Gordonia PV	RE Geel Kop 456	Authorised
25	Shrubland PV	RE Geel Kop 456	Authorised
26	Karroid PV	RE Geel Kop 456	Authorised
27	GK Solar PV	RE Geel Kop 456	Authorised

Cape EAPrac does not have details on the exact configuration of these facilities, however, based on the assumption that each facility on average will result in the transformation of approximately 230ha, one can assume the following transformation of the two vegetation types associated with the greater area.

Table 77: Potential habitat transformation proximity to Dyasons Klip 5.

Status	Transformation Area in Hectares
In operation	920
Under construction	0
Authorised	3220
EIA in Progress	2760

It is impossible to foresee how many of these projects will reach preferred bidder status in terms of the REIPPPP and will eventually be constructed. As a worst-case scenario one can assume a total transformation of 6900 hectares.

Potential cumulative impacts identified for the project include various negative impacts such as loss of habitat, visual massing, loss of agricultural land an influx jobseekers and change in the area's sense of place, but also include positive cumulative impacts on the economy, business development, and employment.

From an ecological perspective, cumulative impacts associated with the development are a concern. However, the loss of the habitat within the preferred alternative is not considered highly significant, given

the context surrounding the site. As a result, the overall cumulative impact of the development is considered likely to be medium.

In terms of habitat loss, the affected vegetation type is still approximately 96% intact and is an extensive vegetation type, the cumulative loss of 6000ha of habitat is not considered highly significant, especially given the spatial context of the site within a Renewable Energy Development Zone.

From a social perspective the project is deemed to have a medium positive cumulative impact from employment, skills and business opportunities and skills development and a low negative cumulative impact from large-scale in-migration of people.

From a visual perspective, the cumulative visual risk to scenic resources was rated medium negative. Retaining the vegetation around the proposed PV areas will retain the surrounding agricultural sense of place, and further localise the combined zone of visual influence. With successful rehabilitation of the area back to an agricultural land use on closure, the cumulative visual risk could be reduced to negligible in the long term.

6.14 IMPACT SUMMARY

The table below summarises the significance (with mitigation) of all impacts assessed in the sections above³¹.

For ease of easy references, impacts are visually reflected using the following colour scheme³².

- All positive impacts (regardless of their significance)
- Neutral or Negligible negative impacts
- Very Low and Low negative impacts
- Medium negative impacts
- Medium – High, High and Very High negative impacts



Table 78: Summary of the significance of impacts associated with Dyasons Klip 5³³.

Impact	Significance (with mitigation)
Social Impacts during the construction Phase	
Creation of employment and business opportunities	Medium positive
Presence of construction workers and potential impacts on family structures and social networks.	Low negative
Influx of job seekers.	Low negative
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers.	Low negative
Increased risk of veld fires	Low negative
Impact of heavy vehicles and construction activities.	Low negative
Loss of farmland.	Low negative
Social Impacts during the operational phase	
Promotion of renewable energy projects	High positive
Creation of employment and business opportunities	Medium positive

³¹ In order to attain these outcomes, the mitigation measures reflected in Section 7 of the report need to be implemented.

³² Where specialist ratings fall across 2 of the groups, the worst case is reflected in the quick reference.

³³ This includes cumulative impacts associated with the facility

Impact	Significance (with mitigation)
Establishment of Community Trust	High positive
Generate income for affected landowner/s	Medium positive
Visual impact and impact on sense of place	Low negative
Impact on tourism	Low positive and negative
Visual Impacts during construction and operation phase	
Change of local and surrounds visual resources due to the construction and operation of the proposed (3.5m high) PV structures, and buildings.	Low negative
Change of local and surrounds visual resources due to the construction and operation of the proposed road access.	Low negative
Palaeontological Impacts of the construction phase	
Impact on potential palaeontological resources	Low negative
Agricultural Impacts	
Soil pollution with contaminants during the construction phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the construction of all facets of the facility: laydown area, concrete foundations of the auxiliary buildings, inverter stations subterranean cabling, main access and internal service roads.	Low negative
The establishment of the Dyasons Klip 5 Solar facility will be done at the expense of agricultural land. The area to be lost for agricultural development would be 267ha in size. This includes the area under PV panels, internal service roads and temporary laydown area	Low negative
The construction of a PV Solar facility will cause impairment of the land capability with the potential risk of erosion	Low negative
The establishment of the PV Solar facility may alter drainage patterns with construction and cause erosion	Low negative
Soil pollution with contaminants during the operational phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the maintenance of the facility.	Low negative
The quantity of available soil for agricultural production decreases as result of the footprints of these facilities. The quality of soil decreases in the way the construction of these structures alters the workability of the soil. This includes the physical deformation in the soil profile (Cumulative)	Medium negative
Clearing of vegetation increases flow speed and a lower infiltration tempo increases silt transport (Cumulative)	Medium negative
Chemicals, hazardous substances and waste used or generated during live span of the facility accumulate and pollute soil will become contaminated (Cumulative)	Medium negative
Freshwater Ecology Impacts	
Loss of Very High Sensitivity systems, namely the mainstem alluvial water course and a pan through physical disturbance although the proposed layout will avoid any of these systems.	Low negative
Impact on secondary alluvial water courses (Moderate Sensitivity), through physical disturbance	Low negative
Impact on all riparian and wetland systems through the possible increase in surface water runoff on riparian form and function through hydrological changes	Low negative
Increase in sedimentation and erosion	Low negative
Risks on the aquatic environment due to water quality impacts	Low negative
Cumulative impacts	Medium Negative
Terrestrial Fauna Impacts	
Loss and/or fragmentation of indigenous natural vegetation due to clearing;	Medium negative
Loss of individuals of plant species of conservation concern and/or protected plants	Low negative
Loss of faunal habitat and refugia	Low negative
Direct mortality of fauna due to machinery, construction and increased traffic	Low negative
Displacement and/or disturbance of fauna due to increased activity and noise levels	Low negative
Effects on physiological functioning of vegetation due to dust deposition	Low negative
Increased poaching and/or illegal collecting due to increased access to the area.	Low negative
Indirect impacts during the construction phase include the following	Low negative
Establishment and spread of alien invasive plants due to the clearing and disturbance of indigenous vegetation	Low negative

