

Basic Assessment Report in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014 (Version 1/2022)

Kindly note that:

1. This **Basic Assessment Report** is the standard report required by GDARD in terms of the EIA Regulations, 2014.
2. This template is current as of April 2022. It is the responsibility of the EAP to ascertain whether subsequent versions of the template have been published or produced by the competent authority.
3. A draft Basic Assessment Report must be submitted, for purposes of comments within a period of thirty (30) days, to all State Departments administering a law relating to a matter likely to be affected by the activity to be undertaken.
4. **A draft Basic Assessment Report must be submitted, for purposes of comments within a period of thirty (30) days, to a Competent Authority (uploaded to the EIA online system) empowered in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended to consider and decide on the application. The EIA online system can be accessed at <https://eia.gauteng.gov.za>.**
5. **A copy (PDF) of the final report and attachments must be uploaded to the EIA online system. The EIA online system can be accessed at <https://eia.gauteng.gov.za>.**
6. **Draft and final reports submitted in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) must be emailed to environmentsue@gauteng.gov.za.**
7. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
8. Selected boxes must be indicated by a cross and, when the form is completed electronically, must also be highlighted.
9. An incomplete report may lead to an application for environmental authorisation or Waste Management License being refused.
10. Any report that does not contain a titled and dated full colour large scale layout plan of the proposed activities including a coherent legend, overlain with the sensitivities found on site may lead to an application for environmental authorization or Waste Management License being refused.
11. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the application for environmental authorisation or Waste Management License being refused.
12. The applicant must fill in all relevant sections of this form. Incomplete applications will not be processed. The applicant will be notified of the missing information in the acknowledgement letter that will be sent within 10 days of receipt of the application.
13. Unless protected by law, and clearly indicated as such, all information filled in on this application will become public information on receipt by the competent authority. The applicant/EAP must provide any interested and affected party with the information contained in this application on request, during any stage of the application process.
14. Although pre-application meeting with the Competent Authority is optional, applicants are advised to have these meetings prior to submission of application to seek guidance from the Competent Authority.

DEPARTMENTAL DETAILS

Gauteng Department of Agriculture and Rural Development
Attention: Administrative Unit of the Sustainable Utilisation of the Environment (SUE) Branch
P.O. Box 8769
Johannesburg
2000

Ground floor, Umnotho House, 56 Eloff Street, Johannesburg

Administrative Unit telephone number: (011) 240 3051/3052
Department central telephone number: (011) 240 2500

NEAS Reference Number:

File Reference Number:

Application Number:

Date Received:

If this BAR has not been submitted within 90 days of receipt of the application by the competent authority and permission was not requested to submit within 140 days, please indicate the reasons for not submitting within time frame.

Not Applicable.

Is a closure plan applicable for this application and has it been included in this report?

No

If not, state reasons for not including the closure plan.

This is an application for development of non-mining activities and is not linked to listed decommissioning activities.

Has a draft report for this application been submitted to a competent authority and all State Departments administering a law relating to a matter likely to be affected as a result of this activity?

Yes

Is a list of the State Departments referred to above attached to this report including their full contact details and contact person?

Yes

If no, state reasons for not attaching the list.

A list of all the relevant State Departments' contact details and contact person referred to above will only be sent to the appointed GDARD Case Officer and not all I&APs, in compliance with the Protection of Personal Information Act, 2013 (POPIA).

Have State Departments including the competent authority commented?

Yes

If no, why?

Comments were only received from the competent authority, no other State Departments have commented on the draft basic assessment report

SECTION A: ACTIVITY INFORMATION

1. PROPOSAL OR DEVELOPMENT DESCRIPTION

Project title (must be the same name as per application form):

The development of a ground-mounted 1.8MWp solar photovoltaic (PV) plant within the Element Six facility on erf 256 Nuffield Township, Registration Division I.R., with the approximate GPS co-ordinates of the centre point at 26°17'46.79"S, 28°27'31.00"E, in the City of Ekurhuleni Metropolitan Municipality, Springs region of Gauteng Province, South Africa.

Select the appropriate box

The application is for an upgrade of an existing development

The application is for a new development

Other, specify

Does the activity also require any authorisation other than NEMA EIA authorisation?

YES NO

If yes, describe the legislation and the Competent Authority administering such legislation.

National Water Act (Act 36 of 1998), Department of Water & Sanitation.

If yes, have you applied for the authorisation(s)?

If yes, have you received approval(s)? (attach in appropriate appendix)

YES	NO
YES	NO

2. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations:

Title of legislation, policy or guideline:	Administering authority:	Promulgation Date:	Description of compliance:
Checklist for Biodiversity Assessments	Gauteng Department of Agriculture and Rural Development (GDARD)	June 2012	<p>The checklist stipulates minimum requirements for Biodiversity Assessments within the province which were considered by the appointed specialists but will in some respects be superseded by the protocols in GN No. 320 of 20 March 2020 & 1195 of 30 October 2020.</p> <p>Several specialists were appointed to conduct impact assessments in the development footprint for environmental features with high to very high sensitivity themes and compliant statements will also be prepared for environmental features with medium sensitivity or features that did not need further assessment. An exemption from full assessment was also prepared for the cultural and heritage features in the development footprint.</p>
Constitution of the Republic of South Africa 1996 including Bill of Rights	National Assembly/Parliament	04 December 1996	<p>Section 24 of the Bill of Rights provides an entitlement to all South Africans to <i>inter alia</i> an environment that is not harmful to their health and development that is ecologically sustainable.</p> <p>The provisions of the report and assessment process have ensured that the provisions of the Constitution have been addressed, including the National Environmental Management Act (Act 107 of 1998) which gives effect to the requirements of the Constitution.</p> <p>The development footprint will have limited impacts on the receiving environment predominantly due to the</p>

			<p>project being situated in an already transformed environment in the form of a zoned industrialized area. Residential areas are located adjacent to the industrial area, but a reasonable distance away. Negative environmental impacts & risks associated with the development of the site can be effectively mitigated with limited residual risks. Additionally, the development of renewable energy projects contributes to sustainable development within the province and country and to reducing the city's reliance on non-renewable energy source such as coal.</p>
<p>Conservation of Agricultural Resources Act (Act 43 of 1983) and Regulations (Government Notice R1048 in Government Gazette 9238)</p>	<p>Department of Agriculture</p>	<p>of 27 April 1983 & 25 May 1984 respectively</p>	<p>The Conservation of Agricultural Resources Act (CARA, Act 43 of 1983) provides for the control of the utilization of the natural agricultural resources and to promote the conservation of the soil, the water sources and the vegetation including the combating of weeds and invader plants.</p> <p>The project footprint is in an industrial setting and therefore does not support any agricultural activities. The vegetation on the project site area is heavily manipulated and is maintained as manicured lawn including a few scattered exotic trees. The manicured lawn contains several indigenous types of grasses which have been addressed in the Terrestrial Biodiversity & Plant Species Assessments. The exotic trees are declared as invader plants listed under the regulations promulgated under section 29 of CARA (GN R. 1048, GG 9238, 25 May 1984 as amended). Accordingly, all Category 1, 2 & 3 plants will need to be controlled in accordance with relevant control measures stipulated by CARA and associated regulations, which will also be included in the project-specific Environmental Management Programme (EMPr).</p>
<p>Convention on Biological Diversity</p>	<p>United Nations</p>	<p>1992</p>	<p>The natural environment provides the basic conditions without which humanity could not survive. Biological diversity – the variability of life on Earth – is the key to the ability of the biosphere to continue providing us with these ecological goods and services and thus is our species' life assurance policy.</p> <p>Impact Assessment aims to ensure sustainable decisions are made. Potential impacts & risks that might occur due to the development, are assessed by appointed specialists in order to verify and quantify the sensitivities of the site, and determine the acceptability of the proposed development based on the impacts and risks pre- and post-mitigation. The mitigation hierarchy aims to avoid impacts were possible before lower tier measures are adopted, with the ultimate aim of retaining biodiversity within the project area.</p>
<p>Ekurhuleni Bioregional Plan</p>	<p>Ekurhuleni Metropolitan Municipality</p>	<p>2014 & 2020 (draft)</p>	<p>The Ekurhuleni Bioregional Plan provides a map of the priority biodiversity areas and has developed associated land use management guidelines with the aim to reduce further loss or degradation of</p>

			<p>biodiversity priority areas and ecological support areas.</p> <p>Bioregional sensitive environments were considered in the placement of the development footprint to mitigate impact to any specified sensitive areas. The development footprint does not fall within any biodiversity priority areas but is in close proximity to Ecological Support Area: Wetlands. There are already developed areas between the biodiversity priority areas and the development footprint, reducing the probability of the site directly impacting these sites.</p>
<p>Electricity Regulation Act (Act 4 of 2006)</p> <p>Schedule 2 of August 2019</p>	<p>National Energy Regulator of South Africa</p>	<p>27 June 2006</p>	<p>The Act was established to <i>inter alia</i> regulate the reticulation of electricity by municipalities; and to provide for matters connected therewith. The applicant intends installing a 1,8 MWp Solar PV facility which prior to 2021 would have required a small-scale embedded electricity generation (SSEEG) license from Ekurhuleni Municipality. The Draft Policy Guideline for small-scale embedded generation in the City of Ekurhuleni further stipulates that generation of over 1MWp will require a generating license or exemption letter from NERSA before the application will be considered by the municipality. This means that the applicant would be required to lodge an application letter to NERSA before the SSEEG will be considered by the municipality. However, amendments to Annexure 2 of the Electricity Regulation Act in 2021 (GN No. 1000 of 5 October 2021) stipulates that activities with a capacity of no more than 100MW are exempt from licensing and need only be registered with the Regulator.</p>
<p>Environmental Conservation Act (Act 73 of 1989)</p>	<p>Department of Forestry, Fisheries and the Environment</p>	<p>9 June 1989</p>	<p>The Environmental Conservation Act (ECA, Act 73 of 1989) published noise control regulations in terms of section 25 of ECA in Government Notice R154 in Government Gazette 13717 which have been repealed in Gauteng by GN 5479/PG 75/19990820, which now govern noise generation. The main aspect of noise control regulations is that you may not exceed the prevailing ambient noise levels, above which a noise disturbance is created.</p> <p>The proposed development will have to adhere to the noise regulation generated in the Gauteng GN 5479/PG.</p>
<p>Environmental Impact Assessment Regulations & Listing Notices (2014) (GN No. R.982, 983 and 985) as amended</p>	<p>National & Provincial departments of Environmental Affairs</p>	<p>4 December 2014</p>	<p>Development of the Solar PV facility falls under listed activities 11 & 12 and specified activity 27, which require an application for environmental authorisation and assessment by way of Basic Assessment, in terms of Listing Notice 1 & 3, respectively.</p>
<p>General Authorisation published in Government Notice No. 509 of Government</p>	<p>Department of Water & Sanitation</p>	<p>26 August 2016</p>	<p>Registration against general authorisation (GA) in terms of section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for water uses as defined in section 21(c) and section 21(i) of the NWA.</p>

Gazette No. 40229			The proposed development occurs within 500m of wetlands identified in the City of Ekurhuleni Metropolitan Municipality 2020 Bioregional Plan. which will not be directly affected by the development or operation of the facility. Because the development project is occurring within the DWS Regulated Area (500m of a wetland), General Authorisation registration is required.
General Environmental, Health and Safety Guidelines of the IFC	World Bank	30 April 2007	The proposed development should endeavour to adhere to the General Environmental, Health and Safety Guidelines of the IFC such as the noise level guidelines which recommend that noise levels in an industrial or commercial setting should not exceed 70 dBA during the day as well as during the night. Noise level monitoring will need to be carried out in the event of the lodging of noise related complaints.
Guidelines for Landscape and Visual Impact Assessment (GLVIA), Second Edition.	The Landscape Institute	2003	The principal aim of the guideline is to encourage high standards for the scope and context of landscape and visual impact assessments, based on the collegiate opinion and practice of the members of the Landscape Institute and the Institute of Environmental Management and Assessment. The guidelines also seek to establish certain principles and will help to achieve consistency, credibility and effectiveness in landscape and visual impact assessment, when carried out as part of an EIA. The guideline informed the appointed specialist visual impact assessment for the project.
Guideline on Alternatives, EIA Guideline and Information Document Series	Western Cape Department of Environmental Affairs & Development Planning	18 June 2010	“Alternatives”, in relation to a proposed activity, means different means of meeting the general purposes and requirements of the activity, which may include alternatives to – (a) the property on which or location where it is proposed to undertake the activity; (b) the type of activity to be undertaken; (c) the design or layout of the activity; (d) the technology to be used in the activity; and (e) the operational aspects of the activity. This guideline and others informed the assessment of alternatives for the proposed project.
Guideline on Need and Desirability, Integrated Management Guideline Series 9	Department of Forestry, Fisheries and the Environment	20 October 2014	The aim of EIA process is to find that (reasonable and feasible) alternative/s that will ensure sustainable development. Consistent with the aforesaid aim and purpose of EIA, the concept of “need and desirability” relates to, amongst others, the nature, scale and location of development being proposed, as well as the wise use of land. Strictly speaking, “need” primarily refers to time and “desirability” refers to place, e.g. is this the right time and is it the right place for locating the type of land-use/activity being proposed? However, “need and desirability” are interrelated and the two components collectively can

			<p>be considered in an integrated and holistic manner.</p> <p>Need and desirability is like a drawstring that pulls the assessment process together to decide on the best option. When the sum of the impacts (evaluated during the impact assessment) is considered holistically through the lens of Need and Desirability, that is by presenting them within the framework of questions posed by the guideline, then Need and Desirability becomes the overall impact summary to determine if the proposed activity is the best option or to decide on the fate of the application.</p> <p>When collectively considering ecological, social and economic impacts it is important to remember that while there might be some trade-offs between the considerations, all development must in terms of Section 24 of the Constitution be ecologically sustainable, while economic and social development must be justifiable. Consequently, there are specific "trade-off rules that apply, namely environmental integrity may never be compromised, and the social and economic development must take a certain form and meet certain specific objectives for it to be considered justifiable.</p> <p>A detailed need and desirability of the proposed development footprint was undertaken informed by the content and structure of the guideline document.</p>
Integrated Development Plan (IDP) 2018 – 2021	City of Ekurhuleni	2016, with Amendments in 2020	<p>The project will play a part in the Development Framework requirements to promote a greener economy within the province.</p> <p>The City of Ekurhuleni is also committed to the use of renewable energy sources and reduction of reliance on non-renewable energy sources such as coal and this renewable energy project will contribute towards the city's goals and commitments, which in turn will also reduce greenhouse gas emissions, climate change and improve the air quality within the district.</p>
Integrated Resource Plan 2010	Department of Energy	25 March 2011	<p>The IRP is an electricity infrastructure development plan based on least-cost electricity supply and demand balance, taking into account security of supply and the environment (minimize negative emissions and water usage).</p> <p>The project has the potential to contribute towards achieving the national renewable energy targets.</p>
International Finance Corporation (IFC).	World Bank	2007	<p>The IFC Environmental Health and Safety Guidelines for Electric Power Transmission and Distribution specifically identifies the risks posed by power transmission and distribution projects to create visual impacts to residential communities. It recommends mitigation measures to be implemented to minimise visual impact. These should include the siting of powerlines and the design of substations with due consideration to landscape views and important</p>

			<p>environmental and community features. Prioritising the location of high-voltage transmission and distribution lines in less populated areas, where possible, is promoted.</p> <p>These guidelines were considered in the Visual Impact Assessment undertaken for the project.</p>
Millennium Ecosystem Assessment (MEA).	World Resources Institute	2005	<p>Ecosystems are defined as being “essential for human well-being through their provisioning, regulating, cultural, and supporting services. Evidence in recent decades of escalating human impacts on ecological systems worldwide raises concerns about the consequences of ecosystem changes for human well-being”.</p> <p>Therefore, the principle of protection of ecosystems was included at all assessment levels for the Element Six project.</p>
Municipal Systems Act (Act 32 of 2000)	Municipal Council	20 November 2000	<p>The Municipal Systems Act aims to <i>“provide for the core principles, mechanisms and processes that are necessary to enable municipalities to move progressively towards the social and economic upliftment of local communities and ensure universal access to essential services that are affordable to all..... to provide for community participation; to establish a simple and enabling framework for the core processes of planning build local government into an efficient, frontline development agency capable of integrating the activities of all spheres of government for the overall social and economic upliftment of communities in harmony with their local natural environment;</i>”</p> <p>There was consideration of the interests, needs and values of all interested and affected parties by the implementation of the public participation process (PPP).</p>
National Biodiversity Assessment (NBA)	Department of Forestry, Fisheries and the Environment (DFFE) and South African National Biodiversity Institute (SANBI)	2011 & 2018	<p>The NBA 2011 assesses the state of South Africa’s biodiversity, across terrestrial, freshwater, estuarine and marine environments, emphasising spatial (mapped) information for both ecosystems and species. It synthesises key aspects of South Africa’s biodiversity science, making it available in a useful form to policymakers, decision-makers and practitioners in a range of sectors. It is used to monitor and report regularly on the state of biodiversity and includes two headline indicators that are assessed across all environments: ecosystem threat status and ecosystem protection level. The NBA 2011 also dealt with species of special concern and invasive alien species, presents new work on geographic areas that contribute to climate change resilience, and provides a summary of spatial biodiversity priority areas that have been identified through systematic biodiversity plans at national, provincial and local scales.</p> <p>The C-Plan & Ekurhuleni Bioregional Plan incorporates aspects of the NBA and informed many of the biodiversity indices</p>

			identified for the development footprint. Site assessments of the development footprint were conducted to determine impacts to local biodiversity and mitigate impacts where possible.
National Biodiversity Framework	Department of Forestry, Fisheries and the Environment	3 August 2009	<p>The purpose of the National Biodiversity Framework (NBF) is to provide a framework to co-ordinate and align efforts of the many organisations and individuals involved in conserving and managing South Africa's biodiversity, in support of sustainable development. The NBF aims to 1. Focus attention on the most urgent strategies and actions required for conserving and managing South Africa's biodiversity and 2. Point to roles and responsibilities of key stakeholders, including organs of state whose mandates impact directly on biodiversity conservation and management. The NBF provides a framework for conservation and development to ensure we achieve continued economic growth with continued functioning of ecosystems and the persistence of the natural resource base.</p> <p>The aim of the project (renewable energy) and the associated site & development footprint selection (and associated impact & specialist assessments) is to help achieve the key outcomes of the NBF.</p>
National Energy Act (Act 34 of 2008)	Department of Energy	24 November 2008	<p>The preamble to the act states that the aim of the act 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. The development of energy resources must take environmental management requirements and interactions amongst economic sectors into account. The act also aims to assist with increased generation and consumption of renewable energies.</p> <p>The proposed Element Six solar PV project aims to diversify the energy mix servicing the Element Six Facility and improve supply assurance.</p>
National Environmental Management Act (Act 107 of 1998)	Department of Forestry, Fisheries and the Environment	27 November 1998	<p>NEMA takes a holistic view of the environment, and promotes the consideration of social, economic and biophysical factors to obtain sustainable development and achieve effective management of the biophysical environment.</p> <p>The proposed development took into consideration the social, economic and biophysical factors as per the NEMA (Act 107 of 1998).</p>
National Environmental Management: Air Quality Act (Act 39 of 2004) including the list of activities which result in atmospheric emissions published in Government	Department of Forestry, Fisheries and the Environment	24 February 2005 & 31 March 2010 respectively	<p>National Environmental Management: Air Quality Act (NEM:AQA, Act 39 of 2004) regulates air emissions to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and to provide for air quality monitoring and specific air quality measures.</p> <p>The proposed development will include limited haulage, stockpiling and installation of infrastructure. These</p>

Notice No. 248 of Government Gazette No. 33064			activities may result in dust and PM ₁₀ emissions, which need to comply with thresholds stipulated in the National Dust Control Regulations (GG No. 36974, GN No. R. 827, 1 November 2013). Effective management of dust emissions will be required including dust suppression, which has been assessed and mitigated and included in the EMPr.
National Environmental Management: Biodiversity Act (Act 10 of 2004): Alien Invasive Regulations, associated Alien Invasive Species Lists and TOPS Regulations, as amended	Department of Forestry, Fisheries and the Environment	7 June 2004, 1 August 2014, 29 July 2016 & 31 March 2015, respectively	<p>The National Environmental Management: Biodiversity Act (NEM:BA, Act 10 of 2004) provides for the protection of ecosystems and species that require national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources and the establishment and functions of the South African National Biodiversity Institute (SANBI).</p> <p>The BA process, including the appointment of SACNASP registered specialists, involved the identification, protection and management of species, ecosystems and areas of high biodiversity value.</p> <p>The identification of listed alien & protected species was undertaken during site assessments for the Terrestrial Biodiversity, Plant & Animal Species Compliance Statements including an assessment of their potential impact on the receiving environment before & during construction. Suitable control mitigations will also be included in the Environmental Management Programme (EMPr).</p>
National Environmental Management: Waste Act (Act 59 of 2009)	Department of Forestry, Fisheries and the Environment	10 March 2009	<p>The National Environmental Management: Waste Act (NEM:WA, Act 59 of 2009) aims to reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.</p> <p>The project will implement the waste hierarchy principles that the Waste Act introduces, to minimise and reduce waste created from the project, whilst encouraging the recycling and reuse of any suitable waste generated to prevent increased disposal at local landfills.</p>
National Forest Act (Act 84 of 1998)	Department of Agriculture	30 October 1998	The National Forest Act (NFA, Act 84 of 9918) aims inter alia to provide special measures for the protection of certain forests and trees.

			The proposed development does not affect any protected trees listed in GN 635 of 2019.
National Heritage Resources Act (Act 25 of 1999)	South African Heritage Resources Agency	28 April 1999	<p>The NHRA affirms that every generation has a moral responsibility to act as trustee of the national heritage for later generations and that the State is obliged to manage heritage resources in the interest of all South Africans. The Act further elaborates on the fact that heritage resources form an important part of the history and beliefs of communities and must be managed in a way that acknowledges the right of affected communities to be consulted and to participate in their management.</p> <p>An exemption application from a Phase 1 Cultural Heritage & Archaeology Impact Assessment and a Palaeontology Compliance Statement were prepared for the development footprint as it situated within an industrial setting and has been extensively disturbed, as well as its surroundings in the recent past by urban residential and industrial activities, and the original natural and historical landscape has nearly been completely transformed. If there was any cultural heritage (archaeological and/or historical) sites or features that existed there in the past they would have been extensively disturbed or even destroyed as a result of the intense industrialization and the likelihood of any significant heritage resources being present are improbable (APelser Archaeological Consulting, 2023).</p>
National list of ecosystems that are threatened and in need of protection	Department of Forestry, Fisheries and the Environment	9 December 2011 & 2022	<p>The White Paper on the Conservation and Sustainable Use of South Africa's Biodiversity (1997) noted that little attention had historically been paid to protection of ecosystems outside protected areas. This laid the basis for the National Environmental Biodiversity Act to introduce a suite of new legal tools for biodiversity conservation outside protected areas, including listing of threatened or protected ecosystems, listing of threatened or protected species, bioregional plans, biodiversity management plans for ecosystems or species, and biodiversity management agreements.</p> <p>The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems, to preserve witness sites of exceptionally high conservation value, enabling or facilitating proactive management of these ecosystems. and to ensure the persistence of landscape-scale ecological processes and associated provision of ecosystem services.</p> <p>The 2011 national list of threatened ecosystems only dealt with terrestrial systems and provided supporting</p>

			<p>information to accompany the list, including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed terrestrial ecosystems. Subsequent iterations of the list were to address threatened ecosystems in the freshwater, estuarine and marine environments, and with protected ecosystems in all environments. The revised National List of Threatened Terrestrial Ecosystems was published in GN No. 2747 on 18th November 2022.</p> <p>The presence of threatened ecosystems was considered in the Site Selection Matrix, Alternatives & Impact assessments, and sensitivity mapping.</p> <p>The development footprint is not in a national threatened ecosystem.</p>
National Protected Areas Expansion Strategy (NPAES)	Department of Forestry, Fisheries and the Environment	2008 & 2016	<p>The National Protected Area Expansion Strategy (NPAES) first published in 2008, presents a 20-year strategy for the expansion of protected areas in South Africa. The goal of the NPAES is to achieve cost effective protected area expansion for improved ecosystem representation, ecological sustainability, and resilience to climate change. It sets protected area targets, maps priority areas for protected area expansion, and makes recommendations on mechanisms to achieve this.</p> <p>The proposed development does not fall within an NPAES focus area.</p>
Gauteng Protected Area Expansion Strategy	GDARD and SANBI	September 2013	<p>Because the scale of the NPAES is at a national level, it focuses its efforts on intact and unfragmented areas, larger than 5,000ha. This excludes highly fragmented and modified landscapes, which means that much of Gauteng is excluded in determining national spatial priorities for protected area expansion. The purpose of the Gauteng Protected Area Expansion Strategy (GPAES) is to provide the framework for protected area expansion in Gauteng over the next 20 years, setting out key strategies for protected area expansion and identifying spatial priorities and protected area targets.</p> <p>The project footprint is not in any Gauteng Protected Area Expansion Strategy but two GPAES sites are located in close proximity to the proposed site.</p>
National Veld and Forest Fire Act (Act 101 of 1998)	Department of Agriculture	27 November 1998	<p>The purpose of the National Veld and Forest Fire Act (Act 101 of 1998) is to prevent and combat veld, forest and mountain fires throughout the Republic.</p> <p>The proposed project will be constructed in Zone 5 of the Gauteng Environmental Management Framework and this zone is mainly an industrial and large commercial focus zone. It is not in natural veld which is further identified in the Ekurhuleni Bioregional Plan as having a high fire risk.</p>

			Even though the proposed project is in an industrial setting, the Environmental Management Programme (EMPr) will still include fire & emergency mitigations.
National Water Act (Act 36 of 1998) including sections 27, 28, 29, 30, 31 and 39 (sections dealing with General Authorisations and Water Use Licenses)	Department of Water & Sanitation	26 August 1998	<p>The NWA recognises that the nations' water resources are held in public trust for the people, and therefore the sustainable, equitable and beneficial use of water resources must serve the peoples' interest. Section 21 of the NWA identifies several water uses for which the permissible uses are provided in Section 22.</p> <p>The study area occurs 500m within several NFEPA & Bioregional wetlands that are identified as the "Regulated area of a watercourse" in terms of Section 21(c) & (i) of the Act, and as such require authorization by way of General Authorisation. Water supply for the construction and operation of the solar PV facility will be supplied by existing municipal to the E6 premises.</p>
Natural Scientific Professions Act (Act 27 of 2003)	South African Council for Natural Scientific Professions	28 November 2003	<p>The Act provides for the establishment of the South African Council for Natural Scientific Professions (SACNASP). SACNASP is the legislated regulatory body for natural science practitioners in South Africa. The natural sciences encompass a wide range of scientific fields covering all the basic sciences and many of their applied derivatives.</p> <p>The practitioners involved in the compilation of the Basic Assessment Report as well as the required specialists are registered with SACNASP.</p>
Promotion of Administrative Justice Act (Act 3 of 2000)	State Departments	3 February 2000	<p>The Bill of Rights in the Constitution of the Republic of South Africa 1996 states that everyone has the right to administrative action that is legally recognised, reasonable and procedurally just. The Promotion of Administrative Justice Act (PAJA, Act 3 of 2000) gives effect to this right. The PAJA applies to all decisions of all State organisations exercising public power or performing a public function in terms of any legislation that negatively affects the rights of any person. PAJA also forces State organisations to explain and give reasons for the manner in which they have arrived at their decisions, and how these issues were considered in the decision-making process.</p> <p>PAJA therefore protects the rights of communities and individuals to participate in decision-making processes, especially if these processes affect their daily lives.</p> <p>The public participation process has identified all relevant interested and effected parties to ensure all aspects and potential concerns have been received and addressed in the final report. In the event of successful issuance of an environmental authorisation (EA), the Department will need to explain and give reasons for coming to their decision.</p>
Promotion of Access to Information Act (Act 2 of 2000)	State Departments & affected third parties	3 February 2000	The Promotion of Access to Information Act (PAIA, Act 2 of 2000) gives effect to the constitutional right of access to any information held by the State and any information that is held by another person

			<p>and that is required for the exercise or protection of any rights.</p> <p>The Public Participation Process was undertaken in accordance with <i>inter alia</i> the requirements of PAIA, and includes distribution of Notifications and Background Information Document, Draft Basic Assessment Report and Environmental Management Programme to registered Interested & Affected Parties, for their information, review and comments.</p>
Protection of Personal Information Act (Act 4 of 2013)	Information Regulator	26 November 2013	<p>The Protection of Personal Information Act (POPIA, Act 4 of 2013) affects several aspects of the Environmental Authorisation (EA) process, with the largest impacts relating to the Public Participation Process and commenting period on draft reports, in terms of Regulations 42 and 19(1)a of the EIA Regulations (2014) as amended. The POPIA requirements include:</p> <ul style="list-style-type: none"> • Section 9 of POPIA requires that personal information must be processed lawfully and in a reasonable manner that does not infringe the privacy of the data subject. • Section 12(1) of POPIA provides that personal information must be collected directly from the data subject. <p>These and other POPIA requirements are considered and applied during the EA application process.</p>
Renewable Energy Feed-in Tariff	Department of Energy	26 March 2009	<p>The South African Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) is a competitive tender process that was designed to facilitate private sector investment into grid-connected renewable energy (RE) generation in South Africa. The Renewable Energy Feed-In Tariff (REFIT) provides incentives to renewable energy developers, making the developments economically feasible to support the achievement of national renewable energy targets.</p> <p>As the electricity generated from the proposed Solar PV project will be utilised solely by the Element Six facility, and not fed into the national or provincial grid, the REIPPPP program and associated tariffs is not applicable.</p>
Requirements for Biodiversity Assessments (Version 3, 2014a)	Gauteng Department of Agriculture and Rural Development (GDARD)	March 2014	<p>Stipulates minimum requirements for Biodiversity Assessments within the province which were considered by the appointed specialists but will in some respects be superseded by the protocols in GN No. 320 of 20 March 2020 & 1195 of 30 October 2020.</p>
South Africa's National Biodiversity Strategy and Action Plan (NBSAP)	Department of Forestry, Fisheries and the Environment	2005 & 2015	<p>The National Biodiversity Strategy and Action Plan (NBSAP) is a requirement of contracting parties to the Convention on Biological Diversity (CBD). NBSAP set out a strategy and plan for contracting parties to fulfil the objectives of the Convention. It identifies the priorities for biodiversity management in South Africa for the period 2015-2025, aligning these with the priorities and targets in the global agenda,</p>