Impact	Significance (with mitigation)
Changes to behavioural patterns of animals, including possible migration away or towards the project area	Low negative
Increased runoff and erosion due to clearing of vegetation, construction of hard surfaces and compaction of surfaces, leading to changes in downslope areas.	Low negative
Cumulative Impacts	Medium negative
Avifaunal Impacts	
Construction of the solar PV plant and associated infrastructure	Low negative
Displacement due to habitat transformation	Medium negative
Collisions	Low negative
Entrapment	Low negative
Electrocution	Low negative
Decommissioning Impacts	Low negative
Cumulative Impacts	Low negative
Traffic Impacts	
Traffic Congestion	Low negative
Noise pollution due to increased traffic.	Low negative
Air quality affected by dust pollution	Low negative

As can be seen from the table above, there are a number of positive impact associated with Dyasons Klip 5. The majority of the negative impacts are either low or medium/ There are no high or very high impacts associated with Dyasons Klip 5.

6.15 IMPACT STATEMENT

None of the participating specialists identified any impacts that remain high after mitigation. Due to the risk adverse approach followed for the development of the preferred layout, all the main sensitive features (most notably significant water courses, rocky outcrops, archaeology features, avifaunal buffers and visually sensitive areas) were avoided.

The affected area is considered suitable for development and there are no impacts associated with Dyasons Klip 5 that cannot be mitigated to a medium level. As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layout provided for the assessment, Dyasons Klip 5 can be supported from a terrestrial ecology, avifaunal, freshwater, visual, social, heritage and agricultural perspective.

A map showing the proposed activity in relation to the key sensitive features is attached as **Appendix D**. All sensitive features along with their appropriate buffers are shown in this plan. As required by the EMPr, all areas outside of the proposed development footprint are to be demarcated as no-go areas.

Please refer to the table in the section above listing the key impacts and their significance post mitigation for the preferred alternative. This section must be read in conjunction with the suggested mitigation measures listed in Section 7 of this report.

The table below shows the listed activities applied for with a reference of where the impacts associated with the specific activity are assessed by specialists.

Table 79: Specialist Impact Assessment of Listed Activities.

Listed activity as described in GN R.983, 984 and 985	Reference to Impact Assessment
Regulation 983 – Basic Assessment	
GN R983 Activity 11: <i>The development of facilities or infrastructure for the transmission and distribution of electricity-</i> <i>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or</i>	Annexures E1, E2, E3, E4, E5, E7, E8, E12, E13 & E14.

<i>(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.</i>	
GN R983 Activity 12: The development of- (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	Annexures E1, E8, E11 & E13
GN R983 Activity 19: <i>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic</i> <i>(i) a watercourse;</i>	Annexures E1, E8, E11 & E13
Regulation 984 – S&EIR	
GN R984 Activity 1: The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area.	Annexures E1, E2, E3, E4, E5, E7, E8, E10, E12, E13 & E14.
GN R984 Activity 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	e

7. MITIGATION MEASURES

Please refer to the table below, which summarises the mitigation measures recommended by both the Specialists and Cape EAPrac. This table summarises the mitigations, and details whether they should be included as conditions of approval, or whether they have been included as actions in the EMP. The table furthermore reflects to which stage of the development the proposed mitigation measures are applicable. In instances where suggested mitigations have already been incorporated into the design phase, they have been reflected as such.

Table 80: Recommended mitigation measures required for the construction, operation and decommissioning of the Dyasons Klip 5 development.

Mitigation	Condition of Approval	Included in EMP	Construction Phase	Operational Phase	Decommissioning Phase
Terrestrial Ecology					
Restrict impact to development footprint only and limit disturbance spreading into surrounding areas.	✓	✓	✓	✓	✓

Mitigation	Condition of Approval	Included in EMPr	Construction Phase	Operational Phase	Decommissioning Phase
As far as possible, locate infrastructure within areas that have been previously disturbed or in areas with lower sensitivity scores.		✓	✓		
Avoid sensitive features and habitats when locating infrastructure		✓	✓		
Cross streams and other linear features at right angles, where possible, and also near their end-points or where there are natural breaks in the feature		✓	✓		
Construct adequate structures at points where roads cross watercourses, either proper stabilized dips in the road or culverts that do not limit the width of natural channels or the natural hydrological function.		✓	✓		
No mass clearing of vegetation for the PV arrays should be allowed. Vegetation to be brush cut and only in exceptional circumstances completely cleared.	✓	✓	✓		
Compile a Rehabilitation Plan		✓	✓	✓	✓
Compile an Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas.		✓	✓	✓	✓
Where possible, access roads should be located along existing farm, access and district roads		✓	✓		
Access to sensitive areas outside of development footprint should not be permitted during construction.		✓	✓		
Undertake monitoring to evaluate whether further measures would be required to manage impacts.		✓	✓	✓	
A number of protected species were found on site. The following mitigation measures would help to avoid and limit impacts: It is a legal requirement to obtain permits for specimens that will be lost.	✓	✓	✓		
A detailed pre-construction walk-through survey will be required during a favourable season to locate any additional individuals of protected plants. This survey must cover the footprint of all approved infrastructure, including internal access roads.	✓	✓	✓		
If possible, plants should be conserved in situ, along with an appropriate buffer zone around them		✓	✓		
Plants lost to the development can be rescued and planted in appropriate places in rehabilitation areas. This will reduce the irreplaceable loss of resources as well as the cumulative effect		✓	✓		
A Plant Rescue Plan must be compiled to be approved by the appropriate authorities.		✓	✓		
Restrict impact to development footprint only and limit disturbance spreading into surrounding areas. Limit clearing of natural habitat designated as sensitive, especially rocky outcrops, cliffs and riparian habitats.	✓		✓		
No speeding on access roads – install speed control measures, such as speed humps, if necessary		✓	✓		
No hunting of protected species.		✓	✓		
Personnel to be educated about protection status of species, including distinguishing features to be able to identify protected species.		✓	✓		
Report any sightings to conservation authorities		✓	✓	✓	
Undertake dust fall-out monitoring and manage, where necessary	✓	✓	✓		
Compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. This should include any areas within proximity to the project that may be affected by the project, or that could have an influence on invasion by alien invasive plants into the property		✓	✓	✓	

Mitigation	Condition of Approval	Included in EMPr	Construction Phase	Operational Phase	Decommissioning Phase
Undertake regular monitoring to detect alien invasions early so that they can be controlled.		✓	✓	✓	
Avoid development of designated sensitive habitats		✓	✓		
Appropriate lighting should be installed to minimize impacts on nocturnal animals.		✓	✓	✓	
Construction activities should not be undertaken at night.		✓	✓		
Compile and implement a stormwater management plan, which highlights control priorities and areas and provides a programme for long-term control		✓	✓		
Undertake regular monitoring to detect erosion features early so that they can be controlled		✓	✓	✓	
Avoid building on or near steep or unstable slopes. Construct proper culverts, bridges and/or crossings at drainage-line crossings, and other attenuation devices to limit overland flow		✓	✓		
No additional clearing of vegetation should take place without a proper assessment of the environmental impacts and authorization from relevant authorities		✓		✓	
If any additional infrastructure needs to be constructed, for example overhead powerlines, communication cables, etc., then these must be located next to existing infrastructure, and clustered to avoid dispersed impacts.		✓		✓	
No driving of vehicles off-road		✓		✓	
Implement Alien Plant Management Plan, including monitoring, to ensure minimal impacts on surrounding areas.		✓		✓	
Access to sensitive areas outside of development footprint should not be permitted during operation. Surface runoff and erosion must be properly controlled and any issues addressed as quickly as possible.		✓		✓	
No illegal collecting of any individuals, particularly the Armadillo Girdled Lizard		✓	✓	✓	
No hunting of protected species or hunting of any other species without a valid permit.		✓	✓	✓	
Personnel to be educated about protection status of species, including distinguishing features to be able to identify protected species		✓	✓	✓	
Avifaunal					
Activity should as far as possible be restricted to the footprint of the infrastructure.		✓	✓		✓
Measures to control noise and dust should be applied according to current best practice in the industry.		✓	✓		✓
Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical.		✓	✓		✓
Access to the rest of the property must be restricted. The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint is concerned.		✓	✓		
A single perimeter fence should be used.		✓		✓	
With regards to the infrastructure within the substation yard and inverter station, the hardware is too complex to warrant any mitigation for electrocution at this stage. It is rather recommended that if any impacts are recorded once operational, site specific mitigation be applied reactively.		✓		✓	
Palaeontology					
Implementation of a chance find procedure		✓	✓		