			<p>as well as national development imperatives.</p> <p>The vision of the NBSAP is to conserve, manage and sustainably use biodiversity to ensure equitable benefits to the people of South Africa, now and in the future. The vision includes several strategic objectives:</p> <ol style="list-style-type: none"> 1. Management of biodiversity assets and their contribution to the economy, rural development, job creation and social wellbeing is enhanced. 2. Investments in ecological infrastructure enhance resilience and ensure benefits to society. 3. Biodiversity considerations are mainstreamed into policies, strategies and practices of a range of sectors. 4. People are mobilized to adopt practices that sustain the long-term benefits of biodiversity. 5. Conservation and management of biodiversity is improved through the development of an equitable and suitably skilled workforce. 6. Effective knowledge foundations, including indigenous knowledge and citizen science, support the management, conservation and sustainable use of biodiversity. <p>The vision & objectives are included in the undertaking of Impact Assessment and the selection of the most environmentally practicable options.</p>
South African National Standards – SANS 10210	South African Bureau of Standards (SABS)	2004	<p>This national standard is used when calculating or predicting increased road traffic noise during new developments.</p> <p>The proposed development will unlikely contribute significantly to increased road traffic noise and adherence to the requirements of the standard would only be applicable in the case of traffic noise complaints by affected parties.</p>
South African National Standards – SANS 10103	South African Bureau of Standards (SABS)	2008	<p>The South African National Standards provide the guidelines for the different recommended prevailing ambient noise levels and how to evaluate when a specific operation or activity is creating a noise disturbance and what reaction can be expected if a noise disturbance is created.</p> <p>Based on the nature of the project, and the environment in which the project is located namely; industrial and heavy commercial, it is improbable that project noise will exceed existing ambient industrial activity noise. In the case where ambient noise complaints are lodged by affected parties, the requirements of the standard would become applicable.</p>
Sustainable Development Goals	Agenda for Sustainable Development adopted by the General Assembly of the UN.	September 2015.	<p>All 189 Members States of the United Nations, including South Africa, adopted the United Nations Millennium Declaration in September 2000. The commitments made by the Millennium Declaration are known as the Millennium Development Goals (MDGs), and 2015 was targeted as the year to achieve these goals. The United Nations Open Working Group of the General Assembly identified seventeen sustainable development</p>

			<p>goals, built on the foundation of the MDGs as the next global development targets. The sustainable development goals include aspects such as ending poverty, addressing food security, promoting health, wellbeing and education, gender equality, water and sanitation, economic growth and employment creation, sustainable infrastructure, reducing inequality, creating sustainable cities and human settlements, and addressing challenges in the physical environment such as climate change and environmental resources (UN, 2014). These aspects are included in the NPD, and it can therefore be assumed that South Africa's development path is aligned with the international development agenda.</p> <p>The proposed Element Six Solar PV project can assist with contributing to achieving goals such as economic growth and employment creation, sustainable infrastructure and promoting health, wellbeing, and education through their enterprise development.</p>
Sustainable Utilisation of Agricultural Resources (Draft Legislation)	Department of Agriculture	2003	<p>The objective of the Bill is to provide for the sustainable utilisation of natural agricultural resources, including control over the subdivision and change of use of agricultural land and prime- and unique agricultural land, in support of biodiversity the prescribing of standards and control measures, the establishment of schemes and trusts, control over the spreading of weeds and invader plants and to provide for incidental matters thereto.</p> <p>The proposed development site and footprint is in an industrial setting which does not support agricultural activities. The vegetation on the site is in a heavily manipulated state and is maintained as a manicured lawn surrounded by exotic trees. The fact that the solar PV arrays are installed by way of ram piling, also means that limited impacts will occur to the soil viability.</p>
The Convention on International Trade in Endangered Species of Wild Fauna and Flora	International Union for Conservation of Nature	1 July 1975	<p>The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was drafted as a result of a resolution adopted at a meeting of members of IUCN (The World Conservation Union). Because the trade in wild animals and plants crosses borders between countries and the effort to regulate it requires international cooperation to safeguard certain species from over-exploitation. Today, it accords varying degrees of protection to more than 37,000 species of animals and plants, whether they are traded as live specimens, fur coats or dried herbs.</p> <p>Because the proposed development footprint has heavily manipulated vegetation and a limited number of suitable habitats for animal species, the probability of occurrence of identified CITES listed species is very low, and no confirmed species were identified during the various specialist assessments.</p>

<p>The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)</p>	<p>United Nations</p>	<p>1 November 1983</p>	<p>The Convention on the Conservation of Migratory Species (CMS) provides a global platform for the conservation and sustainable use of migratory animals and their habitats. CMS brings together the States through which migratory animals pass, the Range States, and lays the legal foundation for internationally coordinated conservation measures throughout a migratory range.</p> <p>Migratory species threatened with extinction are listed in Appendix I of the Convention and migratory species that need or would significantly benefit from international co-operation are listed in Appendix II of the Convention. CMS Parties strive towards strictly protecting these animals, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them.</p> <p>The study area has a limited number of suitable habitats for the species that might be affected and there was a purported NFEPA wetland directly adjacent to the footprint, but it showed no soil, water logging or vegetation characteristics consistent with a wetland. Its erroneous delineation was further confirmed by SANBI. Since there is no NFEPA wetland occurring in the site which would provide habitat for potential animal species of conservation concern, reduces the possibility international migratory species in the site or Project Area of Influence. An aquatic and a terrestrial biodiversity and animal species assessment was conducted to determine if any mitigatory species will be affected.</p>
<p>The Convention on Wetlands (RAMSAR Convention)</p>	<p>United Nations</p>	<p>2 February 1971</p>	<p>The Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat is an international treaty for the conservation and sustainable use of wetlands. It is also known as the Convention on Wetlands. The Convention has five formally recognized "International Organization Partners", which provide expert technical advice and assistance in line with Convention principles:</p> <ul style="list-style-type: none"> ■ BirdLife International ■ International Union for Conservation of Nature (IUCN) ■ International Water Management Institute (IWMI) ■ Wetlands International ■ WWF International <p>Some of the organisation parties (EWT, WESSA, Birdlife) have been included as potential I&APs, to whom all documents are provided for comment and inputs and relevant conditions of the BirdLife Guideline on Renewable Energy Projects included in the Impact Assessment and EMP. The proposed development is not in or affect any RAMSAR wetland.</p>
<p>The National Environmental Management Protected Areas Act (Act 57 of 2003)</p>	<p>Department of Forestry, Fisheries and the Environment</p>	<p>18 February 2004</p>	<p>The National Environmental Management Protected Areas Act (NEM:PAA, Act 57 of 2003) aims to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes; for the</p>

			<p>establishment of a national register of all national, provincial and local protected areas; for the management of those areas in accordance with national norms and standards.</p> <p>The development site does not fall within an area declared as a Protected Area or within a buffer area.</p>
The National Environmental Management: Waste Act (Act 59 of 2008)	Department of Forestry, Fisheries and the Environment	1 July 2009	<p>Waste management practices and protocols associated with the development of the solar PV facility need to comply with the strategies and regulations of the National Environmental Management: Waste Act (NEM:WA, Act 59 of 2008).</p> <p>The adoption of an integrated waste management approach will be included in the EMP.</p>
The United Nations Framework Convention on Climate Change	United Nations	21 March 1994	<p>The United Nations Framework Convention on Climate Change (UNFCCC) established an international environmental treaty to combat "dangerous human interference with the climate system", in part by stabilizing greenhouse gas concentrations in the atmosphere. At the United Nations climate change conference in Paris, COP 21, governments agreed that mobilizing stronger and more ambitious climate action is urgently required to achieve the goals of the Paris Agreement. Action must come from governments, cities, regions, businesses and investors. Everyone has a role to play in effectively implementing the Paris Agreement.</p> <p>The Paris Agreement formally acknowledges the urgent need to scale up our global response to climate change, which supports even greater ambition from governments.</p> <p>Implementing non-polluting technology, especially in the energy sector, is a key component to reducing greenhouse gas emissions and move toward carbon neutral systems.</p> <p>Reducing Element Six's dependency on a coal-based energy utility to renewable energy is key to their contribution to reducing climate change.</p>
Transvaal Nature Conservation Ordinance (No 12 of 1983)	GDARD	1 November 1983	<p>This Ordinance will be repealed in so far as it applies to Gauteng if the Draft Gauteng Nature Conservation Bill, 2014 is passed, until such time aspects of the ordinance are still in effect. Permits for any plants and animals listed in the ordinance may be required, where relocation may be required.</p>
Visual and Aesthetic Guidelines	Western Cape Department of Environmental Affairs & Development Planning	15 April 2005	<p>Reference to the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) Guideline for involving visual and aesthetic specialists in Environmental Impact Assessment (EIA) processes is provided in terms of southern African best practice in Visual Impact Assessment.</p> <p>Thus, the appointed specialist will conduct and prepare a visual impact assessment</p>

			for the development footprint as per the guideline requirements.
White Paper on Biodiversity	Department of Forestry, Fisheries and the Environment	28 July 1997	<p>There is worldwide concern that human activities such as pollution, habitat destruction, overexploitation and foreign plant and animal invasions are resulting in the ever-increasing loss of the earth's biological wealth. If continued unabated, we stand to lose crucial life-support systems through the loss of important habitats; to undermine rural livelihoods, with the degradation of the natural resource base on which people depend; and to diminish economic opportunities, as options for developing medicines and foods are reduced and the natural resource base for tourism is damaged. The White Paper discusses South Africa's biodiversity policy and strategy and is divided into six goals. These are to:</p> <ol style="list-style-type: none"> 1. Conserve South Africa's biodiversity, 2. Use biological resources sustainably and minimise adverse impacts on biodiversity, 3. Ensure that benefits derived from the use and development of South Africa's genetic resources serve national interests, 4. Expand the human capacity to conserve biodiversity, to manage its use, and to address factors threatening it, 5. Create and implement conditions and incentives that support the conservation and sustainable use of biodiversity; and 6. Promote the conservation and sustainable use of biodiversity at the international level. <p>Each of these goals in turn comprises a number of relevant policy objectives and strategies required to attain these objectives.</p> <p>The above goals underpin any environmental assessment process including the assessment and outcomes of the Element Six solar PV Basic Assessment.</p>
White Paper on Renewable Energy	Department of Energy	November 2003	<p>The White Paper on Renewable Energy supplements the White Paper on Energy Policy (1998) that recognise that the medium and long-term potential of renewable energy is significant. It states that renewable energy needs to assume a significant role in supporting economic development.</p> <p>The White Paper expresses that government is committed to the introduction of greater levels of competition in electricity markets, and that promoting renewable energy will contribute towards the diversification of electricity supply and energy security. Renewable energy that is produced from sustainable natural sources will contribute to sustainable development.</p> <p>Thus, the development project at Element Six will contribute to sustainable development.</p>
White Paper on the Energy Policy of the	Department of Energy	02 December 1998	The White Paper on Energy Policy supports investments in renewable energy. It states that government policy is

<p>Republic of South Africa</p>			<p>based on an understanding that renewables are energy sources in their own right, are not limited to small-scale and remote applications, and have significant medium and long-term commercial potential. According to the White Paper, advantages of renewable energy include minimal environmental impacts in 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. The White Paper acknowledge that renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future. It further recognises that renewable energy can be suitable for both small/local and large/centralised applications. Energy should therefore be available to all citizens at an affordable cost. Energy production and distribution should not only be sustainable but should also lead to improvement of the standard of living for all the country's citizens.</p> <p>The Element Six facility will benefit from this renewable energy source especially during times of loadshedding, the facility will be able to continue operating.</p>
<p>World Heritage Convention Act (Act 49 of 1999)</p>	<p>Department of Forestry, Fisheries and the Environment</p>	<p>9 December 1999</p>	<p>The World Heritage Convention (Act 49 of 1999) intends to provide for:</p> <ul style="list-style-type: none"> • the incorporation of the World Heritage Convention into South African law; • the enforcement and implementation of the World Heritage Convention in South Africa; • the recognition and establishment of World Heritage Sites; • the establishment of Authorities and the granting of additional powers to existing organs of state; the powers and duties of such Authorities, especially those safeguarding the integrity of World Heritage Sites; • where appropriate, the establishment of Boards and Executive Staff Components of the Authorities; • integrated management plans over World Heritage Sites; • land matters in relation to World Heritage Sites; • financial, auditing and reporting controls over the Authorities. <p>No World Heritage sites will be affected by the development of the Element Six Solar PV project.</p>
<p>Electronic Communications Act (Act No 103 of 1996)</p>	<p>ICASA</p>	<p>1996</p>	<p>The applicability of the Act to the project relates to energy facilities which may interfere with existing or planned telecommunication installations.</p> <p>The PPP process has included engagement with all major telecommunication companies.</p>

Gauteng Province Environmental Management Framework (GPEMF)	GDARD	2015 & 2022	<p>A dominant purpose of the GPEMF is to delineate and determine preferred land-use practices for each zone.</p> <p>The development project is in Zone 5) of the Gauteng Environmental Management Framework. This zone is an industrial and large commercial focus zone and any development taking place in such areas, must be sustainable in respect to the capacity of the environment and specifically the hydrological system to absorb additional sewage and stormwater loads of increased densities and development in this area must identify any unmapped wetlands, especially seep areas that may occur on any site and when necessary, apply for the required water use licence.</p> <p>The development in the site will have to adhere to the land use practises specified in the Gauteng Environmental Management Framework ensuring activities and especially stormwater runoff doesn't affect wetlands outside the development site but within the Project Area of Influence.</p>
Gauteng Conservation Plan Version 3.3	GDARD	2014	<p>The Gauteng Conservation Plan Version 3.3 identifies those sites that are critical for maintaining biodiversity, enabling planners, environmental professionals, and land use managers to integrate biodiversity into land use planning and decision-making. The areas are described as Critical biodiversity Areas (CBA) and Ecological Support Areas (ESA) etc.</p> <p>The development footprint is not within any CBA or ESA priority area identified in the Gauteng Conservation plan.</p>

3. ALTERNATIVES

Describe the proposal and alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished. The determination of whether the site or activity (including different processes etc.) or both is appropriate, needs to be informed by the specific circumstances of the activity and its environment.

The no-go option must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. **Do not** include the no go option into the alternative table below.

Note: After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Please describe the process followed to reach (decide on) the list of alternatives below

Legislative background

The very consideration of a development in terms of Environmental Impact Assessment (EIA) is about the consideration of alternatives related to the development. The National Environmental Management Act (Act 107 of 1998), as amended prescribes that all environmental impact assessments, which are to be utilised in informing an application for environmental authorisation, must identify and investigate the alternatives to the activity on the environment and include a description and comparative assessment of the advantages and disadvantages that the proposed activity and feasible and reasonable alternatives will have on the environment and on the community, that may be affected by the activity. If, however, after having identified and investigated alternatives, no feasible and reasonable alternatives exist, no comparative assessment of alternatives, beyond the comparative assessment of the preferred alternative and the option of not implementing the proposed project, is required during the assessment phase. In this instance, the Environmental Assessment Practitioner (EAP) managing the application must provide the competent authority with detailed, written proof of the

investigation(s) undertaken and motivation indicating that no reasonable or feasible alternatives, other than the preferred alternative and the no-go option, exist.

The key criteria when identifying and investigating alternatives are that they should be “feasible” and “reasonable”. The “feasibility” and “reasonability” of and the need for alternatives must be determined by considering, *inter alia*, (a) the general purpose and requirements of the activity, (b) need and desirability, (c) opportunity costs, (d) the need to avoid negative impact altogether, (e) the need to minimise unavoidable negative impacts, (f) the need to maximise benefits, and (g) the need for equitable distributional consequences. The (development) alternatives must be socially, environmentally and economically sustainable. They must also aim to address the key significant impacts of the proposed development by maximising benefits and avoiding or minimising the negative impacts.

Given the afore-mentioned definition and description of alternatives, alternatives for investigation in this assessment were first identified by considering whether the different types of alternatives could meet the general purposes and requirements of electricity generation, and subsequently constitute a comparable activity. Thereafter, the need for an alternative was assessed to determine whether it warranted further investigation.

Purpose and requirements of the solar Photovoltaic plant

Generation of “green” energy is being implemented at the Element Six facility to reduce greenhouse gas emissions, reduce their environmental footprint, and improve electricity supply assurance.

The project outcomes align with the national, local, and regional planning objectives in terms of economic development and sustainability. The project will enable Element Six to deal with the disruptive impact of load shedding during operation hours and assist in reducing the country’s dependency on coal as a source of energy. The project is aligned with Ekurhuleni’s 10 Point development plan in terms of manufacturing revitalisation and use of land for strategic development. The development is making use of a vacant site in the facility that contains a heavily manipulated vegetation cover maintained as a manicured lawn, surrounded by predominantly exotic trees.

The project will not affect the environmental rights of any of the affected stakeholder groups and no-one’s livelihoods will be affected in a negative manner. The project will not result in any unfair discrimination or affect the social and environmental rights of any of the stakeholder groups, should the mitigation measures be implemented as suggested. From a social perspective the positive impact that the project will have on the affected environment outweighs the negative impacts by far, and where there are negative impacts, it can be mitigated. The proposed development is in an industrial area and will assist in maintaining job security for the workers at Element Six. Additionally, temporary jobs will be created during the construction phase as well as during the operation.

Provide a description of the alternatives considered

No.	Alternative type, either alternative: site on property, properties, activity, design, technology, energy, operational or other (provide details of “other”)	Description
1	Proposal	<p><u>Identification and investigation of alternatives including motivations</u></p> <p><u>Alternative Type No. 1: Site location</u></p> <p><u>- Purpose and Requirements</u></p> <p>The proposed renewable energy electricity generating facility intends to accommodate a solar photovoltaic (PV) component and associated infrastructure. The solar PV facility will have a maximum export capacity (MEC) of 1.8 Mega Watts peak (MWp). The Element Six facility has already identified a footprint within its facility where the 1.8 MWp Solar Photovoltaic is going to be constructed</p>

- Motivation for the methodology

A significant impact means, “an impact that may have a notable effect on one or more aspects of the environment, or may result in non-compliance with accepted quality standards, thresholds or targets, and...”

According to the EIA Regulation’s definition, there are two measures of significance: (1) a notable effect on the environment, and (2) non-compliance with standards, thresholds, or targets.

(1) A notable effect on the environment

An impact can be significant based on a measurable effect to the environment.

(2) Non-compliance with standards, thresholds, or targets

An impact can be significant based on non-compliance, which is basically a failure to act in accordance with formal requirements such as a law, regulation, term of a contract, rule or in this context, environmental standards, thresholds, and targets.

Consequently, the methodology differentiates between two measures of significance, namely Impact Magnitude and Impact Importance. Impact Magnitude relates to a notable effect on the environment and Impact Importance refers to non-compliance. Significance is assessed using both approaches. If either one is, or both are, significant, then the impact is significant.

Each approach entails assigning ranks, usually Low, Medium, or High, to a set of judgemental criteria, that is criteria that are based on clearly defined value judgements (or descriptors) that have been adapted to the South African EIA context.

Value Judgement

Significance, being an anthropocentric concept, is a value judgement, dependant on the nature of the impact expressed in terms of both biophysical and socio-economic values (Impact Magnitude), and its acceptability to affected communities (Impact Importance).

Impact Magnitude and Impact Importance ratings are predicted as described below.

However, the outcomes of the phase 1-assessment (rankings) should still be verified within the context of the descriptors described in Table 1.

Table 1: Significance Criterion (Impact Magnitude and Impact Importance Rating)

Ranks	Description
High = 3	<ul style="list-style-type: none">• Of a substantial or the highest order possible within the bounds of impacts that could occur.• In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination of these.• Social, cultural, and economic activities of communities are disrupted to such an extent that these come to a halt.
Medium = 2	<ul style="list-style-type: none">• Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur.• In the case of adverse impacts, mitigation is both feasible and easily possible.• Social, cultural, and economic activities of communities are changed, but can be continued (albeit in a different form).• Modification of the project design or alternative action may be required.• In the case of beneficial impacts, other means of achieving this benefit are about equal in time, cost and effort.
Low = 1	<ul style="list-style-type: none">• Zero impact or impact is of a low order and therefore likely to have little real effect.• In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both.• Social, cultural, and economic activities of communities can continue unchanged.• In the case of beneficial impacts, alternative means of achieving this benefit are likely to be easier, cheaper, more effective and less time-consuming.



Figure 1. Google map indicating the proposed development site within the Element Six Facility

- Criteria used to investigate and assess the preferred alternative footprint

A Screening Assessment was undertaken using the National web-based Environmental Screening Tool hosted by the Department (DFFE) on their website (www.environment.gov.za). The Screening Report (Appendix A) identified several specialist assessments based on the selected classification category but associated with affected environmental themes. A Site Sensitivity Verification (SSV) of the development area was undertaken, which involves a desktop analysis and site inspection, to verify the land use and environmental sensitivity (rating) designated by the Screening Tool, and then confirm or dispute the associated level of assessment and reporting requirements.

The result of the site sensitivity verification report were sent to be reviewed and or confirmed by the specialists according to the criteria provided by the "Protocol for the Specialist Assessment and Minimum Report Content Requirements" (GN No. 320 dated 20th March 2020) and Appendix 6 of the EIA Regulations (2014) as amended. The specialists agreed with the ratings that were gathered during the site inspection, but further assessment was conducted on the following environmental themes, excluding the Defence theme:

1. Agriculture
2. Aquatic biodiversity
3. Archaeology & Cultural Heritage
4. Avian
5. Civil aviation
6. Landscape (Visual)
7. Palaeontology
8. RFI
9. Terrestrial biodiversity

Table 2: Summary of sensitivity classes for all environmental themes for the footprint at the three assessment stages. The colours expressed in each cell indicate the sensitivity rating for each environmental theme or attribute for the development footprint.

FOOTPRINT SELECTION	Theme	Screening Report Sensitivity	Site Sensitivity Verification Sensitivity	Specialist Assessment rating
Footprint	Agriculture	High	Low	Low
	Animal species	Medium	Low	Low
	Aquatic biodiversity	Very High	Low	Low
	Archaeology & Cultural Heritage	Low	Low	Low
	Avian	Low	Low	Low

	Civil aviation	Medium	Medium	Medium
	Defence	Low	Low	N/A
	Landscape (Visual)	Very High	Medium	Low
	Palaeontology	Very high	High	Very high
	Plant Species	Low	Low	Low
	RFI	Medium	Low	Low
	Terrestrial biodiversity	Very High	Low	Low

Site (Development Footprint) Selection Matrix

Table 3: Site Selection Matrix based on combined Environmental Theme Sensitivities and EAP's Assessment.

Criteria	Development Footprint versus No-Go option	
	Preferred Alternative	No-Go
Topography		
Gradients & Slope (i.e. Flat or steep)	2	1
	Majority of the footprint is characterized by a gentle slope, and most of the project area is characterised by a slope percentage between 0 and 5%, but there is also smaller patches that are characterized by a slope percentage ranging from 5 to 10%. The digital elevation model of the project footprint indicates an elevation of 1 616 to 1 627 Metres Above Sea Level (MASL). It is assumed that no bulk or fine shaping will take place and that the vegetation and topsoil will be left <i>in situ</i> . Some additional stormwater measures may be required to protect the site from excessive ingress and measures to ensure effective egress from the site, with minimal pooling on site.	Majority of the site has a gentle slope, and the slope percentage ranges from 0 – 5% with smaller patches that have a slope percentage ranging from 5 – 10%. Elevation ranges from 1 616 to 1 627 Metres Above Sea Level (MASL).
Soil Type	2	1
	The development footprint is characterized by a Bb 3 land type that mainly has Hutton, Avalon, Longlands and Rensburg soil forms according to the land type database. Natural soil structure has been affected because its nature was loose in some parts, and it looked to have been filled in the past. The solar PV structures may require concrete fill or footings based on geotechnical constraints.	The development footprint is characterized by a Bb 3 land type that mainly has Hutton, Avalon, Longlands and Rensburg soil forms according to the land type database. Natural soil structure has been affected because its nature was loose in some parts, and it looked to have been filled in the past.
Drainage	2	1
	There are no existing man-made stormwater drainage channels running through the footprint. Additional stormwater measures may be required to avoid stormwater pooling on the site.	There are no existing man-made stormwater drainage channels running through the footprint.
Sensitive Receptors		

			2	1
		Wetlands, Water resources & Flood plains	There are no wetland occurring within the site, but the footprint is located within 500m from two wetlands included under the Bioregional Plan.	The purported NFEPA wetland that was reported to have been directly adjacent to the footprint was confirmed by SANBI to erroneous.
			2	1
		Visual landscape character	The project area has been transformed and landscaped as a lawn with some tree plantings as landscape features. The Landscape is also strongly associated with a large-scale industry that does influence the local sense of place.	The project area has been transformed and landscaped as a lawn with some tree plantings as landscape features.
			2	1
		Zone of Visual Influence	Viewshed analysis indicates a locally contained zone of visual influence. This is due to the built nature of the surrounding industrial areas, where the expected views of the 4m PV structures would be visually screened by the surrounding structure to the north, west, south, and partially to the east.	Viewshed analysis indicates a locally contained zone of visual influence.
			2	1
		Visual Resource Management (VRM) Classes (The assigned class doesn't determine the rank of the impact, but rather if the proposed PV facility will be able to adhere to the objectives of that class or not)	Assigned as a VRM Class IV (Transformed Grasslands) with the objective to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the landscape can be high, and the proposed development may dominate the view and be the major focus of the viewer's (s') attention without significantly degrading the local landscape character.	Assigned as a VRM Class IV (Transformed Grasslands) with the objective to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the landscape can be high, and the proposed development may dominate the view and be the major focus of the viewer's (s') attention without significantly degrading the local landscape character.
			2	1
		Visual Contrast Rating - Key Observation Points (KOP)	Due to limited views, only Parry Road was identified as a KOP. As the road is located adjacent to the site about 70m, the Visual Exposure is defined as High.	Due to limited views, only Parry Road was identified as a KOP. As the road is located adjacent to the site about (70m), the Visual Exposure is defined as High.
			1	1
		Heritage features	No sites identified. The area has been previously disturbed or built upon as there were areas with building rubble material identified.	The proposed development footprint has remnant of an old, demolished building on the north side of the footprint.
		Terrestrial and Aquatic Sensitivities		
			1	1
		Flora	Tsakane Clay Grassland vegetation type classified as Endangered (Mucina & Rutherford, 2006). The Tsakane Clay Grassland is characterised by flat to slightly undulating plains and low hills.	Tsakane Clay Grassland vegetation type classified as Endangered (Mucina & Rutherford, 2006). The Tsakane Clay Grassland is characterised by flat to slightly undulating plains and

	<p>Vegetation is short, dense grassland dominated by a mixture of common highveld grasses such as <i>Themeda triandra</i>, <i>Heteropogon contortus</i>, <i>Elionurus muticus</i> and a number of <i>Eragrostis</i> species (Mucina & Rutherford, 2006). Most prominent forbs are of the families Asteraceae, Rubiaceae, Malvaceae, Lamiaceae and Fabaceae. Disturbance often leads to an increase in the abundance of the grasses <i>Hyparrhenia hirta</i> and <i>Eragrostis chloromelas</i> (Mucina & Rutherford, 2006). However, no significant patches of intact natural vegetation remain, and terrestrial biological diversity is not high or low. This footprint is almost entirely made up of heavily manipulated or transformed vegetation that is maintained as manicured lawn surrounded by predominantly exotic trees.</p>	<p>low hills. Vegetation is short, dense grassland dominated by a mixture of common highveld grasses such as <i>Themeda triandra</i>, <i>Heteropogon contortus</i>, <i>Elionurus muticus</i> and a number of <i>Eragrostis</i> species (Mucina & Rutherford, 2006). Most prominent forbs are of the families Asteraceae, Rubiaceae, Malvaceae, Lamiaceae and Fabaceae. Disturbance often leads to an increase in the abundance of the grasses <i>Hyparrhenia hirta</i> and <i>Eragrostis chloromelas</i> (Mucina & Rutherford, 2006). However, this footprint is also transformed and maintained as a manicured lawn surrounded by exotic trees.</p>
Fauna	2	1
	<p>The following animal species occupy the development footprint: <i>Insecta-Aloeides dentatis dentatis</i>, <i>Mammalia-Chrysospalax villosus</i>, <i>Mammalia-Crocidura maquassiensis</i> and <i>Mammalia-Dasymys robertsii</i>.</p> <p>However only a few of these species were sported on site because there is a limited number of existing suitable habitat and there is also no wetland occurring in the site that serves as a habitat for the affected species, as some of them rely on wetlands or rivers as their habitat such as <i>Mammalia-Crocidura maquassiensis</i> and <i>Mammalia-Dasymys robertsii</i>. The species that were sported on site are common and well adapted to urban areas. These included species such as <i>Burhinus capensis</i> (Spotted Thick-Knee), <i>Vanellus coronatus</i> (Crowned Lapwing), <i>Spilopelia senegalensis</i> (Laughing Dove) and mammal species, <i>Lepus saxatilis</i>.</p>	
Sensitive landscape features	2	1
	<p>The footprint falls 500m within the following sensitive landscapes but none of these landscapes occur inside the footprint:</p> <ol style="list-style-type: none"> 1. Bioregional wetlands 	<p>The footprint does not fall within any sensitive landscapes.</p>
Existing Infrastructure & servitudes		
Accessibility (Roads) & Traffic Management	1	1
	<p>Access to site will be achieved from the Element Six facility entrance along erf 256.</p>	<p>Access to site is from the Element Six facility entrance along erf 256.</p>
Servitude	1	1
	<p>There is no servitude in or across the footprint.</p>	<p>There is no servitude in or across the footprint.</p>
Stormwater	2	1
	<p>Stormwater will continue to flow freely away from the site to the north, vegetation helps with infiltration, but some additional</p>	<p>Stormwater flows freely away from the site and vegetation helps with infiltration.</p>

	stormwater may be necessary to avoid pooling.	
Socio-economic factors		
Employment	3 (positive impact)	1
	There is going to be 40% of new skilled and 40% of new unskilled employment opportunities created in the construction phase of the project. There is going to be 66,67% of new skilled and 16,67% of new unskilled employment opportunities created in the operational phase of the project. The number of new employment opportunities during the operational phase will also be 6.	N/A
Sustainable Development	1	3
	This renewable energy development will contribute to reducing greenhouse gas emissions and improve electricity supply assurance.	Continued use of non-renewable energy.
Land Use Compatibility		
Land use	1	1
	Currently zoned Industrial and commercials. Development taking place in such an area must be sustainable in respect to the capacity of the environment. It must also identify any unmapped wetlands, especially seep areas that may occur on any site and when necessary, apply for the required water use licence	Currently zoned Industrial and commercial. Development taking place in such an area must be sustainable in respect to the capacity of the environment. It must also identify any unmapped wetlands, especially seep areas that may occur on any site and when necessary, apply for the required water use licence
Land potential	1	1
	The project footprint has a land potential of "L6" which can be described as a very restricted potential with regular and/or severe limitations due to soil, slope, temperatures or rainfall and non-arable.	The project footprint has a land potential of "L6" which can be described as a very restricted potential with regular and/or severe limitations due to soil, slope, temperatures, or rainfall and non-arable
Land capability	1	1
	Land capability;09. Moderate-High/10. Moderate-High.	Land capability;09. Moderate-High/10. Moderate-High.
Existing services (Water availability & Electricity)	1	1
	Water will be provided from municipal services supplied to Element Six.	Already serviced.
TOTALS	31	23
Impact Scoring <32 Low Impact, 33-55 Medium, 56- 77 High Impact, 78+ Very-High Impact	Low Impact	Low Impact



Figure 2. Development footprint (light green polygon) preferred alternative and associated terrestrial sensitivities (ESA 1 -dark-yellow polygons, ESA 2 – light-yellow polygons, CBA - dark-green polygon) according to the Ekurhuleni Bioregional Plan (2020).