Mitigation	Condition of Approval	Included in EMP	Construction Phase	Operational Phase	Decommissioning Phase
Visual					
Investigate the possibility of undertaking screening		✓	✓		
Plan to maintain the height of structures as low as possible;		✓	✓		
Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development		✓	✓		
Reinstate any areas of vegetation that have been disturbed during construction		✓	✓		
Remove all temporary works		✓		✓	
Monitor rehabilitated areas post-construction and implement remedial actions;		✓		✓	
Minimise disturbance and maintain existing vegetation as far as is possible both within and surrounding the development area.		✓		✓	
Remove infrastructure not required for the post-decommissioning use of the site		✓			✓
All alien plant re-growth must be monitored and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor.		✓	✓		
It is further recommended that a comprehensive rehabilitation / monitoring plan be implemented from the project onset to ensure a net benefit to the environment within all areas that will remain undisturbed.		✓	✓	✓	
Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off		✓	✓		
Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Suitable dust and erosion control mitigation measures should be included in the EMP to mitigate these impacts.		✓	✓		
Any stormwater within the development area must be handled in a suitable manner, i.e. separate clean and dirty water streams around the plant, and install stilling basins to capture large volumes of run-off, trap sediments and reduce flow velocities (e.g. water used when washing the PV Panels).		✓	✓	✓	
Suitable stormwater management features with erosion control measures (gabions) should also be installed in areas where concentrated flows are anticipated		✓	✓		
Strict use and management of all hazardous materials used on site.		✓	✓		
Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / banded areas		✓	✓		
Containment of all contaminated water by means of careful run-off management on site.		✓	✓		
Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. These must be situated outside of any delineated water courses or the buffers shown		✓	✓		
Strict control of the behaviour of construction workers.		✓	✓		
Appropriate waste management		✓	✓		
Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced.		✓	✓		
Agriculture					
Installation of proper Erosion control, and drainage on the access road.		✓	✓		
Dust control on the access road during construction.		✓	✓		
The general objective is to position the PV facilities on the lowest potential soil and not in places that may have impact on agricultural activities, drainage lines		✓	✓		

Mitigation	Condition of Approval	Included in EMPr	Construction Phase	Operational Phase	Decommissioning Phase
and places with a sensitive nature. Existing road alignments are followed and roads upgraded for use during the live span of facility. With the appropriate planning, the same live style can be achieved during the lease period of the facility from the land so occupied by the facility.					
Refuelling normally takes place in the workshop of the control building. A designated area for refuelling must be constructed with an impervious floor and low wall that will keep the spillage inside. Any spillage must be cleaned with absorbent material as soon as possible and disposed into clearly marked containers. Where spillage takes place, contaminated soil must be excavated and replaced with unpolluted soil. The contaminated soil should be collected by a licenced landfill contractor.		✓	✓		
Ensure that most infrastructure features are erected on transformed or non-arable land. Implement stormwater management as an integral part of planning and as a guideline for the positioning of structures. Use existing roads and conservation structures to the maximum in the planning and operation phases. Rehabilitate disturbed areas as soon as possible after construction.		✓	✓		
Erosion and sediment control with proper water run-off control planning.		✓	✓		
Appropriate handling and storage of chemicals and hazardous substances and waste should be done.		✓	✓		
When spillage accidentally takes place, it should be removed and replaced with unpolluted soil. The clean soil can be sourced from excavations nearby. The polluted soil must be piled at a temporary storage facility with a firm waterproof base and is protected from inflow of storm water. It must have an effective drainage system to a waterproof spillage collection area. Contaminated soil must be disposed of at a hazardous waste storage facility.		✓	✓		
Clear trees and bushes selectively, leaving grass un-disturbed. Use mechanised machinery when installing posts to eliminate need for foundations. Construct on alternate strips to combat possible erosion.		✓	✓		
Establish structures on the contour. Use grass strips to regulate flow speed		✓	✓		
Social					
Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.		✓	✓		
Before the construction phase commences the proponent should meet with representatives from the KGLM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase.		✓	✓		
Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria;		✓	✓		
The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.		✓	✓		
Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase		✓	✓		
The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.		✓	✓		

Mitigation	Condition of Approval	Included in EMPr	Construction Phase	Operational Phase	Decommissioning Phase
The KGLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.		✓	✓		
Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories;		✓	✓		
The proponent should consider the option of establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from local communities, local KGLM Councillor for Ward 8, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community associated with construction workers;		✓	✓	✓✓	
The proponent and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation;		✓	✓	✓	
The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase;		✓	✓		
The construction area should be fenced off before construction commences and no workers should be permitted to leave the fenced off area;		✓	✓		
The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site.		✓	✓		
Where necessary, the contractors should make the necessary arrangements to enable low and semi-skilled workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks;		✓	✓		
The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end;		✓	✓		
It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.		✓	✓		
The proponent should implement a policy that no employment will be available at the gate.		✓	✓		
The construction area should be fenced off prior to the commencement of the construction phase. The movement of construction workers on the site should be confined to the fenced off area;		✓	✓		
The proponent must enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences;		✓	✓		
Traffic and activities should be strictly contained within designated areas		✓	✓		
Strict traffic speed limits must be enforced on the farm		✓	✓		
All farm gates must be closed after passing through		✓	✓		
Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties		✓	✓		
The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that		✓	✓		