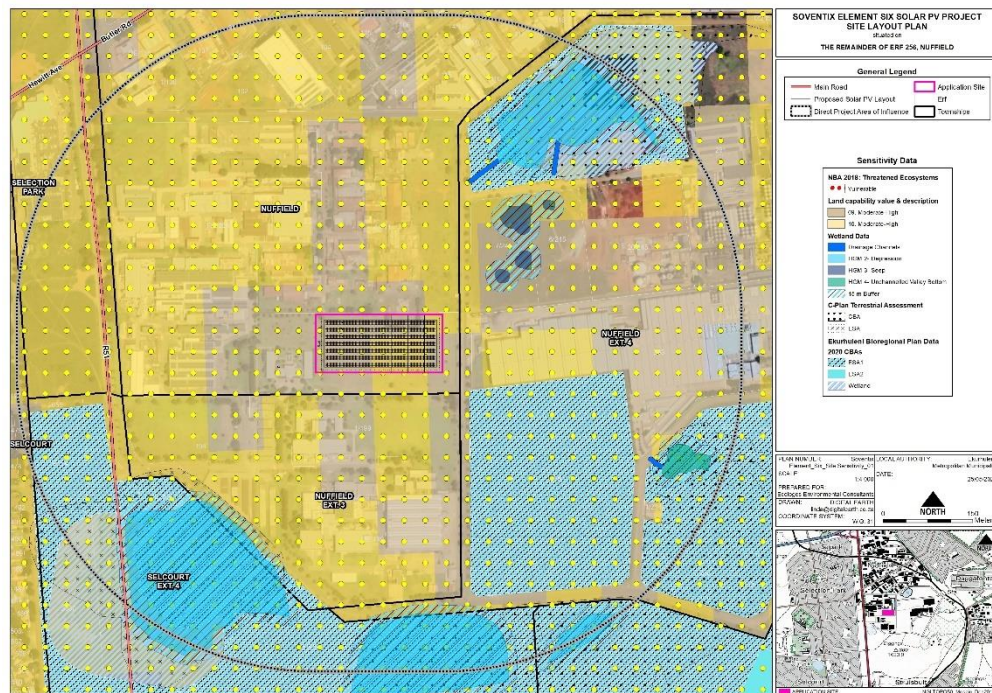


Figure 3. Development footprint (yellow polygon) preferred alternative and associated aquatic & terrestrial sensitivities indicated.

Alternative Type No. 2: Type of Activity

- Purpose and Requirements

The investment in renewable energy and energy efficiency is considered important to reduce the negative economic, social and environmental impacts of energy production and consumption in South Africa (Winkler, 2006). Many renewable energy projects are particularly well suited to off-grid applications and, certainly in South Africa, could improve the flexibility of the grid by distributing generation across the country, closer to some key loads (Winkler, 2006).

The Department of Energy (DoE) gazetted its White Paper on Renewable Energy in 2003 and introduced it as a “policy that envisages a range of measures to bring about integration of renewable energies into the mainstream energy economy.” The White Paper proposed that this would be produced mainly from biomass, wind, solar and small-scale hydropower.

Since the White Paper was gazetted, South Africa's primary and secondary energy requirements have remained heavily fossil-fuel-dependant, both in terms of indigenous coal production and use, as well as the use of imported oil resources. Whilst the medium-term power generation mix will continue to lean heavily on the use of fossil fuels, the Revised Balanced Scenario (RBS) of the 2010 Integrated Resource Plan (IRP) includes for a total additional supply capacity of 17.8GWe from renewable sources by 2030 (DEA, 2015).

The energy sector is the largest contributor, with 79.5% or 429 907 Gg CO₂e, of the total gross emissions for South Africa. This sector is broken down further into energy generation industries (60.4%), Transport (12.6%), Other sectors (11.4%), and Manufacturing industries and construction (8.6%). Since 2000 this sector has increased by 25.0% with the majority of the increase coming in the energy generation industry specifically. This recent increase highlights the need for Independent Power Producers (IPPs) to produce renewable energy to mitigate the Greenhouse Gas (GHG) emissions from the growing needs of the country while endeavouring to meet the United Nations Framework Convention on Climate Change (UNFCCC) GHG commitments.

To reduce the rise in GHG emissions and achieve meaningful reductions, the government of South Africa has implemented a comprehensive set of strategies, policies and sector plans within key sectors of the economy. These include, among others, Integrated Resource Plan (IRP), Energy Efficiency Strategy, the Industrial Policy Action Plan (IPAP), the Green Transport Strategy (GTS), the Climate Change Adaptation and Mitigation Plan (CCAMP) for the South African Agricultural and Forestry Sectors and National Waste Management Strategy (NWMS). Included in this suite of documents, is South Africa's Low-Emission Development Strategy (SA LEDS) 2050, which is based on years of work on climate change in the country. To support SA's climate change response, the country published a National Climate Change Response Strategy in 2004 (DEA, 2004).

Several feasibility studies have been completed by various role players that have identified solar as a preferred technology for South Africa. The annual 24-hour solar radiation average for South Africa is 220 W/m², compared with 150 W/m² for parts of the USA and about 100 W/m² for Europe. Almost the whole of the interior of the country has an average insolation in excess of 5 000 Wh/m²/day (Winkler, 2006).

- Methodology

Soventix South Africa undertook a due diligence of the suitability of solar at a site-specific level including the generation of a Helioscope report in order to generate & assess expected performance figures for the solar PV facility. The following expected performance figures were stated:

- Annual production: 3.337 GWh
- Performance ratio: 82.3%
- KWh/KWp: 1,839.0

Importantly, investments in solar projects bring socio-economic relief to distressed communities via job creation during construction and operation. These developments help to nurture the local economy and create enterprise opportunities and social programmes.

- Criteria used to investigate and assess alternatives

The EIA guideline for renewable energy projects published by the Department of Environmental Affairs (2013) identifies several feasible renewable energy alternatives for South Africa and provides the following narrative on the solar PV alternative as a highly suitable alternative for the country: "South Africa experiences some of the highest levels of solar radiation in the world (between 4.5 and 6.5kWh/m²) and possesses, therefore, considerable solar resource potential for solar water heating applications, solar photovoltaic and concentrated solar power (CSP) generation. Photovoltaic (PV) systems are widely applied in South Africa for powering professional niche applications such as telecommunications, microwave links, navigational aids and meteorology stations, where PV is well established as the best practical option. PV is also applied in small-scale remote power supplies for domestic use, game farms and community water pumping schemes. Internationally, PV is the fastest-growing power generation technology and between 2000 and 2009 the installed capacity globally grew on average by 60% per year. Worldwide more than 35GW of PVs are installed and operating, and in South Africa as much as 8GW PV could potentially be installed by 2020."

The outcomes generated from the Helioscope report identify the criteria used in determining the suitability of the solar PV as a feasible energy generation alternative. Annual figures have been generated and further broken down into monthly production figures, provided in Figures 4 below with sources of forecasting system losses of the Element Six 1.8MWp solar PV plant in figure 5.

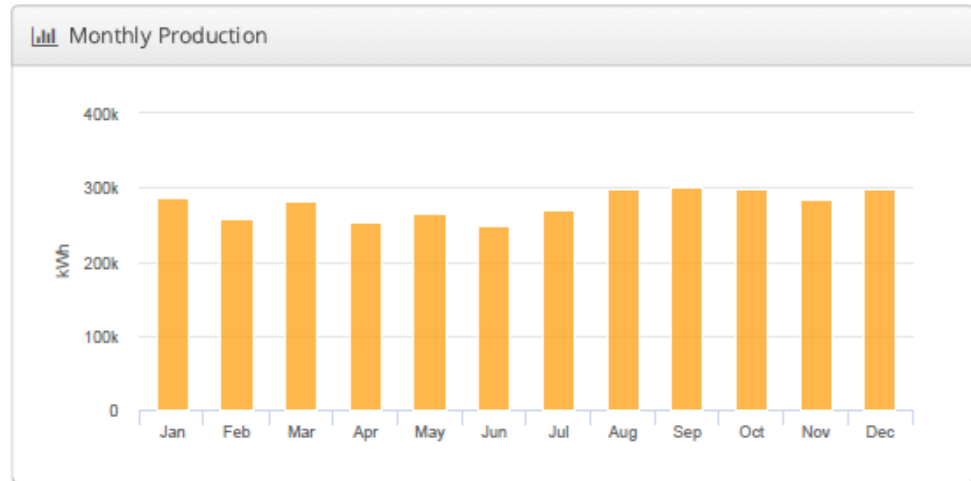


Figure 4. Monthly energy production figure forecast for the Element Six 1.8MWp solar PV plant.

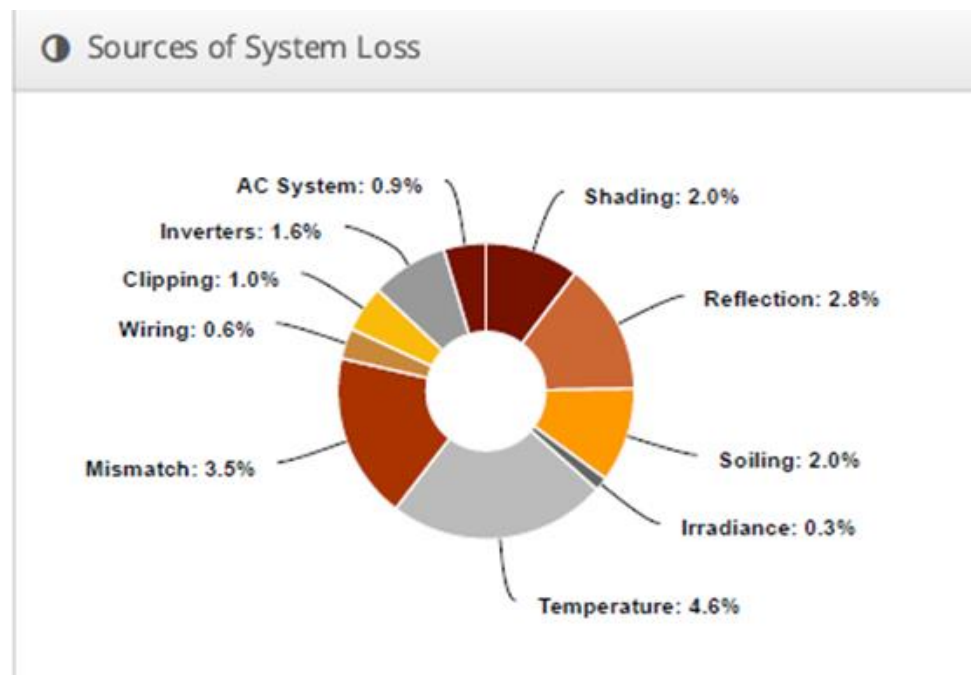


Figure 5. Sources of forecast system losses of the Element Six 1.8MWp solar PV plant.

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

The core business of the project proponent is solar PV facility development and operation for the use in the generation of electricity. As such, the fundamental alternative of a development other than to conduct and operate a solar energy facility is therefore not viable in this case. Furthermore, based on the site-specific context of the Element Six facility, solar PV was deemed the most feasible option, and helps reduce dependency on Fossil Fuel based energy generation, which nationally and internationally is deemed unsustainable and the greatest contributor to GHG emissions.

Alternative Type No. 3: Design and Layout

- Purpose and Requirements

The affected footprint surface area (2.2ha) is determined by the amount of space required to adequately accommodate the desired solar PV generation (1.8MWp) and associated infrastructure, including but not limited to transformers, operations area, lighting and fencing and access tracks between the panel arrays. The design (fixed tilt) and layout parameters of the solar facility are further governed by several factors including but not limited to the

orientation of the facility within the preferred footprint, to ensure a predominantly northern orientation, to optimise the absorption of, and reduce the reflection of, incoming solar radiation (insolation).

Initially, the position of the solar panel arrays had to shift due to the purported NFEPA wetland that was reported to have been directly adjacent to the development footprint, which wetland has now been confirmed erroneous by the SANBI National Wetland Coordinator. The layout will be affected by the presence of existing services, access points and routes, potential buffer distances from building setback lines and avoiding sensitive environmental receptors including minimising the extent of visual impacts.

- Methodology

Each specialist focussed on the impacts associated with the proposed activity on the receiving environment of the development footprint. The assessments identified sensitive receptors within the footprint to help inform recommendations on how to further mitigate impacts associated with the development footprint.

- Criteria used to investigate and assess the preferred alternative

A suite of specialist studies have been undertaken to identify sensitive receptors within the preferred footprint alternative and provide suitable mitigations including the following:

1. Visual Impact Assessment
2. Terrestrial Biodiversity Assessment including Plant & Animal Species (including Avifauna)
3. Aquatic Biodiversity Assessment
4. Agricultural Assessment
5. Cultural Heritage and Archaeology Assessment
6. Palaeontology Assessment
7. Civil aviation (to be submitted with FBAR)
8. RFI

Additionally, following an initial distribution of the Draft Basic Assessment Report on 04 April 2023, Interested & Affected Parties (I&APs), will be able to add their comments or raise their opinions relating to the proposed development.

- Reasoned explanation why the preferred alternative was or was not found to be reasonable or feasible

The proposed solar panel array layout is firstly dependent on available development footprint. The layout is then dependent on existing services, which must be protected. They did not redefine the position of the solar arrays since the purported NFEPA wetland was confirmed erroneous by SANBI. Additionally, proximity to the electrical RMU, required that the solar PV facility be as close as possible, to reduce cabling lengths.

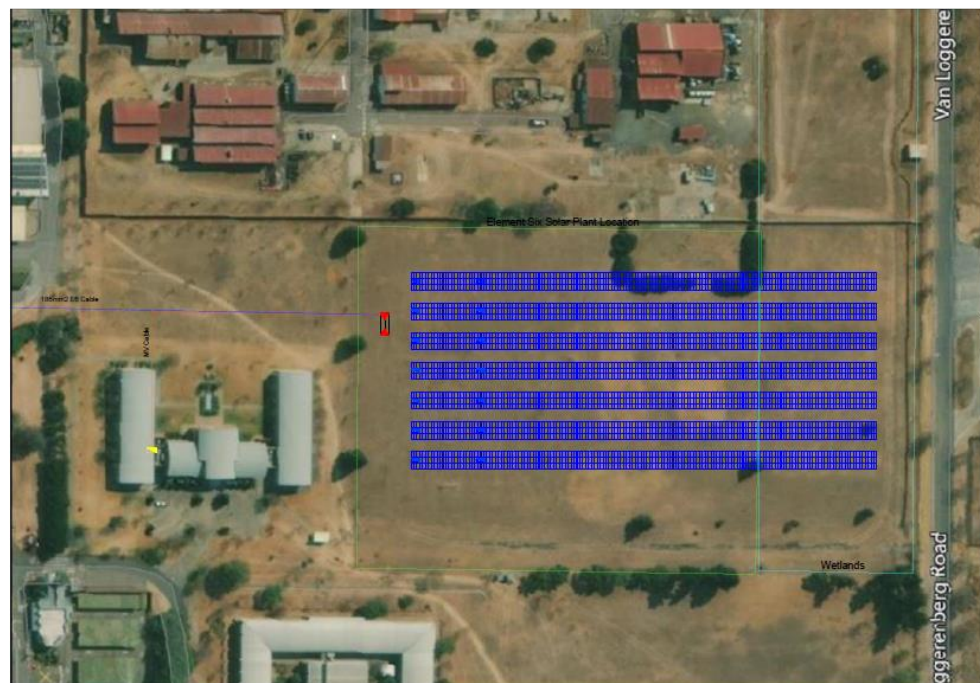


Figure 6. Layout of proposed solar PV development footprint..

Alternative Type No. 4: Technology

- Purpose and Requirements

Independent Power Producers (IPP) that rely on renewable resources for this generation, such as solar photovoltaic (PV) are subject to a number of factors that will influence generation efficiency. These factors include those within the operators' control including PV characteristics, tracking, and those external to operator influence including temperature and cloud cover conditions. The preferred technology for the proposed solar PV panels needs to make use of solar panels which have low losses and perform better in hot climates, higher temperatures and low radiation conditions such as in the early morning or during sunset and cloudy conditions (Ogier, 2020).

- Methodology

Various solar panel, inverter and associated infrastructure technologies (including fixed or tracking options) were investigated by the Applicant and assessed in light of financial and lead-time suitability. Consideration of generators sets or "Genset" units can be considered to provide energy, but predominantly as a supplementary power source. In this instance, they can supplement the PV and Utility supply in unforeseen instances when PV generation and/or utility is unavailable.

- Criteria used to investigate and assess alternatives

The preferred technology of the development project is fixed tilt ground mount solar PV structure. The solar panels are mounted on the ground at a fixed angle oriented towards the sun so that they can be able to generate energy. The solar panel arrays for this development project will be fixed at an angle of 20°. The fix tilt solar system is cost effective and easy to install because of its simple design, it also durable as it can withstand harsh weather conditions such as heavy winds or rainfall.

A pile test procedure was conducted on the footprint to determine the appropriate founding method for the piles and the associated optimum embedment depth for the piles and ensure that the design forces to be experienced during the lifetime of the solar PV project (25-year design life). This included the rammed pile test and the augured and concreted pile tests. Test positions were distributed around the site to achieve a homogeneous distribution of samples with adequate statistical relevance. The rammed pile test yielded unfavourable results due to the weak nature of the soil (underlain by old building rubble) and ramming deeper piles was considered not to be economical as well as exceed the limits of the height of the ramming machine and subsequently require split foundations. The augured pile test was the preferred method to fix the panels in the ground because this founding method and procedure is shown to be an adequate means of resisting the design loading reactions expected to be experienced by the structures during their 25-year design life.

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

Diesel Genset emissions are higher than the emissions from Fossil Fuel (FF) generation and is therefore not a feasible option to replace FF generation in isolation. However, it can be used as a backup augmenting the PV & Utility (FF) generation. The diesel generator emissions are only between 8 and 11% higher than FF per MW. The emission cost benefit from the generator use over normal fossil fuels is therefore estimated to be at ~90% and therefore, remains feasible from a GHG perspective to use diesel generators as a backup to the PV and Utility supply shortfall.

The preferred technology for the proposed PV panels makes use of the thin film PV panels (470-watt Jinko Solar). The thin film solar panels have lower losses or in other words perform better in hot climates, higher temperatures, and low radiation conditions, such as in the early morning or during sunset and cloudy conditions.

Additionally, fixed tilt solar array at an angle of 20 degrees will be installed by way of augured piling due to the loose nature of the soils on the site and the lower associated costs.

Alternative Type No. 5: Operational Aspects

- Purpose and Requirements

Operational aspects falls outside of the Environmental Authorisation Scope of the development footprint.

- Methodology

N/A

- Criteria used to investigate and assess alternatives

N/A

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

N/A

Alternative No. 6: Demand

- Purpose and Requirements

The investment in renewable energy and energy efficiency is considered important to reduce the negative economic, social, and environmental impacts of energy production and consumption in South Africa (Winkler, 2006). Many renewable energy projects are particularly well suited to off-grid applications and, certainly in South Africa, could improve the flexibility of the grid by distributing generation across the country, closer to some key loads (Winkler, 2006).

- Methodology

A reliable, "green" source of electricity, which is not prone to and can compensate for utility failures in supply, was sought by the end-user.

- Criteria used to investigate and assess alternatives

The suitability of various alternative energy sources was considered by the end-user.

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

The current electricity demand will be supplied by a combination of the Eskom utility and the Solar PV facility. A distribution line will be constructed between the Element Six RMU and the solar plant. Any generators will only serve to provide power to meet the required commitment in unforeseen instances when PV or Utility generation is unavailable. It is therefore less likely that any generators will be utilised often.

Alternative No. 7: Input

- Purpose and Requirements

N/A

- Methodology

N/A

- Criteria used to investigate and assess alternatives

N/A

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

No known input alternatives were known to the EAP, including alternative options on raw materials.

-Alternative No. 9: Scheduling and Timing

- Purpose and Requirements

Seasonality contributes strongly to impacts on the receiving environments. Construction during the rainy season is usually fraught with stormwater runoff associated risks including erosion of unvegetated surfaces with associated loss of topsoil, siltation of receiving watercourses and the proliferation of alien invasive vegetation on denuded and degraded surfaces. Construction over the dry winter months is preferable where construction will result in widespread vegetation clearance (clear & grub) but is less important if in situ vegetation will be largely left intact and gradient of the land is flat.

- Methodology

The Agricultural Potential Assessment indicated that the majority of the development footprint has a gentle slope and the area has three sensitive soil forms namely the Hutton, Ermelo and Carolina soil forms. However, due to the existing developments around the project areas, the industrial setting in which the project area is in and environmental factors such as climate, the project area may therefore be assigned an overall sensitivity of 'Moderate' towards the soils. The land capabilities have "Moderate" and "Moderate low"

sensitivities and they are suitable for recreational, industrial, and commercial purposes, which corresponds with the current land use. This indicates that there is no need for shaping of the footprint.

- Criteria used to investigate and assess alternatives

The gradient/slope of land combined with the method of installation of the solar panel arrays will not have a large impact on the preferred timing and scheduling of the construction phase. The foundation conditions of the in-situ material heavily influence the installation method as the solar panel array columns which need to be founded deep enough into the ground to support the above-ground load and avoid overturning.

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

The Agricultural Potential Assessment concluded that most of the area is characterised by a slope percentage between 0 and 5%, with some smaller patches within the project area characterised by a slope percentage ranging from 5 to 10% (Figure 7). This indicates a uniform topography with gentle slopes being present. The Digital Elevation Model (DEM) of the project area indicates an elevation of 1 616 to 1 627 Metres Above Sea Level (MASL) (Figure 8).

The area is characterised by Bb 3 land type which mainly have Hutton, Avalon, Longlands and Rensburg soil forms. Due to the gentle slope and weak nature of the soil characteristics, a suitable option would be the ground mount system foundations comprised of lip C channels placed within augured holes of a 250mm diameter and a depth of 1.0m filled with 15MPa to 20MPa concrete.

The Environmental Authorisation application timeframes are captured in Table 4, which indicates when the commencement of construction can be expected.

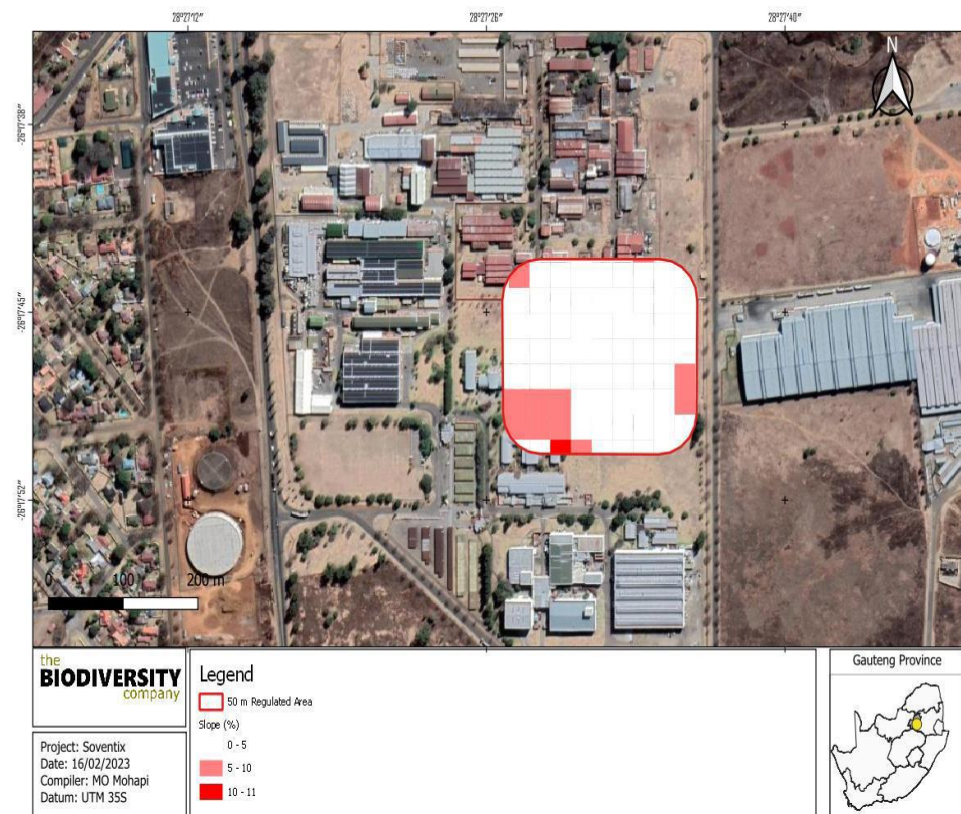


Figure 7. Slope percentage map for the development area.

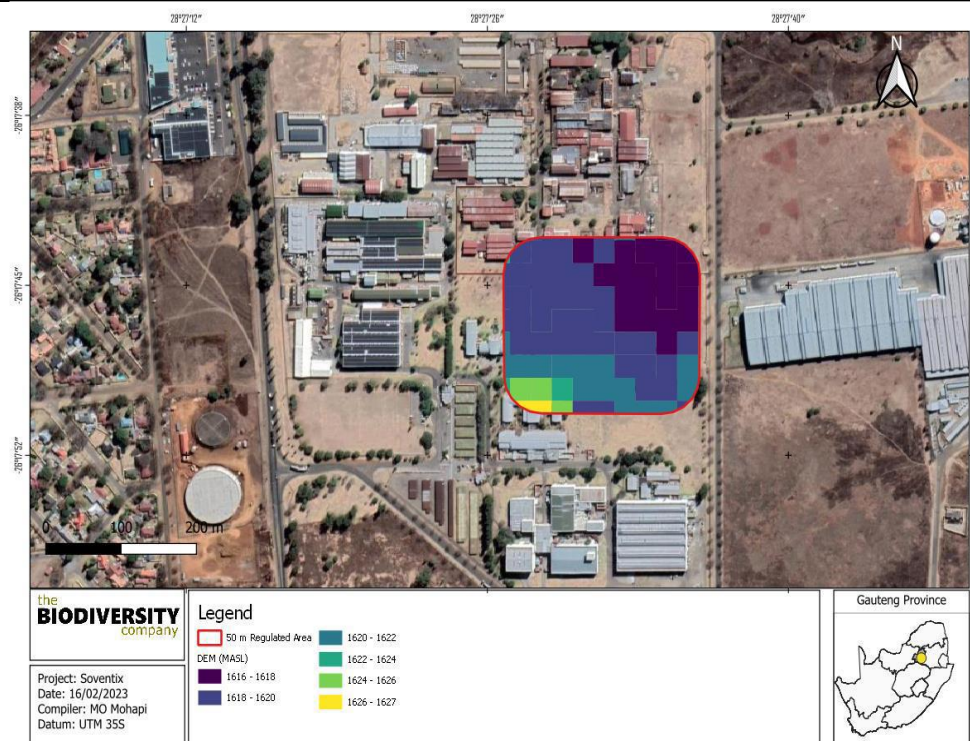


Figure 8. Digital Elevation Model of the development area (metres above sea level).

Table 4: Projected timeframes associated with the Environmental Authorisation application process.