Mitigation	Condition of Approval	Included in EMP	Construction Phase	Operational Phase	Decommissioning Phase
can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover losses and costs associated with fires caused by construction workers or construction related activities (see below)					
The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested		✓	✓		
Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.		✓	✓		
Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation		✓	✓		
The option of establishing a fire-break around the perimeter of the site prior to the commencement of the construction phase should be investigated;		✓	✓		
Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas;		✓	✓		
Smoking on site should be confined to designated areas;		✓	✓		
Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle;		✓	✓		
Contractor to provide fire-fighting training to selected construction staff		✓	✓		
The movement of heavy vehicles associated with the construction phase should be timed to avoid times of the week, such as weekends, when the volume of traffic travelling along the N14 may be higher;		✓	✓		
The section of access road from the N14 that passes adjacent to the vineyards should be surfaced		✓	✓		
Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.		✓	✓		
All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits		✓	✓		
An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;		✓	✓		
All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase		✓	✓		
The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed		✓	✓		
The implementation of the Rehabilitation Programme should be monitored by the ECO		✓	✓		
Implement a skills development and training programme aimed at maximising the number of employment opportunities for local community members; Maximise opportunities for local content, procurement and community shareholding		✓	✓		
The KGLM should liaise with the proponents of other renewable energy projects in the area to investigate how best the Community Trusts can be established and managed so as to promote and support local, socio-economic development in the region as a whole.		✓	✓		

Mitigation	Condition of Approval	Included in EMPr	Construction Phase	Operational Phase	Decommissioning Phase
The KGLM should be consulted as to the structure and identification of potential trustees to sit on the Trust. The key departments in the KGLM that should be consulted include the Municipal Managers Office, IDP Manager and LED Manager.		✓	✓		
Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community;		✓	✓		
Strict financial management controls, including annual audits, should be instituted to manage the funds generated for the Community Trust from the PV facility.		✓	✓		
The proponent should ensure that retrenchment packages are provided for all staff retrenched when the plant is decommissioned.		✓	✓		
All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning		✓	✓		
Revenue generated from the sale of scrap metal during decommissioning should be allocated to funding closure and rehabilitation of disturbed areas.		✓	✓		
The Northern Cape Provincial Government, in consultation with the ZFMDM, KGLM and the proponents involved in the development of renewable energy projects in the Kai Garib Local Municipality, should consider establishing a Development Forum to co-ordinate and manage the development and operation of renewable energy projects in the area with the specific aim of mitigating potential negative impacts and enhancing opportunities. This would include identifying key needs, including capacity of existing services, accommodation and housing and the implementation of an accredited training and skills development programmes aimed at maximising the opportunities for local workers to be employed during the construction and operational phases of the various proposed projects. These issues should be addressed in the Integrated Development Planning process undertaken by the KGLM and ZFMDM.		✓	✓		
Traffic					
Stagger component delivery to site.		✓	✓		✓
Reduce the construction period		✓	✓		✓
The use of mobile batch plants and quarries in close proximity to the site		✓	✓		✓
Staff and general trips should occur outside of peak traffic periods.		✓	✓		✓
Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase		✓	✓		✓
Dust Suppression of gravel roads during the construction phase, as required.		✓	✓		✓
Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase		✓	✓		✓

8. PUBLIC PARTICIPATION PROCESS

Section 41 in Chapter 6 of regulation 982 details the public participation process that has to take place as part of an environmental process. The table below provides a quick reference to show how this environmental process has or intends to comply with these legislated requirements relating to public participation.

Please refer to **Appendix F**, where all evidence of public participation is included.

Table 81: Public participation requirements in terms of S41 of R982

Regulated Requirement	Description
<p>(1) If the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land.</p> <p>(2) Subregulation (1) does not apply in respect of-</p> <p>(a) linear activities;</p>	<p>Proof of landowner consent for Dyasons Klip 5 is attached in Annexure G2.</p> <p>The access road is deemed to constitute a linear activity and as such not required to obtain landowner consent.</p> <p>Land owners of the portion where the access road crosses were interviewed by the social specialist and where also given an opportunity to comment on the Draft BAR.</p>
<p>The person conducting a public participation process must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by -</p>	
<p>(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of -</p> <p>(i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and</p> <p>(ii) any alternative site;</p>	<p>A site notice was placed at two positions along the N14.</p> <p>Photographic evidence of these notices is attached in Annexure F3.</p>
<p>(b) giving written notice, in any of the manners provided for in section 47D of the Act, to -</p>	
<p>(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;</p>	<p>There are no tenants on the affected portions, other than the landowner.</p>
<p>(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;</p>	<p>Owners of adjacent properties have been notified of this environmental process. Such owners have been requested to inform the occupiers of the land of this environmental process. Please refer to Annexure F4 for copies of these notifications</p>
<p>(iii) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;</p>	<p>The ward councillor has been notified of this environmental process.</p> <p>Please refer to Annexure F4 for copies of these notifications</p>
<p>(iv) the municipality which has jurisdiction in the area;</p>	<p>The Kai !Garib municipality (Planning and Technical Services) have been notified of this environmental process.</p> <p>Please refer to Annexure F4 for copies of these notifications.</p>
<p>(v) any organ of state having jurisdiction in respect of any aspect of the activity; and</p>	<p>Please refer to Annexure F1 showing the list of organs of state that were notified as part of this environmental process.</p> <p>Please refer to Annexure F4 for copies of these notifications.</p>
<p>(vi) any other party as required by the competent authority;</p>	<p>DEFF will be given an opportunity to comment on the Draft BAR and EMPr. Their comments will be attached in Appendix G1. in the Final BAR.</p>
<p>(c) placing an advertisement in -</p> <p>(i) one local newspaper; or</p> <p>(ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;</p>	<p>An advert calling for registration of I&APs was placed in Die Gemsbok local newspaper.</p> <p>Please refer to Annexure F3 for a copy of this advertisement.</p> <p>There is currently no official Gazette that has been published specifically for the purpose of providing public notice of applications</p>