No.	Activities	Soventix - Element Six			Responsibility
		Start date	End date	Days	
1	Site Sensitivity Verification	21-Nov-22	21-Nov-22	1	JB
3	Specialist ToR and quotes	24-Nov-22	28-Nov-22	4	JB
2	Project Inception and signing of contract:	29-Nov-22	15-Dec-22	16	JB & CD
4	Specialist appointments	11-Jan-23	12-Jan-23	2	JB
5	Specialist studies	13-Jan-23	27-Feb-23	45	Specialists, awaiting Civil Aviation Compliance Statement
6	Compile PPP documentation	18-Jan-23	20-Jan-23	2	HM & JB
7	Compile Project Programme	19-Jan-23	19-Jan-23	1	JB
8	Pre-application consultation with CA	20-Jan-23	03-Feb-23	14	HM, JB & GDARD
9	Distribute BID & Notification, Advert and erect Site Notice/s	24-Jan-23	26-Jan-23	3	HM JB, PM
10	Registration of I&APs (30-days)	27-Jan-23	26-Feb-23	30	HM & IAPs
11	Complete Application Form	13-Jan-23	23-Jan-23	10	HM, JB & Soventix
12	Submit application for signatures	24-Jan-23	07-Feb-23	14	HM, Soventix, Element Six
13	Prepare Draft BAR & EMPr	13-Jan-23	24-Mar-23	70	HM, JB, PM
14	(a) - (d) General	13-Jan-23	23-Jan-23	10	HM, PM
15	(e) Legislation	13-Jan-23	27-Jan-23	14	PM
16	(f) Need & Desirability - Preferred loc	18-Jan-23	28-Jan-23	10	PM
17	(h) Alternative Impact Assessment	28-Jan-23	01-Feb-23	4	PM, JB
18	(g) Motivation for Preferred Alt.	02-Feb-23	02-Feb-23	1	JB
19	(h) PPP report	27-Feb-23	03-Mar-23	4	HM
20	Review of Specialist Studies	28-Feb-23	04-Mar-23	4	HM, AK
21	(k) Summary of Specialist Reports	28-Feb-23	04-Mar-23	4	AK
22	(i) - (j) Impact Assess of preferred Alt	05-Mar-23	12-Mar-23	7	JB

23	(l) Environmental Impact Statement	13-Mar-23	14-Mar-23	2	JB
24	(m) EMPr	15-Mar-23	19-Mar-23	4	JB
25	(n) - (u) General	20-Mar-23	24-Mar-23	4	HM
26	Internal review of Draft BAR & Application	27-Mar-23	31-Mar-23	4	Ecoleges
27	Print, Bind & Courier Draft BAR & Application - Submit	01-Apr-23	05-Apr-23	4	HM
28	Distribute DBAR to I&APs (Digital Copy)	06-Apr-23	06-Apr-23	1	Hlengile
29	CA to Acknowledge receipt (10 days)	07-Apr-23	16-Apr-23	10	CA
30	30-day comment period	07-Apr-23	11-May-23	34	IAPs & CA
31	Public Meeting				
32	Compile Final BAR with comments	12-May-23	19-May-23	7	Ecoleges
33	Soventix to approve Final BAR	22-May-23	26-May-23	4	Soventix
34	Print, Bind & Courier Final BAR - Submit	27-May-23	31-May-23	4	HM
35	Distribute FBAR to I&APs & CA	31-May-23	04-Jul-23	1	HM
36	CA to Acknowledge receipt (10 days)	05-Jul-23	14-Jul-23	10	CA
37	CA to grant/refuse EA (107 days)	31-May-23	17-Sep-23	109	CA
38	CA to notify applicant of EA (5 days)	17-Sep-23	22-Sep-23	5	CA
39	Notify I&APs of the decision (14 days)	17-Sep-23	01-Oct-23	14	HM
40	"Cool down" period & project handover	01-Oct-23	22-Oct-23	21	Soventix

Alternative No. 10: Scale and Magnitude

- Purpose and Requirements

In some cases, activities that can be broken down into smaller units can be undertaken on different scales. Each of these scale alternatives may have different impacts. Large-scale projects, for example those that fall under the Renewable Energy Independent Power Producers Procurement Programme (REIPPP) under the National Energy Regulator of South Africa (NERSA) for awarding a Power Purchase Agreement (PPA) under the Renewable Energy Feed in-Tariff (REFIT), may place constraints on the maximum generation capacity per development node. Historically, several Bid Windows placed a constraint on the generation output capacity and configuration of the renewable energy projects of 75MWac, with replicates of 75MWac potentially being implemented in a phased approach. As the electricity generated will be fully consumed by Element Six and not fed into the grid, these constraints will not be applicable to this application.

- Methodology

The appointed specialists will provide feedback on biophysical and social environmental aspects of the development footprint. The development footprint has not been redefined since the site sensitivity verification report indicated that the development footprint has quite a low sensitivity rating and some of the specialist agreed with the findings recorded in the site sensitivity report. The minimum area required to ensure that the full generation capacity can be delivered remains 2.2ha and from an operational aspect, it is not necessary for the development project to be broken up into separate units because it is not a large-scale activity.

- Criteria used to investigate and assess alternatives

The end-user of the renewable energy has determined the desired generation capacity and the energy will not be fed into any utility grid, whereby generation capacity or phasing constraints may exist.

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

The proposed solar PV facility with a peak generation capacity of 1.8MW requiring 2.2ha on open ground within the Element Six facility in Daggafontein, will be constructed in a non-phased approach following the issuance of environmental and water use authorization.

Alternative No. 11: No-Go Option

- Purpose and Requirements

The option of not implementing the activity (no-go option) was used as the benchmark against which all impacts associated with the proposed development were assessed. The 'no-go' alternative is sometimes referred to as the 'no-action' alternative (Glasson et al., 1999) and at other times the 'zero-alternative'. It assumes that the activity does not go ahead, implying a continuation of the current situation or the status quo. In a situation where negative environmental impacts have high significance, the 'no-go' alternative takes on particular importance. In some cases, the 'no-go' alternative may be the only realistic alternative and then it has a critical role to play. It is not true to assume that the 'no-go' alternative is necessarily the best from an environmental perspective.

In many cases, expansions, and upgrades of existing industries (the 'go' alternative) permit the implementation of technological improvements such as the replacement of outdated equipment that leads to reduced emissions to the air or water, in addition to the primary aim of increased production capacity. The description of the baseline or existing environment or status quo is essential to all environmental assessments, and should be focussed on the key characteristics of, and values or importance attached to the environment (DEAT, 2004).

- Methodology

The 'no-go' alternative provides the means to compare the impacts of project alternatives with the scenario of a project not going ahead. In evaluating the 'no-go' alternative it is important to take into account the implications of foregoing the benefits of the proposed project (World Bank, 1996 in DEAT, 2004)).

The No-Go alternative relates to the option of not developing the proposed Solar PV plant and associated infrastructure (i.e. the Status Quo). If the proposed project is not developed, the current land use activities are assumed to continue in the long-term.

If the proposed activity was not to go ahead, there would be no additional impacts on the local terrestrial biodiversity, cultural heritage resources, and visual impacts. However, the no-go option would result in a loss of positive opportunities including energy generation by way of a renewable resource, improved energy supply assurance, lowered carbon footprint and a lower frequency of manufacturing interruptions. There would also be a lost opportunity with job creation and skills development associated with the proposed project.

- Criteria used to investigate and assess alternatives

Since Element Six already selected a footprint for the development, there was no need for an investigation of another site because only one site was made available. Thus, it was not necessary to identify another footprint because this was the only available footprint the facility wanted to construct the Solar PV plant.

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

The No-Go option is not deemed the most feasible alternative assessed with the following excerpts supporting the development footprint as the preferred alternative:

Social Impacts

The project outcomes align with the national, local, and regional planning objectives in terms of economic development and sustainability. The project will use a natural, renewable resource and assist with decreasing the country's reliance on coal as a source of energy.

The project will not affect the environmental rights of any of the affected stakeholder groups and no-one's livelihoods will be affected in a negative manner.

The project will not result in any unfair discrimination or affect the social and environmental rights of any of the stakeholder groups, should the mitigation measures be implemented as suggested. From a social perspective the positive impact that the project will have on the affected environment outweighs the negative impacts by far, and where there are negative impacts, it can be mitigated.

Terrestrial Biodiversity including Plant & Animal Species

Even though the vegetation in the footprint is manipulated, it will still be impacted because they must clear it for the installation of the solar panels, and this will expose the soil to erosion and also there is going to be low infiltration rate which will lead to flooding. The proposed development will lead to habitat alteration or loss of habitat for the animal species occurring in the footprint. A terrestrial biodiversity assessment has been conducted to come

up with mitigation to avoid impacts that might cause harm to the species. It also highlighted that the portion of land within the project area that is classified as having a sensitivity rating of Very Low, namely the Modified habitat, is likely to face minimal further impacts from any development activities in terms of terrestrial ecology, and as such the proposed activities may proceed within these areas.

Aquatic Biodiversity

According to the specialist report it is expected that the proposed activities will not directly impact any wetlands. The project was also deemed to pose low residual risks on surrounding wetlands and thus no fatal flaws were identified for the project. Even though the project has low risk to wetlands and aquatic ecosystems, the specialist indicated potential impacts together with their mitigations.

Visual Resources

As the site is located within an industrial area with a high VAC level, a contained ZVI without receptors sensitive to landscape change, the recommendation of the Landscape and Visual Impact Assessment is that development should be authorised. Opportunities for landscape enhancement are available with the planting of missing trees from the avenue of trees in Parry Road. As the Landscape and Visual Impacts are expected to have a Low Significance without mitigation, a detailed impact assessment is not required.

Agriculture

The area is not associated with any arable soils, predominantly due to the climate, which limits crop production significantly. The nature of the soil in the site is also loose and not suitable for crop production.

The proposed activities will not result in any segregation of some high production agricultural land. It is, therefore, the specialist’s recommendation that the proposed Soventix Solar PV project and associated infrastructure may be favourably considered for development with implementation of mitigation measure to ensure low expected significant impacts occurrence.

Heritage Resources

There are no known Stone Age sites or artifacts present in the study area and if any Stone Age artifacts are to be found in the area, then it would more than likely be single, out of context, stone tools. There is no Iron Age sites, features or objects existing in the study area. If there was a presence of those features, extensive disturbances of the recent past would have destroyed all evidence. However, during the geotechnical assessment building rubble materials were identified and this means that construction of the solar plant could possible unearth archaeological or paleontological features. Since the site sensitivity verification report confirmed that the area has high palaeontology sensitivity rating which can be impacted if the project is implemented. A paleontological assessment was conducted in the footprint to confirm if there is any presence of palaeontological features and provide mitigation if there is any.

Palaeontology Resources

There is no objection to the development, it was necessary to request a Phase 1 Palaeontological Impact Assessment: Field Study to determine whether the development will affect fossiliferous outcrops as the palaeontological sensitivity of the area is VERY HIGH. All the land involved in the development was assessed and none of the property is unsuitable for development.

In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be irreversible. With Mitigation the impact will be moderate and the cumulative impact is low. Impacts on palaeontological heritage during the construction and preconstruction phase could potentially occur and is regarded as having a high possibility.

Civil Aviation & Radio Frequency Interference

The project has effectively addressed and mitigated any potential risks that could pose a threat to aviation safety and operations. The proposed solar PV installation meets the necessary requirements and regulations and poses a negligible risk to aviation safety and operations. The project aligns with the South African government’s commitment to sustainable development and supports the transition towards a cleaner, greener future in energy production.

2	Alternative 1	Not applicable.
---	---------------	-----------------

3	Alternati ve 2	Not applicable.
---	-------------------	-----------------

In the event that no alternative(s) has/have been provided, a motivation must be included in the table below.

Element Six selected a footprint for the solar PV development based on several factors including their need to upgrade the existing RMU that feeds the Masikane sub-station, which could be done as part of, and integrate with, the solar PV development as well as consideration for cable lengths and associated costs. Therefore, there was no need for an investigation of another site because only one site was made available. The screening report site sensitivity of the footprint is low, confirmed by the site sensitivity verification report and the specialist assessments.

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the total physical size (footprint) of the proposal as well as alternatives. Footprints are to include all new infrastructure (roads, services etc), impermeable surfaces and landscaped areas:

Proposed activity (**Total environmental (landscaping, parking, etc.) and the building footprint**)

Size of the activity:

2.2 hectares

Alternatives:

Alternative 1 (if any)

--

Alternative 2 (if any)

--

Ha/ m²

or, for linear activities:

Proposed activity

--

Length of the activity:

Alternatives:

Alternative 1 (if any)

--

Alternative 2 (if any)

--

m/km

Indicate the size of the site(s) or servitudes (within which the above footprints will occur):

Proposed activity

17.5773 hectares

Size of the site/servitude:

Alternatives:

Alternative 1 (if any)

--

Alternative 2 (if any)

--

Ha/m²

5. SITE ACCESS

Proposal

Does ready access to the site exist, or is access directly from an existing road?

YES	NO
-----	----

If NO, what is the distance over which a new access road will be built

m

Describe the type of access road planned:

--

Include the position of the access road on the site plan (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

Alternative 1

Does ready access to the site exist, or is access directly from an existing road?

YES	NO
-----	----

If NO, what is the distance over which a new access road will be built

m

Describe the type of access road planned:

--

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

Alternative 2

Does ready access to the site exist, or is access directly from an existing road?

YES	NO
-----	----

If NO, what is the distance over which a new access road will be built

m

Describe the type of access road planned:

--

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

PLEASE NOTE: Points 6 to 8 of Section A must be duplicated where relevant for alternatives

Section A 6-8 has been duplicated

0

Number of times

(only complete when applicable)

6. LAYOUT OR ROUTE PLAN

A detailed site or route (for linear activities) plan(s) must be prepared for each alternative site or alternative activity. It must be attached to this document. The site or route plans must indicate the following:

- the layout plan is printed in colour and is overlaid with a sensitivity map (if applicable);
- layout plan is of acceptable paper size and scale, e.g.
 - A4 size for activities with development footprint of 10sqm to 5 hectares;
 - A3 size for activities with development footprint of > 5 hectares to 20 hectares;
 - A2 size for activities with development footprint of >20 hectares to 50 hectares);
 - A1 size for activities with development footprint of >50 hectares);
- The following should serve as a guide for scale issues on the layout plan:
 - A0 = 1: 500
 - A1 = 1: 1000
 - A2 = 1: 2000
 - A3 = 1: 4000
 - A4 = 1: 8000 (±10 000)
- shapefiles of the activity must be included in the electronic submission on the CD's;
- the property boundaries and Surveyor General numbers of all the properties within 50m of the site;
- the exact position of each element of the activity as well as any other structures on the site;
- the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, sewage pipelines, septic tanks, storm water infrastructure;
- servitudes indicating the purpose of the servitude;
- sensitive environmental elements on and within 100m of the site or sites (including the relevant buffers as prescribed by the competent authority) including (but not limited thereto):
 - Rivers and wetlands;
 - the 1:100 and 1:50 year flood line;
 - ridges;
 - cultural and historical features;
 - areas with indigenous vegetation (even if it is degraded or infested with alien species);
- Where a watercourse is located on the site at least one cross section of the water course must be included (to allow the position of the relevant buffer from the bank to be clearly indicated)

FOR LOCALITY MAP (NOTE THIS IS ALSO INCLUDED IN THE APPLICATION FORM REQUIREMENTS)

- the scale of locality map must be at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map;
- the locality map and all other maps must be in colour;
- locality map must show property boundaries and numbers within 100m of the site, and for poultry and/or piggery, locality map must show properties within 500m and prevailing or predominant wind direction;
- for gentle slopes the 1m contour intervals must be indicated on the map and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the map;
- areas with indigenous vegetation (even if it is degraded or infested with alien species);
- locality map must show exact position of development site or sites;
- locality map showing and identifying (if possible) public and access roads; and
- the current land use as well as the land use zoning of each of the properties adjoining the site or sites.

Appendix A

7. SITE PHOTOGRAPHS

Colour photographs from the center of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under the appropriate Appendix. It should be supplemented with additional photographs of relevant features on the site, where applicable.

Appendix B

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity to be attached in the appropriate Appendix.

Appendix C

SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT

Note: Complete Section B for the proposal and alternative(s) (if necessary)

Instructions for completion of Section B for linear activities

- 1) For linear activities (pipelines etc) it may be necessary to complete Section B for each section of the site that has a significantly different environment.
- 2) Indicate on a plan(s) the different environments identified
- 3) Complete Section B for each of the above areas identified
- 4) Attach to this form in a chronological order
- 5) Each copy of Section B must clearly indicate the corresponding sections of the route at the top of the next page.

Section B has been duplicated for sections of the route

"insert No. of duplicates"

 times

Instructions for completion of Section B for location/route alternatives

- 1) For each location/route alternative identified the entire Section B needs to be completed
- 2) Each alternative location/route needs to be clearly indicated at the top of the next page
- 3) Attach the above documents in a chronological order

Section B has been duplicated for location/route alternatives times (complete only when appropriate)

Instructions for completion of Section B when both location/route alternatives and linear activities are applicable for the application

Section B is to be completed and attachments order in the following way

- All significantly different environments identified for Alternative 1 is to be completed and attached in a chronological order; then
- All significantly different environments identified for Alternative 2 is to be completed and attached chronological order, etc.

Section B - Section of Route (complete only when appropriate for above)

Section B – Location/route Alternative No. (complete only when appropriate for above)

1. PROPERTY DESCRIPTION

Property description:
(Including Physical Address and Farm name, portion etc.)

Erf 256, 1 Debid Road, Nuffield Springs, Gauteng, 1559.

2. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in decimal degrees. The degrees should have at least six decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

Alternative: **Latitude (S):** **Longitude (E):**

In the case of linear activities:

Alternative:

- Starting point of the activity
- Middle point of the activity
- End point of the activity

Latitude (S):	Longitude (E):
°	°
°	°
°	°

For route alternatives that are longer than 500m, please provide co-ordinates taken every 250 meters along the route and attached in the appropriate Appendix

Addendum of route alternatives attached

The 21 digit Surveyor General code of each cadastral land parcel

PROPOSAL	T	0	I	R	0	4	8	5	0	0	0	0	2	5	6	0	0	0	0	
ALT. 1																				
ALT. 2																				
etc.																				

3. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
-------------	-------------	-------------	-------------	--------------	-------------	------------------

4. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site.

Ridgeline	Plateau	Side slope of hill/ridge	Valley	Plain	Undulating plain/low hills	River front
-----------	---------	--------------------------	--------	--------------	----------------------------	-------------

5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

- a) Is the site located on any of the following?

- Shallow water table (less than 1.5m deep)
- Dolomite, sinkhole or doline areas
- Seasonally wet soils (often close to water bodies)
- Unstable rocky slopes or steep slopes with loose soil
- Dispersive soils (soils that dissolve in water)
- Soils with high clay content (clay fraction more than 40%)
- Any other unstable soil or geological feature
- An area sensitive to erosion

YES	<u>NO</u>
YES	<u>NO</u>
YES	<u>NO</u>
YES	<u>NO</u>
YES	<u>NO</u>
YES	<u>NO</u>
YES	<u>NO</u>

(Information in respect of the above will often be available at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by Geological Survey may also be used).

b) are any caves located on the site(s)

YES	<u>NO</u>
-----	-----------

 If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)
Latitude (S): _____ **Longitude (E):** _____

c) are any caves located within a 300m radius of the site(s)

YES	<u>NO</u>
-----	-----------

 If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)
Latitude (S): _____ **Longitude (E):** _____

d) are any sinkholes located within a 300m radius of the site(s)

YES	<u>NO</u>
-----	-----------

 If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)
Latitude (S): _____ **Longitude (E):** _____

If any of the answers to the above are "YES" or "unsure", specialist input may be requested by the Department

6. AGRICULTURE

Does the site have high potential agriculture as contemplated in the Gauteng Agricultural Potential Atlas (GAPA 4)?

YES	<u>NO</u>
-----	-----------

Please note: The Department may request specialist input/studies in respect of the above.

7. GROUNDCOVER

To be noted that the location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Indicate the types of groundcover present on the site and include the estimated percentage found on site

Natural veld - good condition % = 50	Natural veld with scattered aliens % = 0	Natural veld with heavy alien infestation % = 0	Veld dominated by alien species % = 0	Landscaped (vegetation) % = 50
Sport field % = 0	Cultivated land % = 0	Paved surface (hard landscaping) % = 0	Building or other structure % = 0	Bare soil % = 0

Please note: The Department may request specialist input/studies depending on the nature of the groundcover and potential impact(s) of the proposed activity/ies.

Are there any rare or endangered flora or fauna species (including red list species) present on the site

YES	<u>NO</u>
-----	-----------

If YES, specify and explain:

Are there any rare or endangered flora or fauna species (including red list species) present within a 200m (if within urban area as defined in the Regulations) or within 600m (if outside the urban area as defined in the Regulations) radius of the site.

YES	<u>NO</u>
-----	-----------

If YES, specify and explain:

Are there any special or sensitive habitats or other natural features present on the site?

YES	<u>NO</u>
-----	-----------

 If YES, specify and explain:

Was a specialist consulted to assist with completing this section

YES	NO
-----	----

If yes complete specialist details

Name of the specialist:

Andrew Husted

Qualification(s) of the specialist:

- MSc (University of Johannesburg) – Aquatic Health
- BSc Honours (Rand Afrikaans University) – Aquatic Health
- BSc Natural Science
- Pr Sci Nat (400213/11)
- Certificate of Competence: Mondi Wetland Assessments
- Certificate of Competence: Wetland WET-Management
- SASS 5 (Expired) – Department of Water Affairs and Forestry for the River Health Programme
- EcoStatus application for rivers and streams

Postal address: 777 Peridot Street, Jukskei Park

Postal code: 2158

Telephone: _____ Cell: +27 81 319 1225

E-mail: andrew@thebiodiversitycompany.com Fax: +27 86 527 1965


Are any further specialist studies recommended by the specialist? YES NO

If YES, specify: _____

If YES, is such a report(s) attached? YES NO

If YES list the specialist reports attached below

Terrestrial Biodiversity Compliance Statement
 Animal Species Compliance Statement
 Plant Species Compliance Statement
 Agricultural Compliance Statement
 Aquatic Biodiversity Compliance Statement

Signature of specialist:  Date: 27 February 2023

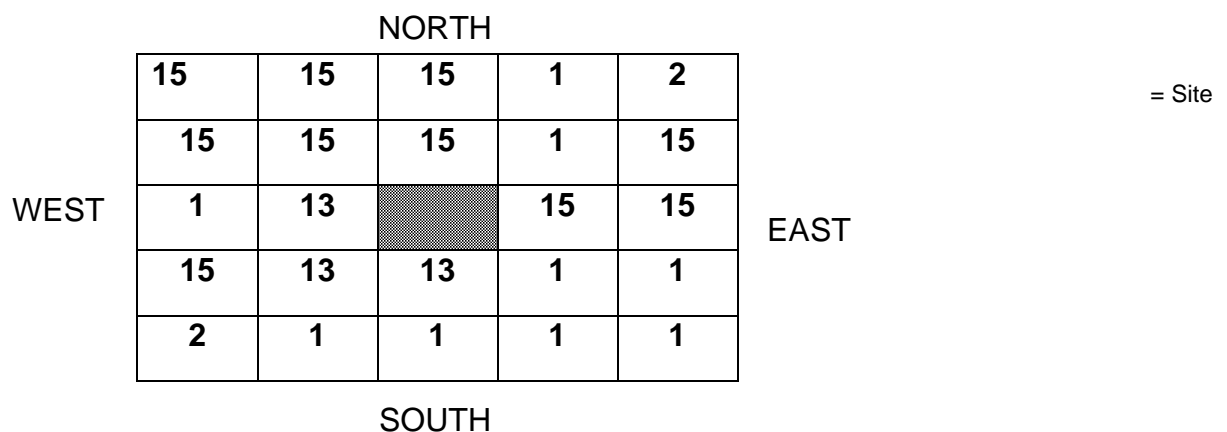
Please note; If more than one specialist was consulted to assist with the filling in of this section then this table must be appropriately duplicated.

8. LAND USE CHARACTER OF SURROUNDING AREA

Using the associated number of the relevant current land use or prominent feature from the table below, fill in the position of these land-uses in the vacant blocks below which represent a 500m radius around the site

1. Vacant land	2. River, stream, wetland	3. Nature conservation area	4. Public open space	5. Koppie or ridge
6. Dam or reservoir	7. Agriculture	8. Low density residential	9. Medium to high density residential	10. Informal residential
11. Old age home	12. Retail	13. Offices	14. Commercial & warehousing	15. Light industrial
16. Heavy industrial ^{AN}	17. Hospitality facility	18. Church	19. Education facilities	20. Sport facilities
21. Golf course/polo fields	22. Airport ^N	23. Train station or shunting yard ^N	24. Railway line ^N	25. Major road (4 lanes or more) ^N
26. Sewage treatment plant ^A	27. Landfill or waste treatment site ^A	28. Historical building	29. Graveyard	30. Archeological site
31. Open cast mine	32. Underground mine	33. Spoil heap or slimes dam ^A	34. Small Holdings	
Other land uses (describe):				

NOTE: Each block represents an area of 250m X 250m, if your proposed development is larger than this please use the appropriate number and orientation of hashed blocks



Note: More than one (1) Land-use may be indicated in a block

Please note: The Department may request specialist input/studies depending on the nature of the land use character of the area and potential impact(s) of the proposed activity/ies. Specialist reports that look at health & air quality and noise impacts may be required for any feature above and in particular those features marked with an "A" and with an "N" respectively.

Have specialist reports been attached
If yes indicate the type of reports below

YES	NO
------------	-----------

1. Terrestrial Biodiversity Compliance Statement,
2. Plant Species Compliance Statement,
3. Animal Species Compliance Statement,
4. Aquatic Biodiversity Compliance Statement,
5. Archaeology & Cultural History Exemption Letter,
6. Agriculture Compliance Statement,
7. Palaeontology Impact Assessment
8. Visual Impact Compliance Statement; and
9. Pile testing report (geotechnical).
10. Civil Aviation & Radio Frequency Interference Compliance Statement

9. SOCIO-ECONOMIC CONTEXT

Describe the existing social and economic characteristics of the area and the community condition as baseline information to assess the potential social, economic and community impacts.

The project outcomes align with the national, local, and regional planning objectives in terms of economic development and sustainability. The project will use a natural, renewable resource and assist with decreasing the country's reliance on coal as a source of energy. The project will not affect the environmental rights of any of the affected stakeholder groups and no-one's livelihoods will be affected in a negative manner.

The project will not result in any unfair discrimination or affect the social and environmental rights of any of the stakeholder groups, should the mitigation measures be implemented as suggested in the Environmental Management Program. The receiving environment is located in an industrial area on the outskirts of the Nuffield area.

Due to the site's location and the nature of the proposed development, very few impacts of a social nature are expected, the most notable being:

- Visual disturbances due to glare from the panels
- Community expectations
- Very minimal traffic impacts
- Safety and security

To address these issues, the following measures are recommended:

- Managing the visual nuisance impact (glare) through erecting visual barriers such as trees.
- Compile a strategy for road safety that avoids construction traffic during peak traffic periods and emphasises safe and responsible road use.
- Compile a strategy for community safety during construction, especially taking into consideration the employees of Bevcan and Element Six, which use the same entrance drive as for the construction activities.
- Implement security measures on site to protect construction material and limit access to property.

Given the positive impact the development will have in the sense that it will use renewable energy, avoiding manufacturing delays through the supply of electricity and the reduced dependency on coal, from a social and economic perspective it is recommended that the project proceeds.

10. CULTURAL/HISTORICAL FEATURES

Please be advised that if section 38 of the National Heritage Resources Act 25 of 1999 is applicable to your proposal or alternatives, then you are requested to furnish this Department with written comment from the South African Heritage Resource Agency (SAHRA) – Attach comment in appropriate annexure

38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-

- (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) the construction of a bridge or similar structure exceeding 50m in length;
- (c) any development or other activity which will change the character of a site-
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Are there any signs of culturally (aesthetic, social, spiritual, environmental) or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or close (within 20m) to the site?

YES	<u>NO</u>
-----	------------------

If YES, explain:

--

If uncertain, the Department may request that specialist input be provided to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist if one was already appointed:

- | |
|--|
| <p>a. All the land involved in the development was assessed and none of the property is unsuitable for development.</p> <p>b. The following should be conserved: if any palaeontological material is exposed during clearing, ground-breaking, digging, excavating, drilling or blasting, SAHRA must be notified. All development activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures.</p> <p>c. Condition in which development may proceed: It is further suggested that a Section 37(2) agreement of the Occupational, Health and Safety Act 85 of 1993 is signed with the relevant contractors to protect the environment (fossils) and adjacent areas as well as for safety and security reasons.</p> |
|--|

The proposed development site is located within an Industrial Context and is surrounded by various industrial, commercial and residential developments. The development & study area itself has been extensively disturbed in the recent past by urban residential and industrial activities, and the original natural and historical landscape nearly completely altered as a result. If any cultural heritage (archaeological and/or historical) sites or features existed here in the past it would have been fairly extensively disturbed or even destroyed as a result and the possibility of any being present here is highly unlikely.

Will any building or structure older than 60 years be affected in any way?
 Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

YES	<u>NO</u>
YES	<u>NO</u>

If yes, please attached the comments from SAHRA in the appropriate Appendix

SECTION C: PUBLIC PARTICIPATION (SECTION 41)

1. The Environmental Assessment Practitioner must conduct public participation process in accordance with the requirement of the EIA Regulations, 2014.

2. LOCAL AUTHORITY PARTICIPATION

Local authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of the application at least thirty (30) calendar days before the submission of the application to the competent authority.

Was the draft report submitted to the local authority for comment?

YES	NO
-----	----

If yes, has any comments been received from the local authority?

YES	NO
-----	----

If "YES", briefly describe the comment below (also attach any correspondence to and from the local authority to this application):

--

If "NO" briefly explain why no comments have been received or why the report was not submitted if that is the case.

The Draft Report was submitted to Ekurhuleni Metro, but no comments have been received.

3. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the activity, site or property, such as servitude holders and service providers, should be informed of the application at least **thirty (30) calendar days** before the submission of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?

YES	NO
-----	----

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

--

If "NO" briefly explain why no comments have been received

No comments were received from any stakeholders other than the competent authority on the Draft Report.

4. GENERAL PUBLIC PARTICIPATION REQUIREMENTS

The Environmental Assessment Practitioner must ensure that the public participation process is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees and ratepayers associations. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was flawed.

The EAP must record all comments and respond to each comment of the public / interested and affected party before the application report is submitted. The comments and responses must be captured in a Comments and Responses Report as prescribed in the regulations and be attached to this application.

5. APPENDICES FOR PUBLIC PARTICIPATION

All public participation information is to be attached in the appropriate Appendix. The information in this Appendix is to be ordered as detailed below

Appendix 1 – Proof of site notice

Appendix 2 – Written notices issued as required in terms of the regulations

Appendix 3 – Proof of newspaper advertisements

Appendix 4 – Communications to and from interested and affected parties

Appendix 5 – Minutes of any public and/or stakeholder meetings

Appendix 6 - Comments and Responses Report

Appendix 7 –Comments from I&APs on Basic Assessment (BA) Report

Appendix 8 –Comments from I&APs on amendments to the BA Report

Appendix 9 – Copy of the register of I&APs

SECTION D: RESOURCE USE AND PROCESS DETAILS

Note: Section D is to be completed for the proposal and alternative(s) (if necessary)

Instructions for completion of Section D for alternatives

- 1) For each alternative under investigation, where such alternatives will have different resource and process details (e.g. technology alternative), the entire Section D needs to be completed
- 4) Each alternative needs to be clearly indicated in the box below
- 5) Attach the above documents in a chronological order

Section D has been duplicated for alternatives

"insert No. of duplicates"

 times
(complete only when appropriate)

Section D Alternative No.

ZERO

 (complete only when appropriate for above)

1. WASTE, EFFLUENT, AND EMISSION MANAGEMENT

Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

YES	NO
------------	----

If yes, what estimated quantity will be produced per month?

0.04m ³

How will the construction solid waste be disposed of (describe)?

An integrated waste management approach will be implemented that is based on waste minimisation and will incorporate reduction, recycling, re-use and disposal where appropriate. The solid waste, which will not be recycled, will be disposed of at a landfill licensed in terms of section 20 (b) of the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008).

Where will the construction solid waste be disposed of (describe)?

At the municipal landfill site.

Will the activity produce solid waste during its operational phase?

YES	NO
-----	-----------

If yes, what estimated quantity will be produced per month?

m ³

How will the solid waste be disposed of (describe)?

Has the municipality or relevant service provider confirmed that sufficient air space exists for treating/disposing of the solid waste to be generated by this activity?

YES	NO
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Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

The Municipality has a licensed landfill site (Rietfontein) in Springs. The project will further adopt an integrated waste management approach in line with Element Six practices, including potentially utilizing their appointed waste service provider.

Note: If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?

YES	NO
-----	-----------

If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility?

YES	NO
-----	-----------

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Describe the measures, if any, that will be taken to ensure the optimal reuse or recycling of materials:

Integrated Waste Management approach including implementation of the waste management hierarchy.

Liquid effluent (other than domestic sewage)

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

YES	NO
-----	-----------

If yes, what estimated quantity will be produced per month?

m ³

If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the liquid effluent to be generated by this activity(ies)?

YES	NO
-----	----

Will the activity produce any effluent that will be treated and/or disposed of on site?

Yes	NO
-----	-----------

If yes, what estimated quantity will be produced per month?

m ³

If yes describe the nature of the effluent and how it will be disposed.

Note that if effluent is to be treated or disposed on site the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA

Will the activity produce effluent that will be treated and/or disposed of at another facility?

YES	NO
-----	----

If yes, provide the particulars of the facility:

Facility name:			
Contact person:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

Waste water will not generated except from small-scale concrete batching in the event ready-mix concrete is not used.

Liquid effluent (domestic sewage)

Will the activity produce domestic effluent that will be disposed of in a municipal sewage system?

YES	NO
-----	----

If yes, what estimated quantity will be produced per month?

	m ³
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If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the domestic effluent to be generated by this activity(ies)?

YES	NO
-----	----

Will the activity produce any effluent that will be treated and/or disposed of on site?

YES	NO
-----	----

If yes describe how it will be treated and disposed off.

Emissions into the atmosphere

Will the activity release emissions into the atmosphere?

YES	NO
-----	----

If yes, is it controlled by any legislation of any sphere of government?

YES	NO
-----	----

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the emissions in terms of type and concentration:

The emissions will be that of the exhaust fumes from the construction vehicles bringing in material and equipment to the site. The concentrations are unknown at this time. There is a possibility that pre-drilling will be required in the event the solar arrays cannot be ram-piled, which will result in dust & noise emissions. On-site concrete batching may result in some cement entrainment, as will dust emissions resulting from construction activities creating and being undertaken on bare ground. The above activities will be governed by the National Dust Control Regulations (GN No. R. 827, 1 November 2013).

2. WATER USE

Indicate the source(s) of water that will be used for the activity

<u>municipal</u>	Directly from water board	groundwater	river, stream, dam or lake	other	the activity will not use water
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If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

	liters
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If Yes, please attach proof of assurance of water supply, e.g. yield of borehole, in the appropriate Appendix

Does the activity require a water use permit from the Department of Water Affairs?

YES	NO
-----	----

If yes, list the permits required

If yes, have you applied for the water use permit(s)?

YES	NO
-----	----

If yes, have you received approval(s)? (attached in appropriate appendix)

YES	NO
-----	----

3. POWER SUPPLY

Please indicate the source of power supply eg. Municipality / Eskom / Renewable energy source

Municipality.

If power supply is not available, where will power be sourced from?

4. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

The project aims at improving energy efficiency of the Element Six Facility through augmenting supply by way of renewable energy sources, and ensure uninterrupted electricity supply during times of utility loadshedding.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

Solar Photovoltaic infrastructure

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts as well as the impacts of not implementing the activity (Section 24(4)(b)(i)).

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summarise the issues raised by interested and affected parties.

No issues raised by I&APs to date.

Summary of response from the practitioner to the issues raised by the interested and affected parties (including the manner in which the public comments are incorporated or why they were not included)

(A full response must be provided in the Comments and Response Report that must be attached to this report):

Not Applicable – No comments received yet.

2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION AND OPERATIONAL PHASE

Briefly describe the methodology utilised in the rating of significance of impacts

Ecoleges sets out to identify, predict and evaluate impacts and risks firstly by identifying the activities that are to be undertaken during the development, and where applicable, related operation of a listed or specified activity. Once the activities and associated environmental aspects, or elements of the contractor's activities that interact or can interact with the environment, are identified, e.g., air emissions, it is possible to identify the potential environmental impact and risks, considering that an impact is any change to the environment resulting from the contractor's environmental aspects. This process of identification is facilitated by a Leopold Matrix, which considers the possible outcomes of each aspect and the cause of that aspect (or activity) within the context of the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment. Other critical inputs are received from Interested & Affected Parties, and, where applicable, the findings contained in specialist studies.

Impacts versus Risks

It is our opinion that a risk is nothing more than a potential impact, meant to encourage people to think beyond the obvious impact and consider (1) variable driving forces, and (2) uncertain outcomes, to identify potential or indirect impacts so that specific actions can be taken in response to that risk.

(1) Variable driving forces

Some variable driving forces include nature, human behaviour, and exposure scenario.

An **environmental aspect** is described in BS EN ISO 14001 as an "element of an organisation's activities, products or services that interacts or can interact with the environment".

An **environmental impact** is an "adverse or beneficial change to the environment resulting from the organization's environmental aspects."

For example, if an activity is driving a covered coal truck on a surfaced road, then one aspect of that activity is emissions to air, including greenhouse gases, and the impact is global warming. If a person changes the exposure scenario to a dirt road, then another emission to air is dust, and the potential impacts or risks include dust fall on vegetation, and the inhalation of dust by people. It would not have been possible to identify the potential risks if one did not consider an alternative exposure scenario.

(2) Uncertain outcomes

Uncertain outcomes relate to the nature and extent of an outcome most often because of a lack of information, data or understanding about, for example, stressors, responses and distributions over space and time.

For example, a lack of meteorological data would make it difficult to assess the effects of wind on dust emissions, and how it can influence the certainty of the impact.

So, the determination of an impact versus risk is based on whether an activity can be exposed to variable driving forces or generate uncertain outcomes. The methodology used in assessing impacts and risks is the same as described below. However, the legislated precautionary principle is adopted when identifying mitigations for risks.

Motivation for the methodology

A **significant impact** means, “an impact that may have a notable effect on one or more aspects of the environment, or may result in non-compliance with accepted quality standards, thresholds or targets, and...”

According to the EIA Regulation’s definition, there are two measures of significance: (1) a notable effect on the environment, and (2) non-compliance with standards, thresholds, or targets.

(1) A notable effect on the environment

An impact can be significant based on a measurable effect to the environment.

(2) Non-compliance with standards, thresholds, or targets

An impact can be significant based on non-compliance, which is basically a failure to act in accordance with formal requirements such as a law, regulation, term of a contract, rule or in this context, environmental standards, thresholds, and targets.

- a. An example of a standard is the General Authorisation for Section 21(f) water uses relating to the “discharge of waste or water containing waste into a water resource...” published in GN No. 665 of 2013. It contains a table of wastewater limit values applicable to the discharge, including such parameters as Chemical Oxygen Demand, pH, Suspended Solids, and the concentration of other dissolved elements.
- b. An example of a threshold is 300m² in the case of Listed Activity 12 of Listing Notice 3 relating to the clearance of indigenous vegetation in an identified geographical area.
- c. An example of targets are the biodiversity targets for ecosystems, species, or ecological processes that CBAs are required to meet.

Consequently, the methodology differentiates between two measures of significance, namely **Impact Magnitude** and **Impact Importance**. Impact Magnitude relates to a notable effect on the environment and Impact Importance refers to non-compliance. Significance is assessed using both approaches. If either one is, or both are, significant, then the impact is significant.

Each approach entails assigning ranks, usually Low, Medium, or High, to a set of judgemental criteria, that is criteria that are based on clearly defined value judgements (or descriptors) that have been adapted to the South African EIA context.

This requirement is written into the second part of the EIA Regulation’s definition of **significant impact**. It continues, “...and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as **duration, magnitude, intensity** and **probability** of occurrence.”

So, not only does the definition identify four key criteria that we need to consider, but it also requires that these criteria are ranked, implying levels of severity determined by the EAP’s judgement.

Additional criteria identified by the EIA Regulations (see Resources used to inform methodology above) for inclusion in the assessment process include **nature, significance, consequence, and extent**.

In total, eight different criteria must be taken into consideration when undertaking an impact and risk assessment. However, which criteria should be used to evaluate **Impact Magnitude** and which criteria should be used to evaluate **Impact Importance**?

Description of the criteria

The “**Nature**” of something means the basic or inherent features, character, or qualities of something. However, considering that identified potential environmental impacts should as far as possible be quantified, the nature of an impact should be evaluated by predicting those attributes that are measurable, or at least prone to minimal subjectivity during their judgment, such as intensity, extent, duration, and status.

The “**Status**” of an impact identifies whether it is a positive or beneficial, negative, or adverse, or neutral impact. Status is not mentioned as a criterion in the EIA Regulations, 2014 as amended, but the Regulations do refer to the inclusion of both positive and negative effects. So, status has been incorporated into the assessment process as a criterion and specifically with reference to evaluating the nature, or determining the inherent qualities, of an impact.

In summary, nature is a composite score that combines four different impact values: (1) **intensity** or severity, (2) geographic **extent** or spatial scale, (3) **duration** (and if applicable frequency), and (4) status.

Once the nature of an impact has been considered together with the **probability**, likelihood of occurrence or, also called, degree of certainty, then a person will arrive at **Impact Magnitude**, which is a separate and standalone measure of significance.

The other measure of **significance** is Impact Importance. Impact importance is effectively a value judgement placed on the degree of change by affected parties and is determined by combining a criterion called "**Level of Acceptability**" with the probability or likelihood of exceeding a threshold of sorts.

Although the Level of Acceptability is not identified as a criterion in the EIA Regulations, it is alluded to in the definition of "significant impact" as non-compliance with standards, thresholds, or targets, e.g., non-compliance with a threshold is unacceptable, and if highly probable, then it constitutes a significant impact.

In fact, the Level of Acceptability is very likely synonymous with, and achieves the same intent as, "**Consequence**."

A single impact can have multiple consequences, e.g., the consequences of global warming are many, ranging from rising sea levels to earlier flowering seasons. So, consequence is an extension of impact. Some consequences may be significant. Some may be insignificant. It is simply not possible to pick up on any significance if not by considering all the context-specific consequences. Therefore, considering that potential consequences are so many and varied, the only way of ranking a consequence is through its level of acceptability.

The Level of Acceptability criterion measures the degree of change in an environmental resource against (1) quantitative thresholds provided by legal requirements and scientific standards, and which represent that point at which a project's potential environmental effects become significant, and (2) qualitative thresholds of social acceptability informed by *inter alia* the Public Participation Process.

Furthermore, the Level of Acceptability criterion, if considered properly in its formulation, also allows for the findings from undertaking a need and desirability to be brought into the impact and risk assessment process, e.g., the answers to the questions in the Need and Desirability Guideline document should be used to inform the Level of Acceptability for applicable impacts.

Value Judgement

Significance, being an anthropocentric concept, is a value judgement, dependant on the nature of the impact expressed in terms of both biophysical and socio-economic values (**Impact Magnitude**), and its acceptability to affected communities (**Impact Importance**).

Considering value judgements can vary greatly amongst different stakeholders, professional judgement, such as that of the EAP, shall be used in conjunction with the different value judgements expressed by various stakeholders. In other words, significance shall be communicated from a variety of perspectives other than the professional opinion of a multidisciplinary study team, and include environmental, socio-economic, or cultural attributes perceived by society to be significant. Despite the potential variety of perspectives, they can be categorized into three broad forms of recognition for determination of impact significance, namely institutional (laws, plans or policy statements), public and technical (scientific or technical knowledge or judgement of critical resource characteristics) (DEAT 2002). Consequently, thresholds of significance were as far as possible based on / determined by reference to legal requirements, accepted scientific standards or social acceptability (**Table 4**).

Significance is relative and must always be set in a context to show whose values they represent. The selected criterion, "Level of Acceptability," provides such a context, taking all three forms of recognition into account by asking whether impacts are legally, publicly, and professionally recognized as important.

Natural environmental, socio-economic, and cultural heritage impacts were identified systematically by considering how the activities to be undertaken during the development phase will interact with all elements of the receiving environment, as well as inputs received from I&APs and specialists.

Once identified, natural environmental, socio-economic, and cultural heritage impacts were then assessed using the approach outlined below. All impacts, including those identified by I&APs and Specialists, are measured against the current land-use activity (the no-go option / option of not implementing the activity) and assessed by ranking a suite of generic criteria. The criteria, as well as the descriptors that are used to assign specific rankings for each criterion, provide a consistent and systematic basis for the comparison and application of judgements. Consequently, this methodology has been distributed to the specialists to avoid inconsistency between the EAP and specialists when determining impact significance.

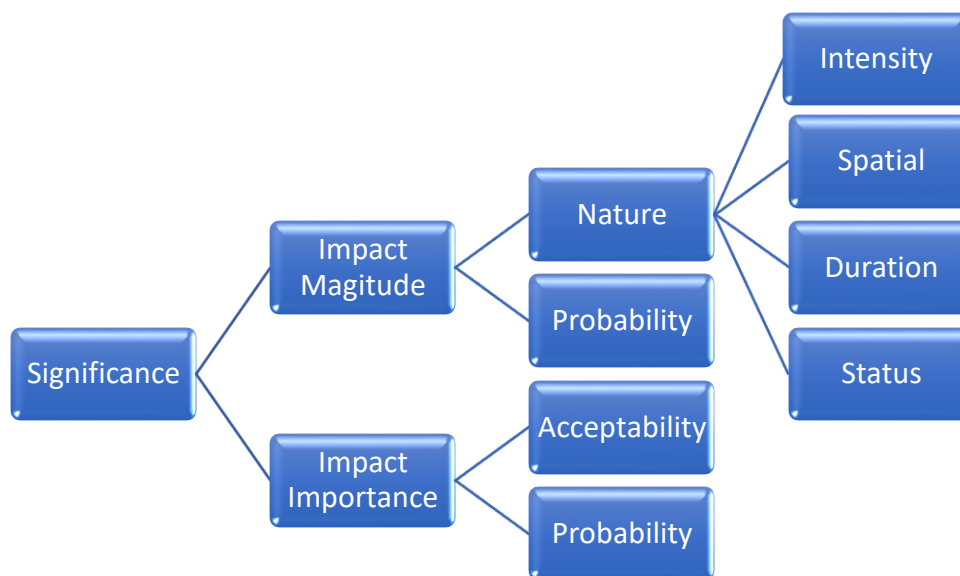
Methodology

The methodology comprises two phases: (1) Phase 1 involves an assessment of significance without mitigation, and (2) Phase 2 involves an assessment with mitigation. If the outcome of a Phase 1 assessment is not significant, then the impact(s) are omitted from further assessment. However, if either Impact Magnitude or Impact Importance are significant, then the highest rank prevails, e.g., if an impact is of low magnitude, but

unacceptable to certain affected parties, then the Impact Importance rank needs to proceed to the Phase 2 assessment. In the case of both Impact Magnitude and Impact Importance being significant, then both ranks shall be simultaneously subjected to a Phase 2 assessment. During Phase 2 either or both Significance ranks (Impact Magnitude and/or Impact Importance) are considered together with the following three criteria to determine whether a phase 1-assessment should be repeated with mitigation or whether the proposed activity needs to be refused or redesigned: Reversibility, Irreplaceable Loss of Resources, and Mitigatory Potential.

Important Note: Non-significant impacts are omitted from further assessment, that is no phase 2-assessment. There is one exception, that is impacts with a positive **Status**. Impacts with a positive status are assessed according to their mitigatory potential to identify further opportunities for enhancing positive effects.

(1) Phase 1-Assessment without mitigation



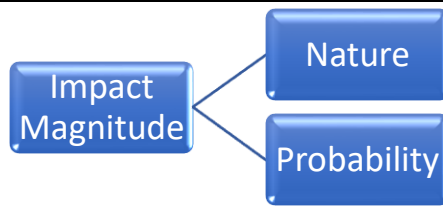
Impact Magnitude and Impact Importance ratings are predicted as described below. However, the outcomes of the phase 1-assessment (rankings) should still be verified within the context of the descriptors described in **Table 5**.

Table 5: Significance Criterion (Impact Magnitude and Impact Importance Rating).

Ranks	Description
High	<ul style="list-style-type: none"> Of a substantial or the highest order possible within the bounds of impacts that could occur. In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural, and economic activities of communities are disrupted to such an extent that these come to a halt.
Medium	<ul style="list-style-type: none"> Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and easily possible. Social, cultural, and economic activities of communities are changed, but can be continued (albeit in a different form). Modification of the project design or alternative action may be required. In the case of beneficial impacts, other means of achieving this benefit are about equal in time, cost and effort.
Low	<ul style="list-style-type: none"> Zero impact or impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. Social, cultural, and economic activities of communities can continue unchanged. In the case of beneficial impacts, alternative means of achieving this benefit are likely to be easier, cheaper, more effective and less time-consuming.

a. Impact Magnitude (Significance)

Impact Magnitude is a composite score that is made up of the following two criteria: (1) Nature (composite score), and (2) Probability, likelihood of occurrence or degree of certainty.



The possible composite scores for Impact Magnitude are:

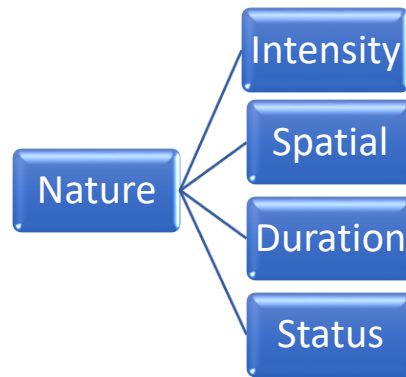
IMPACT MAGNITUDE		Probability		
		High	Medium	Low
Nature	High	±1	±1	±0
	Medium	±1	±1	±0
	Low	±0	±0	±0

Assumption: If the Nature and/or Probability is low, then Impact Magnitude is non-significant.

Significant	±1	Non-significant	±0
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i. **Nature**

Nature is a composite score that is made up of the following four criteria: (1) Intensity or severity, (2) Geographic extent or spatial scale, (3) Duration and frequency, and (4) Status (positive/beneficial, negative/adverse, or neutral).



The possible composite scores for Nature are:

Nature		Intensity		
		High	Medium	Low
Spatial and Duration	High	H	H	H
	Medium	H	M	M
	Low	H	M	L

Assumption: if any one of the criteria are Medium or High, then Nature is significant.

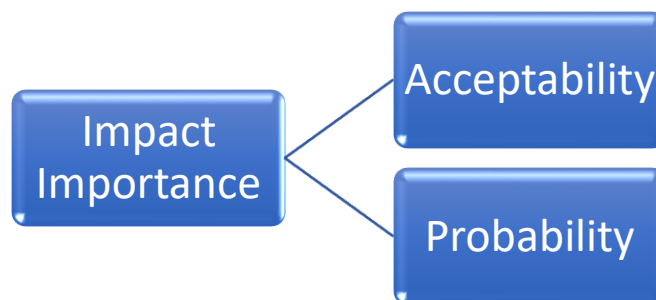
Table 6: Criteria used in evaluating Impact Magnitude (Significance).

Criteria	Ranks and Descriptors		
	Low	Medium	High
Intensity or Severity	<ul style="list-style-type: none"> No disturbance or the disturbance of degraded areas, which have little conservation value. Zero to a minor change in species occurrence or variety. Natural function and processes are not affected, or if affected, then not modified. Social, cultural, and economic activities of 	<ul style="list-style-type: none"> Disturbance of areas that have potential conservation value or are of use as resources. Moderate change in species occurrence and variety. Modified processes will continue. Social, cultural, and economic activities of communities are 	<ul style="list-style-type: none"> Disturbance of pristine areas that have important conservation value. Complete change in species occurrence and variety/Destruction of rare or endangered species. Functioning of processes will cease.

	communities can continue unchanged, or they are changed, but can be continued (albeit in a different form) without stakeholder consultation.	changed, but can be continued (albeit in a different form) with stakeholder consultation.	<ul style="list-style-type: none"> Social, cultural, and economic activities of communities are disrupted to such an extent that these come to a halt. Sensitive environmental receptors with a low capacity (tolerance) to accommodate the change.
Geographical extent or spacial scale (the boundaries at local and regional extents will be different for biophysical and social impacts)	<ul style="list-style-type: none"> Within site boundary. Distribution within a population. Within one property. 	<ul style="list-style-type: none"> Beyond site boundary. Distribution across populations Traverses several properties. Local area. 	<ul style="list-style-type: none"> Widespread. Far beyond site boundary. Distribution across ecosystems Crosses municipal or provincial boundaries. Regional, national international scale.
Duration and frequency (Long term (High), Medium term (Medium), Short term (Low))	<ul style="list-style-type: none"> Immediate, once-off Temporary - quickly reversible. Less than the project lifespan. 0 to 5 years (or for rehabilitation <1yr, restricted to a season). 	<ul style="list-style-type: none"> Delayed, intermittent Temporary - reversible over time. Lifespan of the project. 5 to 15 years (or for rehabilitation >1yr, extending into other season cycles). 	<ul style="list-style-type: none"> Continuous Permanent. Beyond closure or decommissioning. More than 15 years (or for rehabilitation >2yr, extending into multiple season cycles).
Status (-ve (High), neutral (Medium), +ve (Low))	<ul style="list-style-type: none"> Beneficial effects Net gain of resources 	<ul style="list-style-type: none"> Neutral Indifferent No net loss or gain 	<ul style="list-style-type: none"> Adverse effects Costs Net loss of resources
Probability (Definite (High), Probable (Medium), Improbable (Low))	<ul style="list-style-type: none"> The impact will not occur, or it is highly unlikely that the impact will occur. Limited useful information on and understanding of the environmental factors potentially influencing this impact (uncertainty) or a high degree of certainty that it will not occur. Low probability or negligible - less than 1:20 chance of occurrence ($P < 0.05$) of an impact occurring. 	<ul style="list-style-type: none"> There is a chance/risk of the impact occurring. Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact. Moderate probability (5-95%) of a particular fact or the likelihood of an impact occurring. 	<ul style="list-style-type: none"> Impact will occur regardless of prevention measures. Substantial supportive data exist to verify the assessment. Wealth of information on and sound understanding of the environmental factors potentially influencing the impact. Definite or high probability (>95%) of a particular fact or the likelihood of an impact occurring.

b. Impact Importance (Significance)

Impact Importance is a composite score that is made up of the following two criteria: (1) Level of acceptability/consequence, and (2) Probability, likelihood of occurrence or degree of certainty.



The possible composite scores for Impact Importance are:

IMPACT IMPORTANCE		Probability		
		High	Medium	Low
Level of Acceptability	High	±1	±1	±0
	Medium	±1	±1	±0

Assumption: If the Level of Acceptability and/or Probability is low, then Impact Importance is non-significant.

Significant	±1	Non-significant	±0
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Table 7: Probability Criterion used in evaluating Impact Importance.

Ranks	Description
High (H) Definite	<ul style="list-style-type: none"> Wealth of information on and sound understanding of the level of acceptability. High degree of certainty. Definite or high probability (>95%) of a particular fact or the likelihood of a level of acceptability.
Medium (M) Probable	<ul style="list-style-type: none"> Reasonable amount of useful information on and relatively sound understanding of level of acceptability. Moderate degree of certainty or probability (5-95%) of a particular fact or the likelihood of a level of acceptability.
Low (L) Improbable	<ul style="list-style-type: none"> Limited useful information on and understanding of the level of acceptability. Low degree of certainty or probability or negligible - less than 1:20 chance ($P < 0.05$) level of acceptability.

Table 8: Level of Acceptability Criterion used in evaluating Impact Importance.

Ranks	Description
High (Unacceptable)	<p style="text-align: center;"><u>Source of information:</u> Quantitative thresholds (legal requirements, scientific standards, international standards), qualitative thresholds (social acceptability expressed during PPP), Need & Desirability, Specialist Assessments</p> <p><u>Consequence of impact or risk:</u></p> <ul style="list-style-type: none"> Need & Desirability results relating to this impact or risk, and within the context of a specific aspect of the environment, indicate that it is unnecessary and/or undesirable. Environmental quality standards (e.g., GA for S21(f) with wastewater discharge limit values), thresholds (e.g., in listing notices) and targets (e.g., for biodiversity, species and ecological processes that CBAs are required to meet) will be exceeded. Normative thresholds of impacts or resource use that are clearly established by social norms, usually at the local or regional level and often tied to social or economic concerns. Non-compliance <p>ENVIRONMENT</p> <ul style="list-style-type: none"> Extinction of biological species, loss of genetic diversity, rare or endangered species, critical (CR, EN) habitat. Critically Endangered Species <ul style="list-style-type: none"> lead to a long-term decrease in the size of a population, reduce the area of occupancy of the species, fragment an existing population into two or more populations, adversely affect habitat critical to the survival of a species, or disrupt the breeding cycle of a population. Critically Endangered Ecological Communities <ul style="list-style-type: none"> lead to a long-term adverse effect on an ecological community, reduce the extent of a community, fragment an occurrence of the community, or adversely affect habitat critical to the survival of an ecological community. Listed Migratory Species <ul style="list-style-type: none"> substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat of the migratory species, result in invasive species that is harmful to the migratory species becoming established in an area of important habitat of the migratory species, or seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population. Disruption of food webs. Discharges or release of persistent and/or toxic chemicals, microbiological agents, nutrients (nitrogen, phosphorous), radiation or thermal energy (e.g., cooling wastewater). <p>SOCIO-ECONOMIC</p> <ul style="list-style-type: none"> Appropriate and justifiable social and economic outcomes, including meeting basic needs and equity, cannot be achieved, and will be exacerbated, e.g., increase in unemployment or shrinkage in the economy. Social outrage and/or widespread condemnation expressed during PPP. Negative effects on human health, well-being or quality of life, e.g., reduction of the quality or quantity of recreational opportunities or amenities or detrimental change in the current use of lands and resources for traditional purposes by aboriginal persons.

	<ul style="list-style-type: none"> Negative effects on cultural, heritage (incl. architectural), archaeological, or palaeontological resources. <p><u>Required action:</u></p> <ul style="list-style-type: none"> Abandon project in part or in its entirety. Redesign project to remove or avoid impact or risk.
<p style="text-align: center;">Medium (Manageable)</p>	<p><u>Consequence of impact or risk:</u></p> <ul style="list-style-type: none"> Need & Desirability results relating to this impact or risk, and within the context of a specific aspect of the environment, indicate that it is unnecessary or undesirable, but is manageable to the extent that it is neutral. Conflict with policies or land-use plans. Environmental quality standards (e.g., GA for S21(f) with wastewater limit values), thresholds (e.g., in listing notices) and targets (e.g., biodiversity, species and ecological processes that CBAs are required to meet) may be exceeded. Controversial thresholds of impacts or resource use that are highly controversial, or which are sources of conflict between various individuals, groups or organizations. <p>ENVIRONMENT</p> <ul style="list-style-type: none"> Threat of extinction of biological species, loss of genetic diversity, rare or endangered species, critical habitat. Threat of disruption of food webs. Some loss of threatened (VU) habitat. Loss of populations of or damage to commercial biological species. Spread of biological disease, pests, feral animals or weeds can be avoided with mitigation. Threat of discharges or release of persistent and/or toxic chemicals, microbiological agents, nutrients (nitrogen, phosphorous), radiation or thermal energy (e.g., cooling wastewater). <p>SOCIO-ECONOMIC</p> <ul style="list-style-type: none"> Appropriate and justifiable social and economic outcomes, including meeting basic needs and equity, may be achieved. Legitimate concerns expressed by individuals or groups during the PPP are manageable to the satisfaction of those concerned. Increases level of risk on human health, well-being or quality of life, e.g., potential reduction of the quality or quantity of recreational opportunities or amenities, or for detrimental change in the current use of lands and resources for traditional purposes by aboriginal persons. Threat of negative effects on cultural, heritage (incl. architectural), archaeological, or palaeontological resources. <p><u>Required action:</u></p> <ul style="list-style-type: none"> Implement regulatory and/or management controls (with the project proponent's commitments). Adequate compensation must be given to affected communities.
<p style="text-align: center;">Low (Acceptable)</p>	<p><u>Consequence of impact or risk:</u></p> <ul style="list-style-type: none"> Need & Desirability results relating to this impact or risk, and within the context of a specific aspect of the environment, indicate that it is needed and desirable, or neutral. Environmental quality standards (e.g., GA for S21(f) with wastewater discharge limit values), thresholds (e.g., in listing notices) and targets (e.g., biodiversity, species and ecological processes that CBAs are required to meet) will not be exceeded. Preference thresholds of impacts or resource use that are preferences for individuals, groups, or organizations only, as distinct from society at large. Compliance <p>ENVIRONMENT</p> <ul style="list-style-type: none"> No extinction of biological species, loss of genetic diversity, rare or endangered species, critical habitat. No disruption of food webs. Some loss of populations and habitats of non-threatened species. Modification of landscape without downgrading special aesthetic values. Emissions demonstrably less than the carrying capacity of the receiving environment. Zero discharges or release of persistent and/or toxic chemicals, microbiological agents, nutrients (nitrogen, phosphorous), radiation or thermal energy (e.g., cooling wastewater). <p>SCIO-ECONOMIC</p> <ul style="list-style-type: none"> Appropriate and justifiable social and economic outcomes, including meeting basic needs and equity, will be achieved or at least remain unaffected. Project is welcomed by I&APs, or they are indifferent.