Regulated Requirement	Description
(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii);and	Adverts were not placed in provincial or national newspapers, as the potential impacts will not extend beyond the borders of the municipal area.
(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to - (i) illiteracy; (ii) disability; or (iii) any other disadvantage.	Notifications have included provision for alternative engagement in the event of illiteracy, disability or any other disadvantage. In such instances, Cape EAPrac will engage with such individuals in such a manner as agreed on with the competent authority.
(3) A notice, notice board or advertisement referred to in subregulation (2) must - (a) give details of the application or proposed application which is subjected to public participation; and (b) state - (i) whether basic assessment or S&EIR procedures are being applied to the application; (ii) the nature and location of the activity to which the application relates; (iii) where further information on the application or proposed application can be obtained; and (iv) the manner in which and the person to whom representations in respect of the application or proposed application may be made.	Please refer to Annexure F3 .
(4) A notice board referred to in subregulation (2) must - (a) be of a size at least 60cm by 42cm; and (b) display the required information in lettering and in a format as may be determined by the competent authority.	Please refer to Annexure F3 .
(5) Where public participation is conducted in terms of this regulation for an application or proposed application, subregulation (2)(a), (b), (c) and (d) need not be complied with again during the additional public participation process contemplated in regulations 19(1)(b) or 23(1)(b) or the public participation process contemplated in regulation 21(2)(d), on condition that - (a) such process has been preceded by a public participation process which included compliance with subregulation (2)(a), (b), (c) and (d); and (b) written notice is given to registered interested and affected parties regarding where the - (i) revised basic assessment report or, EMPr or closure plan, as contemplated in regulation 19(1)(b); (ii) revised environmental impact report or EMPr as contemplated in regulation 23(1)(b);or	This will be complied with if final reports are produced later on in the environmental process.

Regulated Requirement	Description
<p>(iii) environmental impact report and EMPr as contemplated in regulation 21(2)(d);</p> <p>may be obtained, the manner in which and the person to whom representations on these reports or plans may be made and the date on which such representations are due.</p>	
<p>(6) When complying with this regulation, the person conducting the public participation process must ensure that -</p> <p>(a) information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and</p> <p>(b) participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application.</p> <p>(7) Where an environmental authorisation is required in terms of these Regulations and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation process contemplated in this Chapter may be combined with any public participation processes prescribed in terms of a specific environmental management Act, on condition that all relevant authorities agree to such combination of processes.</p>	<p>All reports that are submitted to the competent authority will be subject to a public participation process. These include:</p> <ul style="list-style-type: none"> - Draft BAR - Draft EMPr - All specialist reports that form part of this environmental process.

8.1 PUBLIC PARTICIPATION PLAN IN TERMS OF THE COVID 19 REGULATIONS OF 05 JUNE 2020 (GNR660)

This plan was submitted in compliance with regulation GNR660 published on 05 June 2020 in terms of the Disaster Management Act (57/2002) and titled: Directions Regarding Measures to Address, Prevent and Combat the Spread of COVID-19 Relating to National Environmental Management Permits and Licences. In compliance with section 5.1 and annexure 2 of these regulations, a public participation plan must be presented to the competent authority for approval prior to implementation. The mechanism of a pre-application meeting will be utilised to present this plan to the Department of Environment Forestry and Fisheries (DEFF) for approval. This plan was accepted by the department and will be implemented in this environmental process.

Section 40(2) in Chapter 6 of regulation 982 requires that the public participation process contemplated in this regulation must provide access to all information that reasonably has or may have the potential to influence any decision with regard to an application unless access to that information is protected by law and must include consultation with—

- (a) the competent authority;
- (b) every State department that administers a law relating to a matter affecting the environment relevant to an application for an environmental authorisation;
- (c) all organs of state which have jurisdiction in respect of the activity to which the application relates; and
- (d) all potential, or, where relevant, registered interested and affected parties.

In order to comply with this requirement, the proposal is to provide all parties, listed in subsections a, b and c above, with full digital copies of the Draft Basic Assessment Report (DBAR), Draft Environmental

Management Programme and all specialist studies and plans. Such digital copies will be provided to the competent authority, organs of state and state departments on CD by post. Where no postal service is available, the documents will be provided by courier service.