	<ul style="list-style-type: none"> • Zero risk or positive effects on human health, well-being, or quality of life, e.g., improvement of the quality or increase in the quantity of recreational opportunities or amenities. • Zero or positive effects on cultural, heritage (incl. architectural), archaeological, or palaeontological resources. • Positive, beneficial, or neutral, that is no risk of harm to the biophysical, economical, or social (incl. cultural heritage and public health) environments. <p><u>Required action:</u></p> <ul style="list-style-type: none"> • Enhance beneficial impacts or risks.
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(1) Phase 2-Assessment with mitigation

Once an impact has been identified, predicted, and evaluated to determine significance, the EIA Regulations, 2014 as amended, further require one to determine the degree to which these impacts (1) can be reversed, (2) may cause irreplaceable loss of resources, and (3) can be avoided, managed, or mitigated.

The fact these requirements are written as a separate provision in the EIA Regulations implies that they are not considered as part of the evaluation of significance but are rather to be considered afterwards.

Furthermore, the fact that the EIA Regulations require “the degree” to be determined also implies that rankings must be assigned to each of these considerations.

Reversibility, irreplaceability and mitigatory potential, when considered together with the outcome of the outcome of the Phase 1 assessment, will decide on whether the activity responsible for an impact should be refused or can be entertained further by re-assessing the impact with mitigation to confirm whether the activity may proceed.

So, during Phase 2 either or both Significance ranks (Impact Magnitude and/or Impact Importance) are considered together with the following three criteria; Reversibility (Table 5), Irreplaceable Loss of Resources (Table 6), and Mitigatory Potential (Table 7), to determine whether (1) a phase 1-assessment should be repeated with mitigation, or (2) the proposed activity needs to be refused or redesigned.

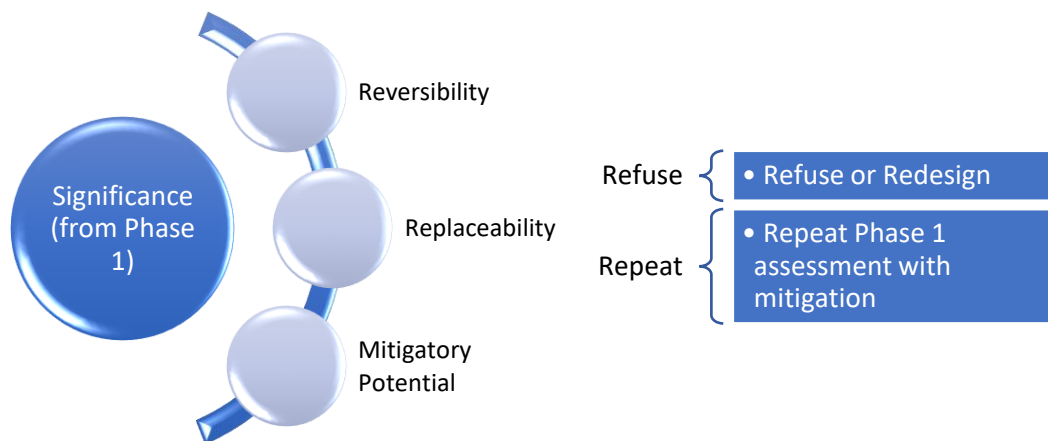


Table 9: Reversibility Criteria.

Ranks	Description
No to low degree	<ul style="list-style-type: none"> • If functional thresholds established for resource use are exceeded, the impacts will disrupt the functioning of an ecosystem sufficiently to destroy resources important to the nation or biosphere irreversibly and/or irretrievably. • Impacts are irreversible and/or the costs of human intervention are unaffordable.
Moderate degree	<ul style="list-style-type: none"> • Impacts are reversible with moderate to high (but affordable) human intervention.
High degree	<ul style="list-style-type: none"> • Impacts are naturally reversible, e.g., do not require any or only little human intervention.

Table 10: Irreplaceability Criteria.

Ranks	Description
Low degree to irreplaceable	<ul style="list-style-type: none"> If functional thresholds established for resource use are exceeded, the impacts will disrupt the functioning of an ecosystem sufficiently to destroy resources important to the nation or biosphere irreversibly and/or irretrievably.
Moderately replaceable	<ul style="list-style-type: none"> Large scale loss of productive capacity of renewable resources. Moderate scale loss of productive capacity of non-renewable resources.
High degree of replaceability	<ul style="list-style-type: none"> Low to moderate loss of productive capacity of renewable resources. Low scale loss of productive capacity of non-renewable resources.

Table 7: Mitigatory Potential (for negative and positive impacts or risks) Criteria.

Ranks	Description
Low	<ul style="list-style-type: none"> Little or no mechanism for mitigation and/or achieving the objectives. No possible mitigation that could offset the impact or mitigation is difficult, expensive, time-consuming or some combination of these.
Moderate	<ul style="list-style-type: none"> Moderate potential (few mechanisms) to mitigate negative impacts, but there remains a risk of the objectives not being met and/or the implementation of mitigation measures may still not prevent some negative effects. Mitigation is both feasible and possible.
High	<ul style="list-style-type: none"> High potential to mitigate negative impacts to the level of insignificant effects and achieve objectives. Mitigation is either easily achieved or little will be required, or both.

Important Note: provide mitigation objectives that would result in a measurable reduction in the impact or risk (using expertise and/or experience). Mitigations must be realistic, that is reasonable and feasible. Quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation action should be provided where appropriate.

Residual Risk

Finally, the level of residual risk after mitigation is determined.

If adequate mitigations are applied, then the residual risk should be at a level of acceptable risk, meaning either the consequences of the impact will be below the quantitative or qualitative thresholds prescribed by legal, scientific, or social acceptability or the magnitude will be low.

If the mitigated risk is not at a level of acceptable risk, then the mitigations are lacking, or if all reasonable mitigations have been exhausted, then the activity responsible for the impact must be refused.

Residual risk also includes the consideration of other factors that could prevent the desired outcomes of the proposed management measures and mitigations.

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the construction phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Proposal

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
PLANNING & DESIGN PHASE				
Any unauthorised activity within the Department's (DWS) regulated area of a watercourse constitutes an offence. Those activities associated with the development which require a S21(c) and (i) authorisation, include: Development of a solar PV project within 500m of a wetland. Any unauthorised activity within the Department's (DWS)	Significant	Construction may not commence without a water use authorisation either General Authorisation (assessed low-risk activities) or a water use license (for assessed medium or high-risk activities) for Section 21(c) and (i) water uses.	Non-significant	Unsuccessful or late issuance of a WUA.

regulated area of a watercourse constitutes an offence.				
Construction of the solar PV facility including potential high-level floodlighting represent a potential obstacle to aviation. All new Solar applications must be lodged to obstacles@atns.co.za.	Significant	(1) Lodge an Obstacle Application for assessment with ATNS to obstacles@atns.co.za at least 120 days before the commencement of construction, preferably during the Planning and design phase once the engineers have determined the specifications of the structures (e.g., dimensions, co-ordinates, etc.) and completed the final layout plan. Refer queries to Yanga Nofuma, Obstacle Administrator COO - Air Traffic Services, Bruma, T: 011 607 1474 • F: 086 695 2610 • E: obstacles@atns.co.za • W: www.atns.com. (2) The client will have to liaise with SACAA to finalise the "As build" and for any queries with the lighting. (3) Obtain a Specialist Civil Aviation Compliance Statement in support of the application.	Non-significant	Issuance of permits may require additional structural interventions in order to comply with obstacle regulations.
Consent/communication must be obtained from telecommunications providers in the area - from electronic communications network service licensees (e.g. Vodacom, Sentech, MTN, Cell C etc.) ito of Section 29 of the Electronic Communications (Act 36 of 2005)	Significant	Ensure all network service providers are registered as default I&APs and included in the distribution of all reports to ensure they can raise any potential conflicts with existing infrastructure and ensure conformance to any requirements they may impose to negate any damage to their structures or network.	Non-significant	Interaction with the various network service providers does not reach the relevant person/s within the organisation who can make an informed decision on the impact of the proposed development to their infrastructure and network.
Permission: Registration of renewable energy generation with NERSA.	Significant	Generation of electricity by way of renewable energy between 1MW & 100MW requires registration with NERSA.	Non-significant	Unsuccessful registration with NERSA or getting a late response.
PRE-CONSTRUCTION PHASE				
49A (1) A person is guilty of an offence if that person - (c) fails to comply with or contravenes a condition of an environmental authorisation granted for a listed activity or specified activity or an approved environmental management programme	Significant	Appoint a suitably qualified SEO & independent ECO prior to commencement of the project.	Non-significant	Failure to comply with or contravenes a condition of an environmental authorisation granted for a listed activity or specified activity or an approved environmental management programme.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) – Section 73(2) "A person who is the owner of land on which a listed invasive species occurs must- (a) notify any relevant competent authority, in writing, of the listed invasive species occurring on that land; (b) take steps to control and eradicate the listed invasive species and to prevent it from spreading; and (c) take all the required steps to prevent	Significant	(1) The landowner must notify the Minister (DFFE) and/or MEC (LEDET), in writing, of the listed invasive species occurring in the project area.	Non-significant	NA

or minimise harm to biodiversity.”				
Soil Compaction	Significant	<ul style="list-style-type: none"> • Make use of existing roads or upgrades tracks before new roads are constructed. • The number and width of internal access routes must be kept to a minimum 	Significant	NA
Water sources pollution	Significant	<ul style="list-style-type: none"> • Implement a dust monitoring programme for construction sites. • Dust Monitoring Units are recommended to be installed. 	Non-significant	NA
Sedimentation of water resources	Significant	<ul style="list-style-type: none"> • It is preferable that construction takes place during the dry season to reduce the erosion potential of the exposed surfaces. • Any exposed earth must be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil. 	Non-significant	NA
Pollution due to accidental releases of contaminated liquids and improper waste disposal.	Significant	<ol style="list-style-type: none"> 1. Any litter, spills, fuels, chemical and human waste in and around the project area must be removed and disposed of timeously and responsibly (Terrestrial Biodiversity compliance statement). 2. Develop and implement an integrated waste management plan that (a) adopts the cadle-to-grave approach extending from waste prevention and minimization to generation, storage, collection, transportation, treatment, and final disposal of waste, (b) incorporates all aspects of the waste management hierarchy, and (c) is aligned with the Waste Classification and Management Regulations (GN No. 634 of 23rd August 2013). 3. All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials must be supported (Wetland Baseline and Risk Assessment) 	Non-significant	Hydrocarbon spills into the surrounding environment
Lack on environmental and OHS awareness	Significant	<ol style="list-style-type: none"> 1. Appoint a suitably qualified HSO to implement OHSA (Act 85 of 1993). 2. Any litter, spills, fuels, chemical and human waste in and around the project area must be removed and disposed of timeously and responsibly. 3. All contractors and employees must undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and 	Non-significant	NA

		general good "housekeeping".		
A 6.6kV distribution line will be constructed between an existing substation and the solar farm, this will require a consent or an approval from the municipality. Construction without permission will constitute an offence in terms of the relevant legislation.	Non-significant	<ul style="list-style-type: none"> According to the City of Ekurhuleni Policy Guideline for Small Scale Embedded Generation, the EAP has to apply to Eskom for consent to connect SSEG to the Eskom electrical grid. 	Non-significant	NA
Damage or Destruction of Fossil Heritage features	Significant	<ol style="list-style-type: none"> A written assessment of the work done, fossils excavated, not removed or collected and observed. Conclusion reached regarding the fossil material. A detailed site plan. Possible declaration as a heritage site or Site Management Plan. 	Non-significant	NA
Conditions of EA and EMP are not enforced or penalised through employment contracts	Significant	Contractor should include in labour employment contracts a penalty system regarding incidences of non-compliance with the EA and EMPr	Non-significant	NA
Vulnerable group's susceptible to negative influences in society such as prostitution, relationships with minors, alcohol and drug abuse, gambling and fighting due to the presence of people from outside the area.	Significant	<ol style="list-style-type: none"> Any person that does any work on site must sign the Code of Conduct and presented with a copy. The Code of Conduct must include the following aspects: <ul style="list-style-type: none"> Respect for local residents, their customs and property. No un-authorized taking of products. Zero tolerance of illegal activities by construction personnel including: prostitution; illegal sale or purchase of alcohol; sale, purchase or consumption of drugs; illegal gambling or fighting. Description of disciplinary measures for violation of the Code of Conduct and company rules. If workers are found to be in contravention of the Code of Conduct, which they will be required to sign at the the beginning of their contract, they will face disciplinary procedures that could result in dismissal. Stock theft should be noted as a dismissible offence. 	Non-significant	NA
Lack of environmental awareness	Non-significant	<ol style="list-style-type: none"> All contractors, sub-contractors and their workers shall participate in an Environmental Awareness Training before being allowed to enter site. The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course Refresher environmental awareness training is available as and when required. All staff are aware of 	Non-significant	NA

		<p>the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr;</p> <p>(5) Environmental awareness training must include as a minimum the following:</p> <p>a) Description of significant environmental impacts, actual or potential, related to their work activities;</p> <p>b) Mitigation measures to be implemented when carrying out specific activities;</p> <p>c) Emergency preparedness and response procedures;</p> <p>d) Procedures to be followed when working near or within sensitive areas;</p> <p>e) Wastewater management procedures;</p> <p>f) Water usage and conservation;</p> <p>g) Solid waste management procedures;</p> <p>h) Sanitation procedures;</p> <p>i) Fire prevention; and</p> <p>j) Disease prevention.</p> <p>(6) A record of all environmental awareness training courses undertaken as part of the EMPr must be available.</p> <p>(7) A staff attendance register of all staff to have received environmental awareness training must be available.</p> <p>(8) Course material must be available and presented in appropriate languages that all staff can understand.</p> <p>(9) Develop an induction programme that includes a Code of Conduct for all workers (including sub-contractors). The induction programme must include HIV/AIDS awareness, substance abuse programmes and education about alcohol abuse and gender-based violence.</p>		
An EMPr designed to manage different aspects or attributes of the environment may be difficult for a contractor to implement.	Non-significant	(1) The contractor should develop method statement for each "management category" by incorporating the applicable management actions identified in this EMPr to mitigate various aspects of the receiving environment, prior to the commencement of construction.	Non-significant	NA
<p>(1) Vehicles in poor condition are more prone to breakdowns and/or leaks (Risk).</p> <p>(2) Spills from vehicles undergoing maintenance can contaminate the topsoil.</p>	Significant	1. An emergency protocol must be developed that deals with accidents and spills. This must include methods for absorbing chemical spills, as well as the transport and on-site bioremediation or disposal of all contaminated	Non-significant	Hydrocarbon spills into the surrounding environment

		material at a licensed hazardous waste site. 2. All machinery and equipment must be inspected regularly for faults and possible leaks, these should be serviced off-site(Wetland Baseline and Risk Assessment).		
Transformation of ecosystems and construction camp creep	Significant	(1) A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location of key infrastructure and services (where applicable), including but not limited to offices, overnight vehicle parking areas, stores, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas, cooking and ablution facilities, waste and wastewater management (DEA Generic EMPr)	Non-significant	NA
Surface water run-off laden with sediment from the construction camp area/hydrocarbon spills can enter the watercourse, increasing turbidity	Non-significant	Designate and contain potential sources of pollution, e.g., concrete batching area, within the construction camp by deflecting surface water runoff on the up-and down-slope side using, for example, sandbags.	Non-significant	Hydrocarbon spills into the surrounding environment
Direct loss of terrestrial plants from construction camp footprint.	Non-significant	<ul style="list-style-type: none"> •Structure placement must be (preferably) located in already disturbed areas. • Vegetate or cover all stockpiles after stripping/removing soils. 	Non-significant	NA
Loss of land capability	Significant	Vegetate or cover all stockpiles after stripping/removing soils.	Non-significant	NA
Loss of land capability	Non-significant	1. A stormwater management plan must be implemented for the development. The plan must provide input into the road network and management measures.	Non-significant	NA
Impact to biodiversity (The direct and indirect loss and disturbance of floral and fauna species and communities). Loss of Irreplaceable Resources	Non-significant	<ol style="list-style-type: none"> 1. It is recommended that areas to be developed be specifically demarcated so that during the construction/activity phase, only the demarcated areas be impacted upon. 2. The construction camp, including planned operational area, shall not exceed 2 ha in size. 	Non-significant	NA
The loss and fragmentation of vegetation communities	Non-significant	1. It is recommended that areas to be developed be specifically demarcated so that during the construction/activity phase, only the demarcated areas be impacted upon.	Non-significant	NA
Disturbance of terrestrial habitat	Significant	1. On site management of noise with buffers and other disturbance such as lighting at night.	Non-significant	NA

		2. Noise must be kept to a minimum during the evenings/ at night to minimize all possible disturbances to nocturnal mammals.		
Animals may enter the construction camp and have access to waste, hazardous substances, equipment, etc.	Significant	1. Erect and maintain a barrier (e.g., shade cloth fence) around the perimeter of the construction camp.	Non-significant	NA
Increased potential for criminal activity, including stock theft, property theft, emotional and/or physical harm to victims, etc.	Non-significant	1. Security during construction will be mitigated by erecting the fence at the onset of construction to prevent any movement out of the development footprint.	Non-significant	NA
Artificial lighting threatens biodiversity by disrupting the night behaviour of organisms affecting survivorship and or reproduction, e.g., by attracting insects and their predators from frogs to bats.	Significant	(1) Any outside lighting should be minimised, positioned at or below roof height and directed away from highly sensitive areas, e.g., downwards. (2) Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible. (3) Adopt LEDs and smart control technologies (such as motion sensors and timers) to control and manage the effects of artificial light on wildlife and 'sense of place'. (4) Incorporate the following best practice lighting design principles into the design of lighting: (a) Start with natural darkness and only add light for specific purposes, (b) Use adaptive light controls to manage light timing, intensity and colour, (c) Light only the object or area intended – keep lights close to the ground/mounting fixtures as low as possible, directed and shielded to avoid light spill, (d) Use the lowest intensity lighting appropriate for the task, (e) Use non-reflective, dark-coloured surfaces, and (f) Use lights with reduced or filtered blue, violet and ultra-violet wavelengths/Use lights with longer wavelengths, e.g., a white 2 700 K LED light (as opposed to a 5 000 K LED light) (National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds, Commonwealth of Australia 2020)	Non-significant	NA
Energy wastage	Significant	1. If colour discrimination is not important, choose energy- efficient fixtures utilising yellowish high-pressure sodium (HPS) bulbs. If “white” light is needed, fixtures using LEDs, compact fluorescent or metal-halide (MH) bulbs are more energy-efficient than those using incandescent,	Non-significant	NA

		halogen, or mercury-vapour bulbs. 2. When purchasing energy efficient alternatives to traditional energy consumptive lighting, remember that they use less watts to produce the same amount of light (measured in lumens). So, never replace incandescent bulbs with alternatives that use the same or more watts.		
Leaks or spills from the hazardous substance store can contaminate the topsoil.	Significant	(1) Any bunded areas must have capacities displayed on the bund wall. (2) The bund must have a draining valve and a sump at the lowest point of the bund area; the draining valve must be closed and locked at all times. (3) Where practical/necessary the bund wall must have protective barriers to prevent mobile equipment and vehicles from colliding with the walls and damaging it. (4) The bund wall must be effectively sealed and capable of storing 110% of the volume of the container.	Non-significant	NA
The physical footprint of certain construction activities will result in a loss of local terrestrial habitat.	Significant	1. Laydown areas are restricted to the construction camp and/or staging area. 2. All laydown, chemical toilets etc. should be restricted to 'Very Low' sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded (Terrestrial Biodiversity Compliance Statement).	Non-significant	NA
The physical footprint of certain construction activities will result in a loss of local terrestrial habitat.	Significant	(1) Overnight parking areas are restricted to the construction camp and/or staging area.	Non-significant	NA
(1) Vehicles in poor condition are more prone to breakdowns and/or leaks (Risk). (2) Spills from vehicles undergoing maintenance can contaminate the topsoil.	Significant	1. If a maintenance/service/repair facility for construction plant (vehicles, machines, or equipment) is required, then it will be in the construction camp. The maintenance/service/repair bay shall be bunded, roofed to prevent ingress of rain, include a stormwater diversion system to prevent the ingress of surface water run-off (e.g., a 'speed bump' at the entrance to the bunded service bay), and designed with an oil-water separator to remove hydrocarbons (oil, grease, fuel, hydraulic fluid, etc.).	Non-significant	NA
Non-compliance with dangerous goods requirements	Significant	1. Any combined fuel storage capacity must remain below 80 cubic meters.	Non-significant	NA

Hydrocarbon spills into the surrounding environment can contaminate the soil	Significant	1. A spill response kit must be available at all times. The incident must be reported on and if necessary, a biodiversity specialist must investigate the extent of the impact and provide rehabilitation recommendations	Non-significant	NA
Sedimentation of the water resource Water quality impairment	Non-significant	1. The wetlands and buffer areas must be avoided. 2. The contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly. 3. All chemicals and toxicants to be used for the construction must be stored within the construction site and in a bunded area. 4. All machinery and equipment must be inspected regularly for faults and possible leaks, these should be serviced off-site. 5. Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems.	Non-significant	Hydrocarbon spills into the surrounding environment
Unsafe disposal - soil contamination and water pollution.	Significant	• Any person who stores or disposes of domestic wastewater are subject to (must comply with) the limits and conditions set out in the General Authorisation for Section 21(g) Disposing of waste in a manner which may detrimentally impact on a water resource published in GN No. 665 of Government Gazette No. 36820 on 06th September 2013 or alternatively, the conditions contained in the water use license.	Non-significant	NA
Increased potential for criminal activity, including stock theft, property theft, emotional and/or physical harm to victims, etc.	Significant	No accommodation shall be provided for contractors, sub-contractors and their workers at the construction camp or on the construction site.	Non-significant	Security personnel may require permanent quarters to facilitate 24-hour security.
Soil Compaction	Significant	The construction vehicles and machinery must make use of existing access routes as much as possible, before adjacent areas are considered for access.	Non-significant	Appointed sub-contractors do not implement and comply with the provisions of the EMPr
Damage to the environment due to unplanned movement of vehicles.	Significant	1. All contractors must be made aware of all these access routes. 2. Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the development of new roads; 3. Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands. 4. Access roads must only	Non-significant	Nature of construction cannot be completed with limited access roads

		be developed on a pre-planned and approved roads.		
Concrete slurry from the batching plant can contaminate surface water flows.	Significant	Designate and contain a concrete batching plant within the construction camp by deflecting surface water runoff on the up-and down-slope side using, for example, sandbags.	Non-significant	Washing of concrete mixing tools and/or ready-mix trucks may defeat the mitigations applied
CONSTRUCTION PHASE				
Disturbance during construction can cause active mammals and birds to temporarily evade or emigrate from the area.	Non-significant	(1) Keep noise levels as low as practically possible when working, e.g. no unnecessary shouting, loud music or revving of engines.	Non-significant	NA
Use of land/surrounding areas for ablutions could result in microbiological pollutants to soil.	Non-significant	Washing and going to the toilet in the wilderness is strictly forbidden.	Non-significant	NA
Increase in sedimentation/dust covering flora species.	Significant	1. Vehicles transporting dispersive materials shall be covered. 2. Offloading of dispersive materials should be avoided during windy conditions.	Non-significant	NA
Disturbance during construction can cause active mammals and birds to temporarily evade or emigrate from the area.	Non-significant	1. Drivers must adhere to the speed limit (30 or 40 km/hr).	Non-significant	NA
Loss of sedentary or active fauna and aves when driving.	Non-significant	1. Drivers must adhere to the speed limit (30 or 40 km/hr) and slow down when approaching animals. This is to be included in the induction. 2. Drivers must be vigilant and on the lookout for animals.	Non-significant	NA
1. The direct and indirect loss and disturbance of floral and fauna species and communities. 2. Loss of Irreplaceable Resources	Non-significant	1. It is recommended that areas to be developed be specifically demarcated so that during the construction/activity phase, only the demarcated areas be impacted upon.	Non-significant	NA
<ul style="list-style-type: none"> • Alteration of subsurface flow dynamics • Indirect loss of wetland areas • Sedimentation of water resources 	Non-significant	<ul style="list-style-type: none"> • A stormwater management plan must be compiled and implemented for the project, facilitating the diversion of clean water to the delineated resources. • It is preferable that construction takes place during the dry season to reduce the erosion potential of the exposed surfaces. • The wetlands and buffer areas must be avoided 	Non-significant	NA
Disturbance during construction at both sites can cause active mammals to temporarily emigrate from the area.	Non-significant	Construction plant, machinery and equipment must be regularly serviced and well maintained to reduce noise levels.	Non-significant	NA
Soil pollution/contamination	Non-significant	1. The contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly. 2. All chemicals and toxicants to be used for the construction must be stored within the construction site and in a bunded area. 3. All machinery and	Non-significant	Hydrocarbon spills into the surrounding environment

		<p>equipment must be inspected regularly for faults and possible leaks, these should be serviced off-site.</p> <p>4. All contractors and employees must undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".</p> <p>5. Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems.</p>		
Poorly maintained vehicles can result in hydrocarbon and other pollution. Hydrocarbon spills, during construction in the watercourse may temporarily reduce the quality of the water.	Significant	<p>1. Any construction plant, machinery, and equipment which leaks shall not be permitted on site. Undertake visual inspections for any leakages that may emanate from any vehicle accessing the site - all vehicles must be in good working order when entering the site .</p> <p>2. All vehicles must be parked with drip trays in designated areas outside ecological buffer areas and if over night, then preferably in the .</p> <p>3. Enough drip trays must be available for all construction plant.</p> <p>4. Provide accidental spill response equipment at the construction camp.</p> <p>5. In event of a spill, immediately remove the contaminated soil to the depth of penetration and temporarily store in a sealed container within the designated waste storage area for on-site bioremediation or disposal at a licensed hazardous waste landfill.</p>	Non-significant	Hydrocarbon spills into the surrounding environment
Parking of vehicles will compact the ground:	Significant	<p>(1) Identify and avoid no-go areas or areas sensitive to compaction on the site plan</p> <p>(2) All activities remain strictly within demarcated routes and areas.</p> <p>(3) Once the intervention has been completed, break the crust on bare compacted areas to enhance vegetation establishment.</p>	Non-significant	NA
(1) Vehicles in poor condition are more prone to breakdowns and/or leaks (Risk). (2) Spills from vehicles undergoing maintenance can contaminate the topsoil.	Non-significant	(1) Any construction plant, machinery, and equipment which leaks shall not be permitted on site. Undertake visual inspections for any leakages that may emanate from any vehicle accessing the site - all vehicles must be in good working order when entering the site.	Non-significant	Hydrocarbon spills into the surrounding environment

		<p>(2) Have fuel/oil spill clean-up kits on site.</p> <p>(3) Any planned maintenance or servicing of construction plant, machinery and equipment is not permitted on site, including the construction camp.</p> <p>(4) Any emergency repairs on site shall be undertaken with drip trays.</p>		
Risk of non-compliance	Non-significant	<p>(1) Waste shall be managed in accordance with the integrated waste management plan.</p> <p>(2) The contractor(s) must determine whether he/she needs to register a waste management activity on the South African Waste Information System (SAWIS) using the South African Waste Information Centre's website, e.g., generators of hazardous waste in excess of 20kg per day must register.</p> <p>(2) The waste generator must keep accurate and up to date records of the management of the waste they generate including records that reflect:</p> <ul style="list-style-type: none"> • The classification of the wastes (General waste, including domestic, business, building and demolition waste not containing hazardous waste/chemicals is listed in Annexure 1 of the Waste Classification and Management Regulations, 2013 and therefore do not require formal classification and assessment in terms of the same Regulations); • The quantity of each waste generated, expressed in tons or cubic metres per month; • The quantities of each waste that has either been reused, recycled, recovered, treated, or disposed of; and • By whom the waste was managed. 	Non-significant	NA
Spillage could result in microbiological pollutants to soil. - loss of microorganisms in the soil and groundwater(direct)	Non-significant	<p>1. Chemical toilets or E-Loos (1 toilet for 20 or less staff) shall be provided in the construction camp.</p> <p>2. Chemical toilets are to be contained.</p> <p>3. Chemical toilets or E-Loos shall be regularly emptied by the appointed service provider for appropriate disposal.</p> <p>4. Oil-water separators must be inspected regularly and emptied into containers designated for the temporary storage of hazardous waste, unless the clean water from the oil-water separator at the wash bay can be re-used for washing plant.</p>	Non-significant	NA
Unsafe disposal, leaking /overflowing chemical toilets can contaminate	Non-significant	<p>(1) Portable chemical toilets shall be in good working order and the</p>	Non-significant	NA

soil and surface water causing soil and water pollution.		<p>holding tank shall be contained within a drip tray or other impermeable containment structure.</p> <p>(2) The sewerage shall be removed regularly (dependant on usage) from the holding tank of portable chemical toilet and conveyed to a municipal treatment or disposal facility.</p> <p>(3) The appointed service provider shall dispose of the domestic wastewater at a licensed municipal Wastewater Treatment Works (WWTW) that has the capacity to receive it, and provide evidence of safe disposal, e.g., retain a copy of the waste manifest document completed by the manager of waste, confirming that the hazardous waste load was accepted and managed.</p>		
Overuse of chemical toilets can be unhygienic.	Non-significant	(1) Sufficient chemical toilets (1 toilet for 20 or less staff) shall be provided for staff at the different work fronts.	Non-significant	NA
Hydrocarbon spills can contaminate topsoil.	Non-significant	<p>1. Soil contaminated with hydrocarbons should as far as is possible be treated on site by bioremediation so that it can be reused for rehabilitation.</p> <p>2. The storage and bioremediation of contaminated soil should take place in intact, impervious, not corroded receptacles within the designated waste storage area of the construction camp at least 100 m away from the outer edge of the ecological buffer.</p> <p>3. The temporary storage of contaminated/treated soil for re-use (or rehabilitation) must comply with the limits and conditions of the GA for S21(g) in GN 665 of 06 September 2013, particularly those provisions relating to the location of the waste storage receptacle and incidence reporting.</p>	Non-significant	Hydrocarbon spills into the surrounding environment
Waste, such as oncrete slurry, can contaminate surface water run-off.	Non-significant	<p>(1) Temporarily stored waste shall be re-used, recycled, and/or disposed of within a period not exceeding 90 days.</p> <p>(2) Paper and stationary waste (from the offices) should be separated for re-use, recycling, and/or collected for disposal at the Ekurhuleni licensed landfill site.</p> <p>(3) Ink cartridges (from the offices) should be transferred to or collected by the supplier for recycling.</p> <p>(4) Organic food waste (from the staff welfare area) should be collected</p>	Non-significant	NA