In terms of point d above, all Interested & Affected Parties (I&APs) that are identified or register as part of the process will be provided access to the Draft BAR via the following:

1. The digital copy of the documentation that will be on the Cape EAPrac website and any other digital platform that is identified by Cape EAPrac or the recipients.
2. I&AP's that do not have access to digital platforms will be provided with printed hardcopies of the executive summary and any specialist reports that they may have interest in. Such copies will be provided by courier or postal service.
3. Potential and registered I&APs will be informed that copies of the documentation can be provided via postal or courier services.

Section 41 in Chapter 6 of regulation 982 details the public participation process that has to take place as part of an environmental process. The table below lists these requirements along with the proposed actions in order to comply with both section 41 in regulation 982 as well as well as section 5.1 and annexure 2 of regulation 660.

Table 82: Proposed Public participation in terms of Regulation 660

Regulated Requirement	Proposed Actions
<p>(1) If the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land.</p> <p>(2) Subregulation (1) does not apply in respect of-</p> <p>(a) linear activities;</p>	<p>A landowner consent for the development has been obtained in terms of this requirement. No deviation or additional actions in terms of regulation 660 are required.</p>
<p>The person conducting a public participation process must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by -</p>	
<p>(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of -</p> <p>(i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and</p> <p>(ii) any alternative site;</p>	<p>A site notice will be placed at the boundary of the property along the N14. No deviation or additional actions in terms of regulation 660 are required.</p>
<p>(b) giving written notice, in any of the manners provided for in section 47D of the Act, to -</p>	
<p>(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;</p>	<p>There are no tenants on the affected portions, other than the landowner who has provided consent for the development. No deviation or additional actions in terms of regulation 660 are required.</p>
<p>(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;</p>	<p>Owners of adjacent properties will be notified of this environmental process and will be provided with digital copies of the documents via postal or courier services (where available), if they do not have access to online platforms. Such owners have been requested to inform the occupiers of the land of this environmental process and the process to obtain copies of the relevant reports.</p>

Regulated Requirement	Proposed Actions
(iii) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;	The ward councillor will be notified of this environmental process and will be provided with a digital copy of the documentation via postal or courier services.
(iv) the municipality which has jurisdiction in the area;	The Kai !Garib Municipality (Planning and Technical Services) will be notified of this environmental process and will be provided with digital copies of all documentation via postal or courier service.
(v) any organ of state having jurisdiction in respect of any aspect of the activity; and	All organs of state that have jurisdiction in respect of the activity will be notified of this environmental process and will be provided with digital copies of all documentation via postal or courier service (where available).
(vi) any other party as required by the competent authority;	DEA will be given an opportunity to comment on the Draft BAR and EMPr. Should they identify additional parties that need to provide comment, copies of the documentation and opportunity to comment will be provided to such parties.
(c) placing an advertisement in - (i) one local newspaper; or (ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;	An advert calling for registration of I&APs will be placed in Die Gemsbok local newspaper. There is currently no official Gazette that has been published specifically for the purpose of providing public notice of applications.
(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii);and	Adverts will not be placed in provincial or national newspapers, as the potential impacts will not extend beyond the borders of the municipal area.
(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to - (i) illiteracy; (ii) disability; or (iii) any other disadvantage.	Notifications will include provision for alternative engagement in the event of illiteracy, disability or any other disadvantage. In such instances, Cape EAPrac will engage with such individuals in such a manner as agreed on with the competent authority.
(3) A notice, notice board or advertisement referred to in subregulation (2) must - (a) give details of the application or proposed application which is subjected to public participation; and (b) state - (i) whether basic assessment or S&EIR procedures are being applied to the application; (ii) the nature and location of the activity to which the application relates; (iii) where further information on the application or proposed application can be obtained; and (iv) the manner in which and the person to whom representations in respect of the application or proposed application may be made.	All notification and adverts will comply with this requirement. No deviation or additional actions in terms of regulation 660 are required.

Regulated Requirement	Proposed Actions
<p>(4) A notice board referred to in subregulation (2) must -</p> <p>(a) be of a size at least 60cm by 42cm; and</p> <p>(b) display the required information in lettering and in a format as may be determined by the competent authority.</p>	<p>The notice board which will be placed on the site boundary will comply with this requirement.</p>
<p>(5) Where public participation is conducted in terms of this regulation for an application or proposed application, subregulation (2)(a), (b), (c) and (d) need not be complied with again during the additional public participation process contemplated in regulations 19(1)(b) or 23(1)(b) or the public participation process contemplated in regulation 21(2)(d), on condition that -</p> <p>(a) such process has been preceded by a public participation process which included compliance with subregulation (2)(a), (b), (c) and (d); and</p> <p>(b) written notice is given to registered interested and affected parties regarding where the -</p> <p>(i) revised basic assessment report or, EMPr or closure plan, as contemplated in regulation 19(1)(b);</p> <p>(ii) revised environmental impact report or EMPr as contemplated in regulation 23(1)(b); or</p> <p>(iii) environmental impact report and EMPr as contemplated in regulation 21(2)(d);</p> <p>may be obtained, the manner in which and the person to whom representations on these reports or plans may be made and the date on which such representations are due.</p>	<p>This will be complied with if final reports are produced later in the environmental process.</p>
<p>(6) When complying with this regulation, the person conducting the public participation process must ensure that -</p> <p>(a) information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and</p> <p>(b) participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application.</p> <p>(7) Where an environmental authorisation is required in terms of these Regulations and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation process contemplated in this Chapter may be combined with any public participation processes prescribed in terms of a specific environmental management Act, on condition that all relevant authorities agree to such combination of processes.</p>	<p>All reports that are submitted to the competent authority will be subject to a public participation process. These include:</p> <ul style="list-style-type: none"> - Draft BAR - Draft EMPr - All specialist reports that form part of this environmental process.

8.2 REGISTRATION OF KEY STAKEHOLDERS

A number of key stakeholders were automatically registered and were given an opportunity to comment on the Draft BAR. Copies and proof of these notifications are included in **Annexure F4**. A list of key stakeholders registered for this process included in the table below.

Table 83: Key Stakeholders automatically registered as part of the Environmental Process

Stakeholders Registered		
Neighbouring property owners	Department of Environmental Affairs and Nature Conservation	Department of Water and Sanitation
All parties registered as having prospecting rights on the farm	Kai !Garib Municipality: Municipal Manager	Department of Science and Technology
Joe Morolong: Ward 4 Councillor	South African National Roads Agency Limited	The Council for Scientific and Industrial Research
South African Heritage Resources Agency	Department of Transport and Public Works	The South African Square Kilometre Array
Northern Cape Heritage Resources Authority	Department of Health	The South African Civil Aviation Authority
Department of Agriculture, Forestry and Fisheries	Department of Minerals and Energy	Affected Land Owner
Provincial Department of Agriculture	Eskom	Department of Communications
Endangered Wildlife Trust.	Department of Mineral Resources	SENTECH
Department of Environmental Affairs, Biodiversity Directorate.	Birdlife Africa.	

9. CONCLUSION AND RECOMMENDATIONS

This environmental process is currently being undertaken to present proposed project to the public and potential I&APPs, and to identify and assess environmental impacts, issues and concerns raised regarding the proposed development alternatives.

Cape EAPrac is of the opinion that the information contained in this Basic Assessment and the documentation attached hereto is sufficient to allow the I&APs to apply their minds to gain an understanding of the potential negative and/or positive impacts associated with the development, in respect of the activities applied for. This environmental process has not identified any fatal flaws with the proposal and as such it is our reasoned view that the all I&APs and the competent authority have sufficient information to be able to apply their minds to the potential positive and negative impacts associated with this project. All specialists concur that the development as proposed (Layout Alternative 1, Access Road Alternative 1 and Grid connection alternative 1.2) can be considered for approval and that there are no reasons why the development should not be implemented. All impacts assessed range from high positive to medium negative and all very high, high and medium - high negative impacts have been avoided by the risk adverse approach to the design of this facility.

All stakeholders including the competent authority will have the opportunity to review the Draft BAR and the associated appendices (including all specialist studies), and provide comment, or raise issues of concern, directly to Cape EAPrac within the specified 30-day comment period. All comments received during this comment period will be included in the Final BAR submitted to DEFF for decision making.

This Draft BAR is available to all potential and registered I&AP's for a 30- day review and comment period.

It is the EAP's considered opinion that the preferred alternative (Layout Alternative 1), preferred access road (Access Alternative 1), and Grid Connection (Grid Alternative 1.2) be considered for approval by the competent Authority on condition that all other legislative approvals be obtained, and that the final EMPr be adhered to.

9.1 REMAINDER OF ENVIRONMENTAL PROCESS

The following process is to be followed for the remainder of the environmental process:

- Draft BAR is herewith available for 30-day commenting period;

- Comments and responses report (CRR) will be compiled following the 30-day review period;
and
- Where necessary, the draft BAR will be amended to include/address the CRR.

10. ABBREVIATIONS

AIA	Archaeological Impact Assessment
BGIS LUDS	Biodiversity Geographic Information System Land Use Decision Support
CBA	Critical Biodiversity Area
CDSM	Chief Directorate Surveys and Mapping
CEMPr	Construction Environmental Management Programme
DEFF	Department of Environment, Forestry and Fisheries
DEA&NC	Department of Environmental Affairs and Nature Conservation
DME	Department of Minerals and Energy
DSR	Draft Scoping Report
EAP	Environmental Impact Practitioner
EHS	Environmental, Health & Safety
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GPS	Global Positioning System
GWh	Giga Watt hour
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
LUDS	Land Use Decision Support
LUPO	Land Use Planning Ordinance
MW	Mega Watt

NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NPAES	National Protected Area Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act
PM	Post Meridiem; "Afternoon"
PSDF	Provincial Spatial Development Framework
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
S.A.	South Africa
SACAA / CAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SDF	Spatial Development Framework
TOPS	Threatened and Protected Species

11. REFERENCES

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³⁴ This reference list excludes specialist studies that form part of this environmental process and which are contained in Annexure E1 – E12

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