		<p>for disposal at the Ekurhuleni licensed landfill site.</p> <p>(5) Food/drink packaging (from the staff welfare area) should be separated for re-use, recycling, and/or collected for disposal at the De Aar licensed landfill site.</p> <p>(6) Packaging (Cardboard, plastic, wood, cement bags, etc.) should be collected for re-use and/or recycling. Packaging may not be 'donated' for reuse in the townships as its addition to houses is illegal and creates a fire hazard.</p> <p>(7) Solid concrete rubble will be re-used as fill material and/or disposed at the Ekurhuleni licensed landfill site.</p>		
Reuse of certain containers may be harmful to people.	Significant	Reusable containers which held a Hazardous Chemical Substance (HCS) may not be donated to any person for reuse, and preferably returned to the supplier to be cleaned and decontaminated, otherwise if that is not possible then punctured and disposed of at a licensed hazardous waste disposal facility.	Non-significant	NA
Risk of non-compliance	Non-significant	<p>(1) Separate waste into recyclable (glass, metals, paper, plastic) and non-recyclable waste.</p> <p>(2) Waste must not be mixed where this would reduce its potential for reuse, recycling, or recovery.</p> <p>(3) Any container or storage impoundment holding waste must be labelled. If labelling is not possible, then records must be kept.</p> <p>(4) Labels and records need to reflect:</p> <ul style="list-style-type: none"> • The date on which the waste was first placed into the container; • The date on which the last bit of waste was placed into the container before it was filled, closed, sealed or covered; • The dates when, and quantities of, waste added, and waste removed from containers or storage impoundments (if relevant); • The specific category or categories of waste in the container or storage impoundment as identified in terms of the National Waste Information Regulations (2012); and • The classification of the waste once it has been completed. 	Non-significant	NA
Loss of fauna if inorganic waste is ingested.	Non-significant	(1) General waste, such as food packaging and cement bags shall be immediately disposed of in the designated	Non-significant	NA

		receptacles, e.g., scavenger proof bins, and removed from the construction site overnight		
storage of waste in an unbanded area could result in pollution to soil.	Non-significant	(1) Designate and contain a temporary waste storage area within the construction camp (e.g., covered skips, scavenger proof bins, etc.). (2) Take steps to ensure that the containers where waste is stored are intact and not corroded and are fit for the storage of waste. (3) Adequate measures must be taken to prevent: <ul style="list-style-type: none"> • Accidental spillage or leaking. • Waste from blowing away. • Nuisances such as foul odour; visual impact and breeding of vectors. • The pollution of the environment and harm to health. 	Non-significant	NA
Unsanitary conditions surrounding infrastructure promoting the establishment of alien plants and/or invasive rodents.	Non-significant	(1) Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site.	Non-significant	NA
contaminated rainwater may be released from the bund into the environment.	Significant	1. The above ground fuel storage tank must be located on an impervious bund capable of containing 110% of the volume of the fuel storage tank. The fuel tank and bund shall be roofed to prevent ingress of rain. 2. A mobile fuel bowser must be parked (when not being used) on an impervious bund capable of containing 110% of the volume of the fuel bowser. The bund for parking the bowser shall be roofed to prevent ingress of rain and include a stormwater diversion system to prevent the ingress of surface water run-off (e.g., a 'speed bump' at the entrance to the banded bay).	Non-significant	NA
Altered aquatic ecosystem structure and function.	Non-significant	The designated temporary waste storage area must be contained (e.g., covered skips and scavenger proof bins, fenced) to prevent rainfall accumulation/wind blown litter.	Non-significant	NA
Large amounts of stored waste can cause unpleasant odours	Non-significant	Waste receptacles must not be overfilled. General waste shall be disposed of at the nearest licensed landfill.	Non-significant	NA
Risk of non-compliance	Non-significant	1. Given the overwhelming legal requirements governing the transport of Hazardous Chemical Substances (HCS) or dangerous goods, and therefore hazardous waste, it is recommend that the services of a licensed service provider	Non-significant	NA

		<p>be employed to undertake this activity. None the less, the consignor or person who dispatches the hazardous waste remains responsible to ensure that hazardous waste is packaged, transported, treated and disposed of in terms of the legal requirements and that there is an auditable record of the steps involved in storing, collecting and transporting the waste.</p> <p>2. A Safety Data Sheet (SDS) and Waste Manifest must accompany a load of hazardous waste transported from the point of generation to the waste management facility.</p> <p>3. Waste transporters may not accept waste that has not been classified in terms of SANS10234, unless it is listed in Annexure 1 of the Waste Classification and Management Regulations, 2013.</p>		
Windblown litter from transporting waste can contaminate the environment.	Significant	Trucks transporting waste must be covered.	Non-significant	NA
Risk of non-compliance	Non-significant	1. Waste generators must ensure that their waste is reused, recycled, recovered, treated and/or disposed of within 18 months of generation.	Non-significant	NA
Illegal dumping	Non-significant	Ensure the responsible disposal of waste.	Non-significant	NA
Chemical pollution of the water resources.	Non-significant	(1) No illegal dumping of waste. (2) No littering. (3) General Waste shall be disposed of at a licensed municipal landfill, whereas hazardous waste will be disposed of at a licensed hazardous waste disposal facility.	Non-significant	Incidents of chemical pollution of watercourses.
Improper safety procedures followed when refueling.	Non-significant	(1) Implement the following restrictions on all staff operating on the site: (a) No work may be done without the use of PPE (b) No alcohol or illegal substance use on site (c) No firearms permitted on site (2) A first aid kit must always be accessible on site and must include the number of the local emergency service. (3) Set up and enforce use of designated smoking area(s) (4) Maintain basic firefighting equipment at the work site and ensure that personnel are trained in the use of such equipment. (5) At least one person within each working team must have a valid First Aid Certificate and a First Aid Kit that is adequate to deal with the range of possible life-threatening injuries.	Non-significant	NA

Spills from mobile fuel bowser can contaminate the topsoil.	Non-significant	(1) Any mobile fuel bowser shall be parked in a suitably bunded area within the construction camp. (2) Always use a drip tray when refuelling with a mobile fuel bowser. (2) In event of a spill, immediately remove the contaminated soil to the depth of penetration and temporarily store in a sealed container within the designated waste storage area for on-site bio-remediation or disposal at a licensed hazardous waste landfill.	Non-significant	NA
Chemical pollution of the water resources.	Significant	(1) Refuelling with a mobile fuel bowser shall take place 100 m away from the ecological buffer.	Non-significant	NA
Concrete slurry from the vehicle and spills can contaminate the topsoil and form a hardpan layer	Non-significant	Mixer trucks should return any residual RMC to their batching plant after the delivery.	Non-significant	NA
Contamination of soil with hydrocarbons.	Non-significant	(1) Any waste oil shall be collected by a registered collector for recycling and reuse or appropriate disposal.	Non-significant	Hydrocarbon spills into the surrounding environment
(1) Water quality impairment and (2) Sedimentation of the water resource	Non-significant	1. The contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly. 2. All machinery and equipment must be inspected regularly for faults and possible leaks, these should be serviced off-site. 3. All contractors and employees must undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping". 4. Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems.	Non-significant	NA
Hydrocarbon spills into the surrounding environment can contaminate the soil	Non-significant	A spill response kit must be available at all times. The incident must be reported on and if necessary, a biodiversity specialist must investigate the extent of the impact and provide rehabilitation recommendations.	Non-significant	Hydrocarbon spills into the surrounding environment
Sedimentation of the water resource Water quality impairment	Non-significant	1. The wetlands and buffer areas must be avoided. 2. The contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly. 3. All chemicals and toxicants to be used for the construction must be stored within the	Non-significant	NA

		<p>construction site and in a bundled area.</p> <p>4. All machinery and equipment must be inspected regularly for faults and possible leaks, these should be serviced off-site.</p> <p>5. Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems.</p>		
<p>Alien invasive plants: Prevent the cleared areas from degrading, as invasive non-native plants will spread into degraded areas.</p>	Non-significant	<p>(1) Clearing of invasive alien plants must take place coupled with the sowing of seeds of indigenous species to stabilise disturbed habitats. Re-vegetation with appropriate indigenous species (to prevent dust and erosion, as well as establishment of alien species).</p> <p>(2) Compacted bare ground should be loosened and pitted, and covered with branches or stones. This will improve the ability of the surfaces to trap seeds and to absorb rainwater, thereby hastening vegetation recovery.</p>	Non-significant	NA
<p>Disturbance of aquatic or terrestrial habitat can favour the recruitment of alien invasive plants.</p>	Non-significant	<p>(1) Immediately control any alien invasive plant in its entirety (including roots and propagating material) upon being identified on site, using preferably mechanical control methods as opposed to chemical spraying.</p>	Non-significant	NA
<p>Risk of veld fires caused by workers during the construction of the facility.</p>	Non-significant	<p>1) Undertake a risk analysis to determine inter alia the probability and frequency of a wildfire during construction and operation, and prepare a fire management plan accordingly.</p> <p>2) Join the local Fire Protection Association if there is one and abide by their minimum requirements, as well as any agreements entered into with the Minister or other FPAs to provide mutual assistance in fighting and extinguishing fires.</p> <p>3) Appoint a responsible person (or agent) who will extinguish a fire, or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant Fire Protection Association, if any.</p> <p>4) If no agent is appointed, a team of designated fire fighting personnel shall be trained and readily available to immediately deal with any runaway veld fires.</p> <p>5) Obtain the necessary PPE for fire fighting personnel.</p>	Non-significant	

		<p>6) Obtain such fire fighting equipment as would be reasonably required in the circumstances, that is proportional to the risk.</p> <p>7) Fire fighting equipment shall be maintained and readily available during construction (and operation) - regularly test and service equipment.</p> <p>8) Maintain a firebreak around the perimeter of the solar PV facility. Be aware of burning firebreaks under powerlines as dense vertical columns of smoke can conduct electrical charge to the ground posing a danger to personnel and wildlife or livestock.</p>		
Risk of veld fires caused by workers during the construction of the facility.	Non-significant	<p>Join the local Fire Protection Association if there is one and abide by their minimum requirements, as well as any agreements entered into with the Minister or other FPAs to provide mutual assistance in fighting and extinguishing fires.</p> <p>3) Appoint a responsible person (or agent) who will extinguish a fire, or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant Fire Protection Association, if any.</p> <p>4) If no agent is appointed, a team of designated fire fighting personnel shall be trained and readily available to immediately deal with any runaway veld fires.</p> <p>5) Obtain the necessary PPE for fire fighting personnel.</p> <p>6) Obtain such fire fighting equipment as would be reasonably required in the circumstances, that is proportional to the risk.</p> <p>7) Fire fighting equipment shall be maintained and readily available during construction (and operation) - regularly test and service equipment.</p> <p>8) Maintain a firebreak around the perimeter of the solar PV facility. Be aware of burning firebreaks under powerlines as dense vertical columns of smoke can conduct electrical charge to the ground posing a danger to personnel and wildlife or livestock.</p>	Non-significant	
There is a potential for erosion and sedimentation of the surrounding wetlands from, e.g., excavations and vegetation clearance and topsoil disturbance; if	Non-significant	(1) Construction should be restricted to the dry winter months (e.g., May to September), that is commence with such activities as clearing or grading, excavating and	Non-significant	NA

<p>storm events take place and insufficient vegetation cover is present.</p>		<p>importing material at the end of the wet season/beginning of the dry season whilst the soil is still moist to reduce dust and as far as is practical, be completed in, the dry winter months with a decreased probability of storm events. (2) All development footprint areas must remain as small as possible and vegetation clearing to be limited to what is essential. (3) Retain as much indigenous vegetation as possible and re-vegetate cleared or eroded areas to reduce stormwater peak flows. (4) It is recommended that sandbags and temporary berms be used, to manage stormwater runoff and control erosion. (5) Exposed soils to be protected using a suitable covering, e.g., mulch. (6) Where required, cover soil stockpiles with a temporary liner to prevent erosion and contamination. (7) Re-vegetate areas where erosion is noted or where vegetation is required to reduce stormwater peak flows.</p>		
<ul style="list-style-type: none"> • Altering hydromorphic properties • Erosion • Compaction 	<p>Significant</p>	<ul style="list-style-type: none"> • It is preferable that construction takes place during the dry season to reduce the erosion potential of the exposed surfaces. • Any exposed earth must be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil. 	<p>Significant</p>	<p>NA</p>
<ul style="list-style-type: none"> • Altered surface flow dynamics • Alteration of subsurface flow dynamics • Altering hydromorphic properties • Change in drainage patterns 	<p>Significant</p>	<ul style="list-style-type: none"> • A stormwater management plan must be compiled and implemented for the project, facilitating the diversion of clean water to the delineated resources. • It is preferable that construction takes place during the dry season to reduce the erosion potential of the exposed surfaces. 	<p>Non-significant</p>	<p>NA</p>
<p>Construction activities may alter the physical characteristics of the terrain.</p>	<p>Significant</p>	<p>(1) Monitor for signs of channelled surface water run-off, e.g., rills and gullies, caused by roads, and if observed, take actions necessary to immediately re-instate the original ground level and sheet flow across the affected site. (2) Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that it does not re-occur.</p>	<p>Non-significant</p>	<p>NA</p>

Direct loss of terrestrial plants from construction activities on land.	Non-significant	(1) Suitable demarcation must be erected around the construction area, including the servitude, areas where material is stored and the actual footprint of the development to prevent access to sensitive areas. (2) Site demarcations should be maintained until the cessation of all construction activities. (3) Vehicular or pedestrian access is prohibited in natural areas beyond the demarcated boundary of the construction site. (4) Cleared vegetation from the construction camp, laydown area and other footprints shall be stockpiled separately within the construction camp for use during rehabilitation. (5) Conduct active rehabilitation during the construction activities according to a rehabilitation plan that will restore the natural vegetation to what it was prior to construction so that the long-term impact could be negligible. (6) Cordon off areas under rehabilitation as "no-go areas" to prevent vehicular & pedestrian access.	Non-significant	NA
Loss of Land Capability	Significant	1. A stormwater management plan must be implemented for the development. The plan must provide input into the road network and management measures.	Non-significant	NA
Disturbance during construction can cause active mammals and birds to temporarily evade or emigrate from the area.	Non-significant	(1) Keep noise levels as low as practically possible when working, e.g. no unnecessary shouting, loud music or revving of engines. (2) If work is to be undertaken in the vicinity of nest or roosts of species of conservation concern the scheduling of work must be planned outside of the breeding season of the nesting bird.	Non-significant	NA
Damage or Destruction of Fossil Heritage features	Significant	1. Implement the Chance Find Procedure in the event of any Cultural Heritage, Archaeological or Palaeontological artefacts being unearthed.	Non-significant	NA
Trapping of burrowing animals	Non-significant	1. Any holes/deep excavations must be dug in a progressive manner in order to allow burrowing animals time to move off and to prevent trapping. Should the holes remain open overnight they must be covered temporarily to ensure no fauna species fall in.	Non-significant	NA
Loss of Land Capability	Significant	1. A stormwater management plan must be implemented for the development. The plan must provide input into the road network and	Non-significant	NA

		management measures. 2. Vegetate or cover all stockpiles after stripping/removing soils.		
Blasting without a permit.	Non-significant	(1) Any blasting activity must be conducted by a suitably licensed blasting contractor. (2) The contractor carrying out the blasting work shall hold and be in possession of a permit authorizing such use in terms of the Explosives Act, 2003 (Act No. 15 of 2003), unless the activity relates to occupational health or occupational safety, in which case the matter is regulated under the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). (3) Adhere to any local bylaws and regulations regarding the generation of noise.	Non-significant	NA
Stockpiled topsoil left for extended period resulting in compaction	Non-significant	No driving, parking, or storing of construction plant is permitted on topsoil stockpiles.	Non-significant	NA
Construction activities may alter the physical characteristics of the terrain.	Significant	(1) Monitor for signs of channelled surface water run-off, e.g., rills and gullies, caused by construction activities, and if observed, take actions necessary to immediately re-instate the original ground level and sheet flow across the affected site.	Non-significant	NA
Stockpiled topsoil left for extended period.	Significant	Alien plant growth on stockpiled topsoil must be uprooted manually by hand.	Non-significant	Failure to identify and uproot alien invasive plant species.

Alternative 1

(REPEAT THIS TABLE FOR EACH ALTERNATIVE)

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Not applicable.				

No Go

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Reduced employment opportunities	Significant	Commence with project	Non-significant	Employment expectations are not achieved.
Continued reliance on Fossil Fuel based electricity generation	Significant	Commence with project	Significant	Projected solar electricity generation are not met, and dependence on utility supply remains in place. Continued reliance on fossil fuels and disruption to operations from load shedding may produce significant negative impacts for the environment and business, respectively.

1. Visual Impact Assessment
2. Terrestrial Biodiversity Assessment including Plant & Animal Species (including Avifauna)
3. Aquatic Biodiversity Assessment
4. Agricultural Assessment
5. Cultural Heritage and Archaeology Assessment
6. Palaeontology Assessment
7. Civil aviation
8. Pile / Pull-out Testing (geotechnical)

Describe any gaps in knowledge or assumptions made in the assessment of the environment and the impacts associated with the proposed development.

Agricultural Potential Assessment

- The information contained in this report is based on auger points taken and observations on site. There may be variations in terms of the delineation of the soil forms across the area;
- The GPS used for delineations is accurate to within five meters. Therefore, the delineation plotted digitally may be offset by at least five meters to either side.

Aquatic Biodiversity Assessment

- The focus area was based on the spatial files provided by the client and any alterations to the area and/or missing GIS information would have affected the area surveyed;
- Only the outline area of the proposed site was provided to the specialist;
- Some areas within the 500 m project area of influence were fenced and no access was granted to groundtruth; and
- The GPS used for the survey has a 5 m accuracy and therefore any spatial features may be offset by 5 m.

Palaeontology Phase 1 assessment

The accuracy and reliability of the report may be limited by the following constraints:

1. Most development areas have never been surveyed by a palaeontologist or geophysicist.
2. Variable accuracy of geological maps and associated information.
3. Poor locality information on sheet explanations for geological maps.
4. Lack of published data.
5. Lack of rocky outcrops.
6. Inaccessibility of site – mostly accessible.
7. Insufficient data from developer and exact lay-out plan for all structures - sufficient.

Terrestrial Biodiversity, Plant & Animal Species Compliance Statement

The following limitations and assumptions should be noted for the assessment:

- The assessment area was based on the area provided by the client and any alterations to the route and/or missing GIS information pertaining to the assessment area would have affected the area surveyed;
- The area was only surveyed during a single site visit and therefore, this assessment does not consider temporal trends, however it was deemed sufficient to derive a meaningful baseline; and
- Whilst every effort is made to cover as much of the site as possible, it is possible that some plant and animal species that are present on site were not recorded during the field investigations due to the inherent secretive nature of fauna species or the lack of material required for flora species identification.

Visual Impact Compliance Statement

- Digital Elevation Models (DEM) and viewsheds were generated using ASTER elevation data (NASA, 2009). Although every effort to maintain accuracy was undertaken, as a result of the DEM being generated from satellite imagery and not being a true representation of the earth's surface, the viewshed mapping is approximate and may not represent an exact visibility incidence. Thus, specific features identified from the DEM and derive contours (such as peaks and conical hills) would need to be verified once a detailed survey of the project area has taken place.
- The use of open-source satellite imagery was utilised for base maps in the report.
- Some of the mapping in this document was created using Bing Maps, Open-Source Map, ArcGIS Online and Google Earth Satellite imagery.
- The project deliverables, including electronic copies of reports, maps, data, shape files and photographs are based on the author's professional knowledge, as well as available information.

- VRM Africa reserves the right to modify aspects of the project deliverables if and when new/additional information may become available from research or further work in the applicable field of practice or pertaining to this study.
- As access to farms and private property is often limited due to security reasons, limiting access to private property in order that photographs from specific locations are taken. 3D modelling is used to reflect the expected landscape change area where applicable.
- Mapping makes use of the SANI BGIS webmap (SANBI, 2018).

Civil Aviation Compliance Statement

Non specified.

3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING AND CLOSURE PHASE

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the decommissioning and closure phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Proposal

Potential impacts:	Significance rating of impacts(positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Not applicable				

Alternative 1

Potential impacts:	Significance rating of impacts(positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Not applicable				

Alternative 2

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Not applicable				

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

1. Terrestrial Biodiversity Compliance Statement,
2. Plant Species Compliance Statement,
3. Animal Species Compliance Statement,
4. Aquatic Biodiversity Compliance Statement,
5. Archaeology & Cultural History Exemption Letter,
6. Agriculture Compliance Statement,
7. Palaeontology Exemption Letter,
8. Visual Impact Compliance Statement,
9. Civil Aviation Compliance Statement; and
9. Pile testing report (geotechnical).

Where applicable indicate the detailed financial provisions for rehabilitation, closure and ongoing post decommissioning management for the negative environmental impacts.

Not applicable.

4. CUMULATIVE IMPACTS

Describe potential impacts that, on their own may not be significant, but is significant when added to the impact of other activities or existing impacts in the environment. Substantiate response:

Agricultural potential assessment

The cumulative impacts have been scored “Low,” indicating “Low” potential incremental, interactive, sequential, and synergistic cumulative impacts. It is probable that the impact will result in spatial and temporal cumulative change.

Limited mitigation is required given the fact that the pre- mitigation significance rating has been scored as “Low – Negative” and the post- mitigation significance rating being scored as “Low – Negative” which are negligible cumulative effects in the proposed Solar PV project with post mitigation measures.

1. Loss of land capability, soil erosion and compaction effects - Negligible cumulative impact: The impact would result in negligible to no cumulative effects.

Palaeontology Assessment

In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be irreversible. With Mitigation the impact will be moderate and the cumulative impact is low. Impacts on palaeontological heritage during the construction and preconstruction phase could potentially occur and is regarded as having a high possibility.

Visual Impact Assessment

As the site is of a small scale in relation to the industrial landscape of the surrounding areas that is dominated by large structures creating a high VAC level, the potential of landscape degradation is limited. Further development of PV in the area would be seen as a component of the industrial landscape.

5. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that sums up the impact that the proposal and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Proposal

Agricultural Potential Assessment

Three main sensitive soil forms were identified within the assessment area, namely the Hutton, Ermelo and Carolina soil forms. The land capability sensitivities (DALRRD, 2017) indicate land capabilities with “Moderate” to “Moderate high” sensitivities, which correlates with the findings from the baseline assessment. However, due to the existing developments around the project areas, the industrial setting in which the project area is located in and environmental factors such as climate, the project area may therefore be assigned an overall sensitivity of ‘Moderate’.

The assessment area is associated with non-arable soils. In addition, the available climatic conditions of low annual rainfall and high evapotranspiration potential severely limits crop production significantly resulting in land capabilities with “Moderate” and “Moderate low” sensitivities. The land capabilities associated with the assessment area are suitable for recreational, industrial, and commercial purposes, which corresponds with the current land use.

It is the specialist’s opinion that the proposed Soventix Solar PV project and infrastructure will have an overall low residual impact on the agricultural production ability of the land. The proposed activities will not result in any segregation of some high production agricultural land. It is, therefore, the specialist’s recommendation that the proposed Soventix Solar PV project and associate infrastructure may be favourably considered for development with implementation of mitigation measure to ensure low expected significant impacts occurrence.

Aquatic Biodiversity & Wetland Assessment

Baseline Ecology

During the site assessment, four HGM units were identified and assessed within the project area of influence, it was determined that none of the HGM units can be impacted by the proposed development. Multiple drainage features flowing towards the HGM units were identified within the PAOI. These artificial wetlands do not provide any ecological function. The wetlands scored overall PES score ranging from D – “Largely Modified” to E – “Seriously Modified due to the modification to both the hydrology and vegetation of the wetlands through anthropogenic activities. The wetlands scored “Moderate” importance and sensitivity scores, predominantly attributed to the threat status of ‘Critical’. The average ecosystem service score was determined to range from “Moderately Low” to “Moderately High”. After using the wetland buffer tool, a 15 m post mitigation buffer was assigned to the wetland systems.

Risk Assessment

The risk assessment considered only the indirect impacts on the different HGM units. Since the proposed development will take place well outside the wetland buffers it is expected that the development will pose low residual risks to the systems.

Specialist Recommendation

Based on the results and conclusions presented in this report, it is expected that the proposed activities will not directly impact any wetlands.

Thus, the project was deemed to pose low residual risks on the wetland and thus no fatal flaws were identified for the project. Due to these low risks posed on the wetland a General Authorisation (GN 509 of 2016) is required for the water use authorisation for the proposed development.

Geotechnical piling and pull-out tests

The initial rammed pile tests conducted did not yield favourable results and the weak soil nature was noted during the ramming process due to the speed and ease at which the posts were rammed into the soil. Due to the unfavourable results attained for the rammed piles, an alternative founding method needed to be investigated as ramming deeper piles would not be economical as well as exceed the limits of the height of the ramming machine and subsequently require split foundations which would once again not be economical for the project. On average, the rammed piles achieved a 46% of the designed vertical uplift load and 79% of the designed horizontal load and as such proves not to be a viable founding solution.

The augured and concreted pile tests were thereafter conducted as the added surface area and subsequent skin friction would allow for a greater load capacity for the piles. The three embedment depths tested being 1.0m, 1.25m and 1.5m passed all test procedures that were tested for with the exception of test posts. The results of these piles were still favourable and overall, the average horizontal load resisted was 123% compared to the design load and 186% of the vertical design load.

In conclusion, the above test procedures, and recommendations for the Caracal Engineering fixed tilt solar PV ground mount system foundations to be comprised of lip C channels placed within predrilled/augured holes of a 250mm diameter and a depth of 1.0m filled with 15MPa to 20MPa concrete. With all the above considerations this founding method and procedure is shown to be an adequate means of resisting the design loading reactions expected to be experienced by the structures during their 25-year design life.

Heritage Exemption Letter

No known Stone Age sites or artifacts are present in the study area. The closest known Stone Age sites are those of Linksfield, Primrose, Waldrif and others (Bergh 1999: 4). If any Stone Age artifacts are to be found in the area, then it would more than likely be single, out of context, stone tools. No Iron Age sites, features or objects are known to exist in the study & development area. Based on the aerial images of the area, and the heritage desktop study, it is therefore deemed unlikely that any significant sites, features or material of cultural heritage (archaeological and/or historical) origin and/or significance will exist in the study area & proposed development area. Recent historical activities (mainly urban related residential and industrial) would have impacted on any if they did exist here in the past and would have disturbed or destroyed these to a large degree. Known archaeological and historical sites, features and material have been identified in the larger geographical area and this needs to be taken into consideration during actions related to the proposed future development.

Palaeontology Impact Assessment

The development footprint is situated on the Vryheid Formation (Pv) of the Ecca Group, Karoo Supergroup with a Very High palaeontological sensitivity. The nature of the impact is the destruction of Fossil Heritage. Loss of fossil heritage will have a negative impact. The extent of the impact only extends in the region of the development activity footprint and may include transport routes. The expected duration of the impact is assessed as potentially permanent. The intensity/magnitude of the impact is high as it is destructive. The probability of the impact occurring will be definite and will occur regardless of preventative measures.

In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be irreversible. With Mitigation the impact will be moderate and the cumulative impact is low. Impacts on palaeontological heritage during the construction and preconstruction phase could potentially occur and is regarded as having a high possibility.

- All the land involved in the development was assessed and none of the property is unsuitable for development.
- The following should be conserved: if any palaeontological material is exposed during clearing, ground-breaking, digging, excavating, drilling or blasting, SAHRA must be notified. All development

activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures.

Terrestrial Biodiversity, Plant & Animal Species Assessment

The project area has historically been modified to accommodate the development of the Element Six Industrial Complex and as such remains in a modified state. It does, however, remain important that the management outcomes presented be adhered to, in order to mitigate the negative expected environmental impacts that will stem from the development activities. These include:

- The loss and fragmentation of vegetation communities;
- The safe movement of fauna species; and
- The direct and indirect loss and disturbance of floral and fauna species and communities.

Completion of the Terrestrial Biodiversity Assessment led to a disputing of the 'Very High' classification for the terrestrial biodiversity theme sensitivity as allocated by the National Environmental Screening Tool. However, the assessment has determined that the project area possesses a 'Very Low' sensitivity, as a result of the significant levels of environmental disturbance that have taken place and the fact that no SCC were observed - or are very likely to occur.

Visual Impact Assessment - Scoping

As the site is located within an industrial area with a high VAC level, a contained ZVI without receptors sensitive to landscape change, the recommendation of the Landscape and Visual Impact Assessment is that development should be authorised. Opportunities for landscape enhancement are available with the planting of missing trees from the avenue of trees in Parry Road. As the Landscape and Visual Impacts are expected to have a Low Significance without mitigation, a detailed impact assessment is not required.

Civil Aviation Assessment

Effects on Aircraft, Aviation Flight Operations, Aircraft Weather Radar Equipment, Air Traffic Control Unit Radar and Effects on Aviation Regarding Height of Planned Project were all ranked as "Extremely Improbable" with "Negligible" impact severity.

A classification of "medium" sensitivity for civil aviation, must submit a Civil Aviation Compliance Statement. Assessing the potential impact of the proposed ground-level solar farm on nearby aviation activities, it is recognized that the installation is approximately 7.9 km from the nearest airfield, just marginally under the 8 km threshold established by the South African Civil Aviation Authority (SACAA).

However, several compelling reasons suggest that a compliance statement may not be necessary in this specific case. The most significant factor is the nature of the solar farm itself. Being a ground-level installation, it does not present a physical obstruction to aircraft flight paths, a key consideration in most aviation assessments. The risk of interference with aviation activities is thus considerably reduced due to the low-profile nature of the installation.

Furthermore, the orientation of the runways at the nearest airfield does not align with the direction of the proposed solar farm. This means that aircraft taking off or landing at this airfield are unlikely to pass directly over the site, further minimizing the potential for any aviation-related impact.

Taking these factors into account, it is argued that the unique conditions of this project substantially diminish the likelihood of adverse effects on civil aviation. Therefore, the proposal is made that the requirement for a Civil Aviation Compliance Statement may not be necessary in this instance.

Alternative 1

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Alternative 2

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No-go (compulsory)

The dominant impacts that will result in the event the project is not developed, relates predominantly to the continued reliance of Element Six on Fossil Fuel based electricity supply and the inability for the company to make a contribution to reduction of Greenhouse Gas emissions. Additionally, there manufacturing will continue to be disrupted and influenced by utility-based loadshedding.

In the event that in situ vegetation is not cleared, and largely maintained intact, many of the assessed impacts are unlikely to occur.

6. IMPACT SUMMARY OF THE PROPOSAL OR PREFERRED ALTERNATIVE

For proposal:

Several of the impacts assessed in the Phase 1 impact assessment (pre-mitigation or raw risk stage) computed significant for either Impact Magnitude or Impact Importance or both. However, in almost all cases the mitigatory potential was high, with limited residual impacts expected. The fact that the proposed site is located within a zoned industrial area, facilitates a development of this nature. Furthermore, the governing spatial and land use planning documents are in support of this development within this zone (e.g. GPEMF).

For alternative:

Having assessed the significance of impacts of the proposal and alternative(s), please provide an overall summary and reasons for selecting the proposal or preferred alternative.

The Element Six has already installed roof-mounted solar PV as phase 1 of their renewable energy generation programme.
The currently proposed phase 2 ground-mounted solution will augment their renewable energy capabilities and increase electricity generation self-reliance with associated benefits to GHG emissions, grid stability, manufacturing continuity and
productivity. The receiving environment to the proposed solar PV plant is already heavily transformed and is likely to remain so for the foreseeable future, as a formally zoned industrial area. The nature of the solar PV plant is unlikely to
Increase degradation to the receiving and surrounding environment, especially if in situ vegetation is left intact and not
removed, which if removed would reduce rainfall infiltration and increasing runoff and erosion potential. The most sensitive
surrounding environment are the bioregionally important wetlands downslope of the project area and the fact that the
Project is located within the Endangered Threatened Ecosystem of Tsakane Clay Grassland. Although the project site
is located within an Endangered Threatened Ecosystem, the Terrestrial Biodiversity Assessment verified that the site is
transformed and no longer in a natural state. The site is outside any Critical Biodiversity Areas (CBAs) or
Ecological Support Areas (ESAa) in terms of the Gauteng C-Plan and Ekurhuleni Bioregional Plan (2020).

7. SPATIAL DEVELOPMENT TOOLS

Indicate the application of any spatial development tool protocols on the proposed development and the outcome thereof.

SPATIAL DEVELOPMENT TOOL	LINK OR YEAR
1. DEPARMENT: Forestry, Fisheries and the Environment	https://screening.environment.gov.za/screeningtool/index.html#/pages/welcome (2022)
2. BGIS Biodiversity GIS	https://bgis.sanbi.org/mapviewer including Gauteng C-Plan, Important Birding Areas, Protected Areas, National Freshwater Ecosystem Areas (NFEPA), Strategic Water Source Areas, 2022 Red List Ecosystems.
3. Gauteng Protected Area Expansion Strategy	2013
4. Technical Report for the Gauteng Conservation Plan	2014
5. Highveld Priority Area Air Quality Management Plan	2011
6. The Vegetation of South Africa, Lesotho and Swaziland	2006
7. Review of Bioregional Plan for the City of Ekurhuleni	2021
8. Gauteng Provincial Environmental Management Framework	2022

9. Ekurhuleni Metropolitan Municipality	https://gis.ekurhuleni.gov.za/mapviewer/
10. South Africa's Important Bird and Biodiversity Areas	2015
11. Freshwater Biodiversity Information System	https://freshwaterbiodiversity.org/
12. Integrated Development Plan	https://www.ekurhuleni.gov.za/ (2020/2021)
13. Strategic water source areas for urban water security: Making the connection between protecting ecosystems and benefiting from their services	2017
14. Threatened Species No-Go Map	https://nogo.ewt.org.za/
15. Protected Areas Register	https://dffportal.environment.gov.za/portal/apps/webappviewer/

OUTCOMES OF EACH SPATIAL DEVELOPMENT TOOLS

Geographical aspect:

Strategic Areas

- The study area is located within a Strategic Transmission Corridor according to the DFFE Screening Report (Ecoleges, 2022) (and GN No. 113 in GG No. 41445 of 16 February 2018, as well GN No. 383, GG No. 44504 of 29 April 2021).
 - In terms of GN No. 113 dated 16 February 2018 (Gazette, 2018), “Applications for an environmental authorisation for large scale electricity transmission and distribution facilities, where such facilities trigger 9 of the Environmental Impact Assessment Regulations Listing Notice 2 of 2014 and any other listed and specified activities necessary for the realisation of such facilities, and where the greater part of the proposed facility is to occur in one or more such Strategic Transmission Corridors, must follow the basic assessment procedure contemplated in Regulation 19 and 20 of the Environmental Impact Assessment Regulations, 2014 in order to obtain environmental authorisation, as required in terms of the Act.” – **The proposed development which is the subject of this application does fall within the “Central Corridor” but does not trigger LA 9 of LN2.**
- The study area is not located within a Renewable Energy Development Zone (REDZ) (Ecoleges, 2022).

Radio Frequency

- The **Medium** Radio Frequency Interference (RFI) theme according to the Screening (Ecoleges, 2022). The screening report indicates that the medium sensitivity of features is between 30 and 60 km from a Weather Radar installation and within the radar’s line of sight.

Gauteng EMF Zone 5

- The development footprint is within Zone 5 as per the Gauteng Province Environmental Framework (GPEMF) (Ecoleges, 2022). This zone is mainly industrial and commercial areas (Anon., 2022). The Gauteng Province Environmental Framework indicates conditions that must be followed when doing any activity in this zone.
- **Condition:** “It indicates that any development taking place in such areas, it must be sustainable in respect to the capacity of the environment and specifically the hydrological system to absorb additional sewage and stormwater loads of increased densities and development in this area must identify any unmapped wetlands, especially seep areas that may occur on any site and when necessary apply for the required water use licence” (Anon., 2022).

Protected Areas

- Study area is not within a National protected area (bgisviewer.sanbi.org, 2011).

- The site sensitivity verification report for the project area indicated that the project area occurs outside two Gauteng Protected Area Expansion Strategy Expansion sites.
- The map on (Figure 9) shows surrounding protected areas but there is no protected area or buffer area found in the study area (bgisviewer.sanbi.org, n.d.).
- The map on (Figure 9) indicates that the project area is not within a national protected area.

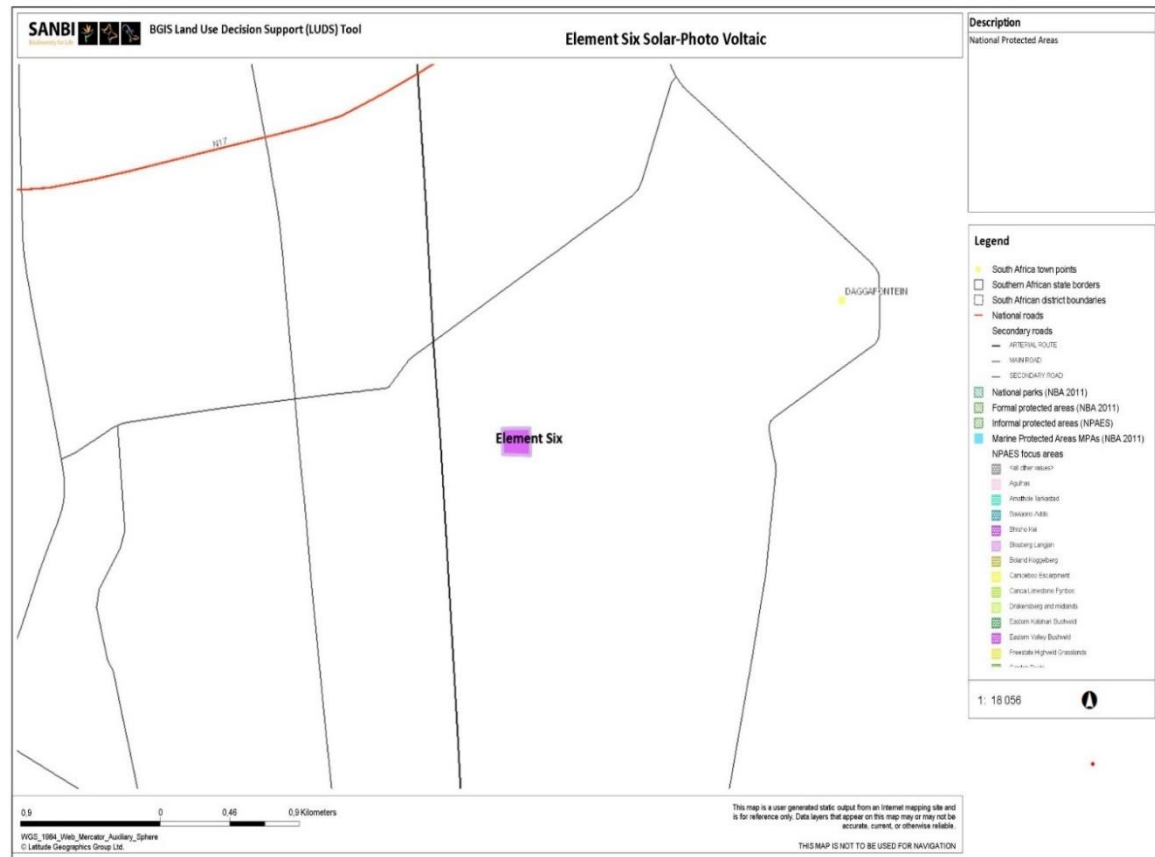


Figure 9. National Protected Areas relative to the project area. The white background area indicates the site is outside of any National Protected Area.

Physical aspect:

Atmosphere

Air Quality Highveld Priority Area (HPA)

- The study area is within an Air Quality Highveld Priority Area (Ecoleges, 2022). “The Highveld area in South Africa is associated with poor air quality, and elevated concentrations of criteria pollutants occur due to the concentration of industrial and non-industrial sources” (Environmental Affairs, 2011).
- Highveld priority area occur in the entire grassland biome ecosystem and where the ecosystems have modified or transformed by human activities such as: “cultivation for commercial crops or subsistence agriculture; livestock; forestation for commercial timber production; the invasive spread of alien plants; urbanisation and settlements; the impoundment of rivers; mining; transportation and industrialisation” (Environmental Affairs, 2011).
- Industrial sources are the largest contributors of emissions in the highveld priority area (Environmental Affairs, 2011).
- The city of Ekurhuleni is one of the air quality hotspots on the HPA and because it is mostly urbanised, it dominates the HPA (Environmental Affairs, 2011).
- The map generated on the screening report tool on (figure 10) indicates the location of the project area in relation to an Air quality priority area.

Project Location: Proposed Solar PV project

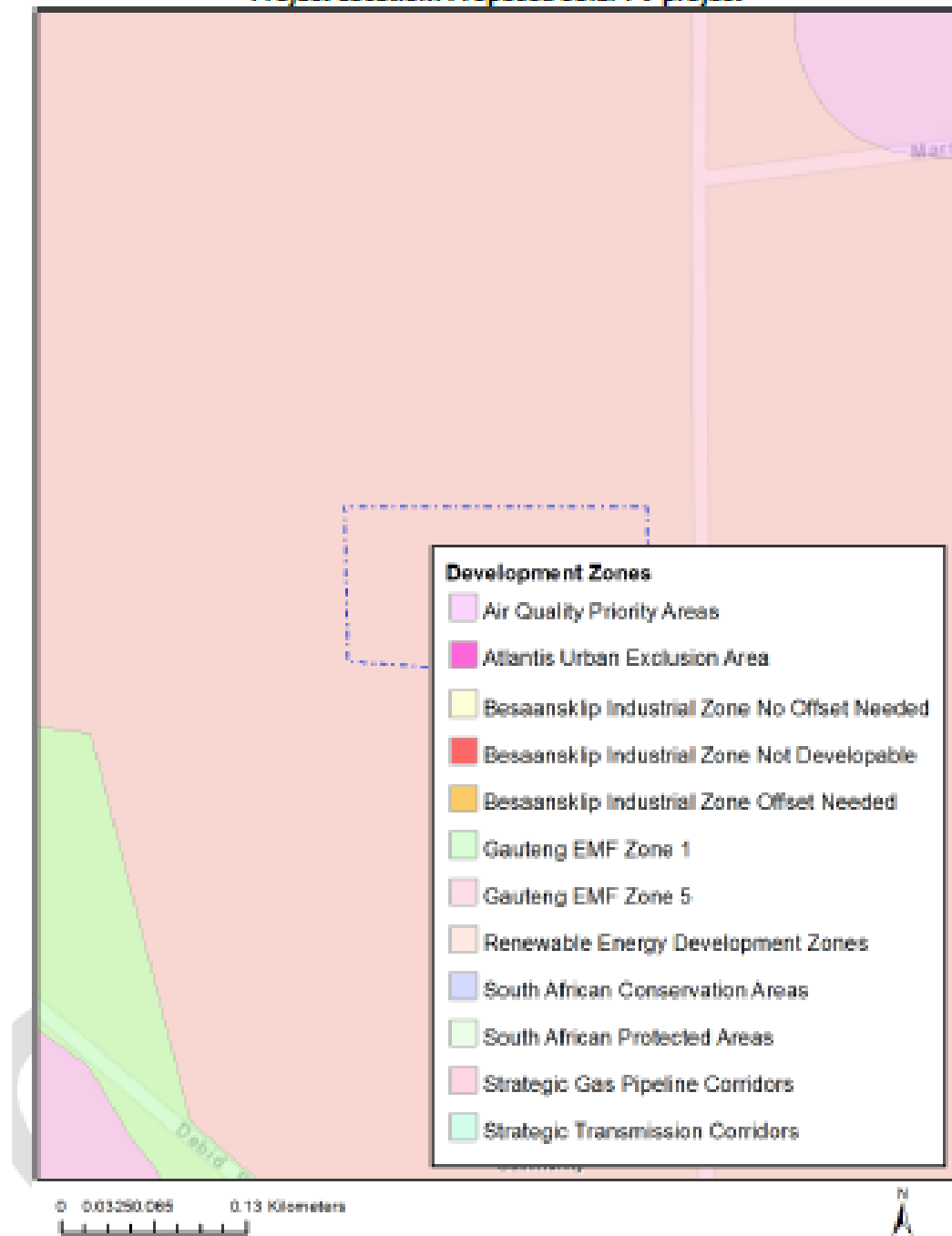


Figure 10. Air Quality Priority Areas.

Climate

- The Tsakane clay grassland vegetation type experiences a strong seasonal summer rainfall and is accompanied by dry winters (Mucina & Rutherford, 2006). The MAP ranges from 630 – 720 mm and the overall MAT is 15°C (Mucina & Rutherford, 2006). The MAP shows a shift between a cool temperature and a warm temperature climate.
- The city of Ekurhuleni experiences rainfall that is highly seasonal and most of the rainfall occurs between November and April (Hawley & Desmet, 2021).
- The annual rainfall of the city ranges from 650 mm – 950 mm (Hawley & Desmet, 2021). Temperatures experienced in the city of Ekurhuleni vary between mild warm summers and cold winters where frost and sub-zero temperatures are common (Hawley & Desmet, 2021).
- The Bioregional Plan of the city of Ekurhuleni indicated that “according to the South African Risk and Vulnerability Atlas (2017), it is predicted that the city of Ekurhuleni will experience similar rainfall, but it will be unpredictable in terms of season, frequency and intensity” and temperatures will in turn be affected by this change.

Geology

- Tsakane clay grassland contains one of the most important rocks which is the basaltic lava of the Klipriviersberg Group as well as the sedimentary rocks of the Madzaringwe Formation of the Karoo Super group (Mucina & Rutherford, 2006). The soils are typical of Ba and Bb land type (Mucina & Rutherford, 2006).
- The site sensitivity verification report for the study area stated that according to the Ekurhuleni Environmental Data, the proposed site is underlain by Dolomite, but the soils described for the site by the Agriculture and geotechnical investigations did not support this geological substrate.
- The map on SANBI map viewer shows that the study area contains red or yellow structureless soils with a plinthic horizon (bgisviewer.sanbi.org, n.d.).
- The map below (Figure 11) shows the extent of soil classes over the study area.



Figure 11. Soil Classes Map, with the study area on red or yellow structureless soils with a plinthic horizon.

Wetlands

- The study area is not within an area identified in terms of an international convention, such as a RAMSAR site.
- The site sensitivity verification report noted a dispute about the purported NFEPA wetland directly adjacent to the proposed development area, it further indicated that SANBI conformed the wetland as an erroneous delineation. Furthermore, the site assessment indicated there was no indication of soil waterlogging or vegetation characteristics consistent with a wetland on the NFEPA wetland.
- The site sensitivity verification of the development area confirmed that two wetlands occur 500m within the development site, but they are not within the site. It also indicated that wetlands from the Gauteng C-Plan & Ekurhuleni Bioregional Plan are within the Project Area of Influence (PAOI) of the proposed development footprint but are not inside the development footprint.
- The wetlands that occur within 500m to the footprint form part of the ESA1 from the Gauteng C-Plan and they are described as ESA1 (Ecological Support Area 1) priority for restoration category (Hawley & Desmet, 2021). Wetlands under this category have been degraded to some extent “but have been earmarked as priorities for restoration due to their potential to support disaster risk management and climate adaptation/mitigation” (Hawley & Desmet, 2021).
- According to the Draft Bioregional plan for the city of Ekurhuleni, ESA1 Priority for restoration is also all the semi-natural wetlands that were not classified as CBAs.
- The map in (figure 12) shows the position of the project area relative to the two wetlands described as ESA1 Priority for restoration.

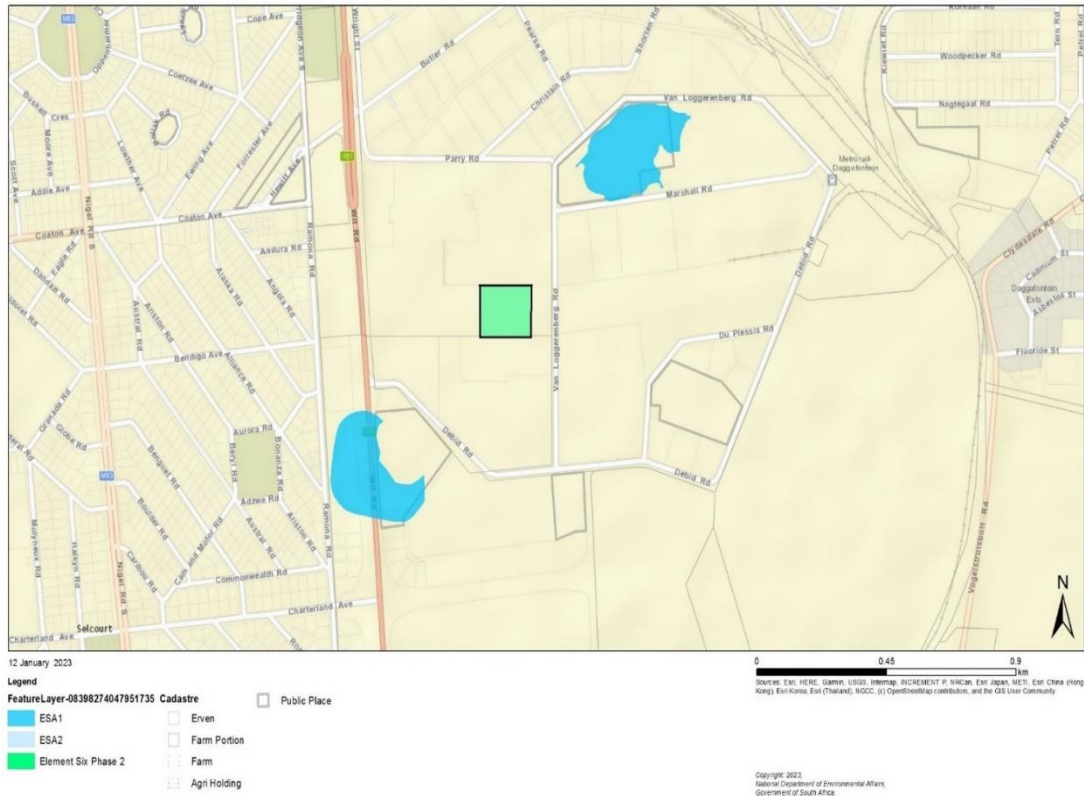


Figure 12: Wetlands within the PAOI of the project footprint.

Surface Water (Hydrology)

- Based on the 2017 SWSA data it indicates that the project area is located within a Strategic Water Source Area (bgisviewer.sanbi.org, 2017).
- But the site sensitivity verification report highlighted that based on the 2021 SWSA data the site is not in a Strategic Water Source Area.
- Strategic Water Source Areas play a very important role in the country's water supply (Nel, et al., 2017).
- In their article, Nel and the other authors indicated that when they linked strategic water source areas to water supply systems and their associated urban centers, they were able to show that they support at least 51% of South Africa's population and almost 64% of the country's economy (Nel, et al., 2017). Therefore, they need to be protected.
- The project area falls within the Upper Vaal Water Management Area (freshwaterbiodiversity.org, n.d.). The water management area forms part of the National water resource strategy, which facilitates proper management of water and defines water management areas (Harpe & Ramsden, n.d.).

Groundwater (Geohydrology)

- The city of Ekurhuleni constitutes significant hydrological features in the form of permanent rivers, valley bottom wetlands and depression/pan wetlands (Hawley & Desmet, 2021).
- According to the draft Bioregional Plan for the city of Ekurhuleni, the portion of the city that is in the north is drained through the Rietvlei and Hennops tributaries, which flow north and converge to form Rietvlei River. The central and eastern areas are drained by the Blesbokspruit River system, and the south-west is drained by the Rietspruit, Elsburgspruit and Natspruit rivers which merge to form the Klip River (Hawley & Desmet, 2021).
- The project area is further away from the Blesbokspruit river which forms part of the NFEPA rivers (bgisviewer.sanbi.org, n.d.).

Terrestrial Biodiversity

- There is a **Very High** Terrestrial Biodiversity theme according to the Screening Report (Ecoleges, 2022)

It also shows that there is a high sensitivity of endangered ecosystems due to the footprint falling with the Tsakane Clay Grassland "Endangered" ecosystem. "Endangered ecosystems are ecosystems that

- have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems” (Government Gazette, 2004).
- According to the Gazetted Terrestrial Biodiversity Assessment Protocol, “An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified on the screening tool as being of “very high sensitivity” for terrestrial biodiversity, must submit a Terrestrial Biodiversity Specialist Assessment.”
- The site sensitivity verification report for the development footprint supports a low to medium Terrestrial Biodiversity sensitivity theme because the footprint is on a highly transformed location and within an industrial context and largely disconnected functionally from the rest of the landscape.
- The map on Figure 12 shows the position of the footprint (green polygon) relative to the Ecological Support Areas (ESA1) according to the Gauteng Conservation Plan (yellow polygons).

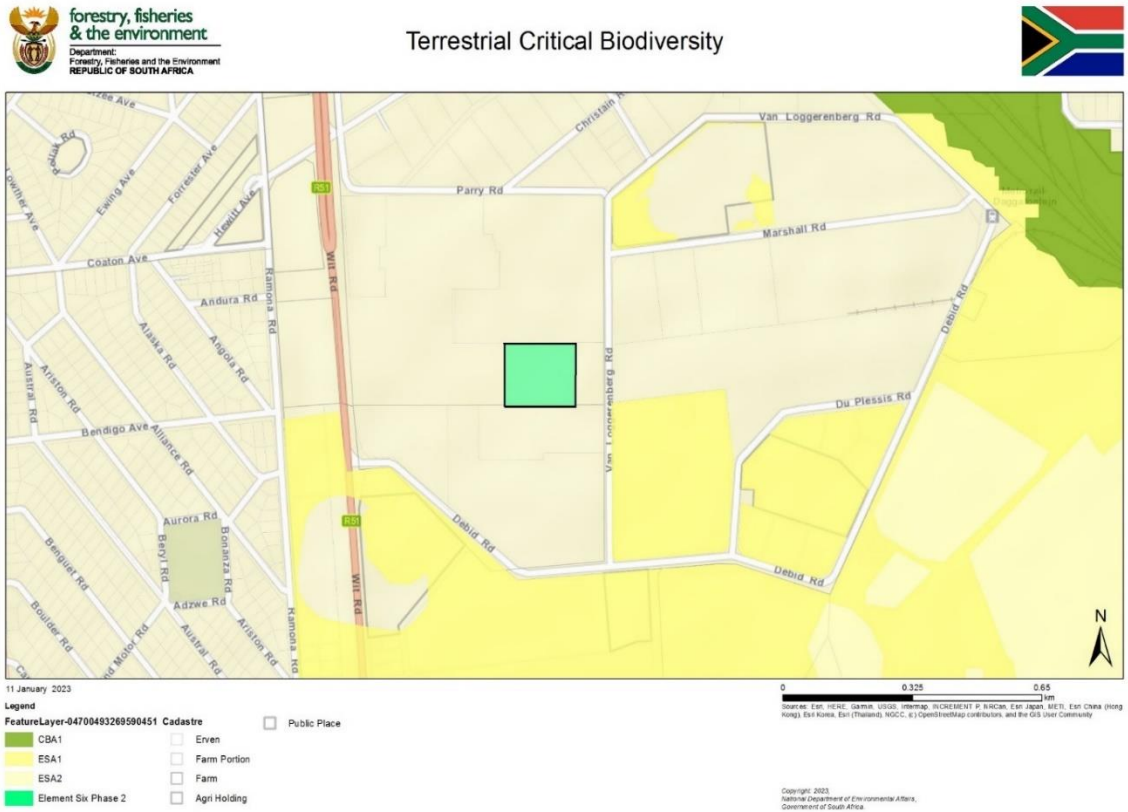


Figure 12. Terrestrial Critical Biodiversity & Ecological Support Areas relative to the proposed solar PV project site.

Animal Species

- There is a medium animal species sensitivity associated with the following animal species in the project area (Ecoleges, 2022).

Table 11: Sensitivity Features.

• Sensitivity	Feature(s)
Medium	<i>Insecta-Aloeides dentatis dentatis</i>
Medium	<i>Mammalia-Chrysospalax villosus</i>
Medium	<i>Mammalia-Crocidura maquassiensis</i>
Medium	<i>Mammalia-Dasymys robertsii</i>

- According to the Gazetted Animal Species Protocol a medium sensitivity theme for terrestrial animal species indicates the following:
 1. Suspected habitat for SCC based either on historical records (prior to 2002) or being a natural area included in a habitat suitability model for this species.
 2. SCC listed on the IUCN Red List of Threatened Species or South Africa’s National Red List website as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.
- Hence, an assessment must be prepared by a specialist to determine the presence or likely presence of SCC.

- The site sensitivity verification report of the footprint supported a low sensitivity rating for animal species theme because there is a limited number of suitable habitats for the affected species on the proposed footprint, which includes manicured lawn surrounded by a few sparse exotic trees. There is no wetland within the site that can provide a habitat for many of the animal species of conservation concern listed.
- Based on the site sensitivity verification report for the footprint, the following information applies to the animal species occurring in the project footprint:
 1. **Aloeides dentatis dentatis (Roodepoort Copper butterfly)**
It is endemic to the Gauteng Province in South Africa, along and close to the Witwatersrand and Suikerbosrand mountain ranges near Heidelberg eastwards to around Delmas. The number of individuals in the population is less than 1 500 with each of the six subpopulations having less than 250 individuals. Threats of the species occur due to continued urbanization, inappropriate burning regimes and a decline in quality of habitat in and near residential areas has increased the threat. Therefore, the taxon qualifies globally under the IUCN criteria as endangered, and the subpopulations occur in three protected areas which are well monitored.
 2. **Mammalia-Chrysospalax villosus (Rough-haired golden mole)**
This species is distributed across the localities of Eastern Cape, Kwazulu-Natal, Gauteng, and Mpumalanga. It has a very specific habitat requirement. The species is Vulnerable due to its small area of occupancy, there is six locations where its presence is still certain. It is found on sandy soils in grassland and meadows and along edges of marshes the grassland. It has been reported that it is also found marginally on golf courses adjoining natural grasslands. Habitat alteration is one of the major threats to the species occurrence. It occurs in the Blyde River Canyon Nature Reserve and Verloren-Vallei Nature Reserve (Mpumalanga) and Mgeni Vlei Nature Reserve (KwaZulu-Natal).
 3. **Mammalia-Crocidura maquassiensis (Makwassie Musk Shrew)**
This is a rare species that is endemic to South Africa Swaziland and Zimbabwe, it occurs in moist grassland habitats in the Savannah and Grassland biomes, and it appears to be patchily distributed. There is little information about the habitats and ecology of this species, but wetlands are used as a proxy for suitable habitat. It is a naturally rare species that is difficult to identify. The main threat to the population of this species is the loss or degradation of moist, productive areas such as wetlands and rank grasslands within suitable habitat. This is due to abstraction of surface water and draining of wetlands through industrial and residential expansion and overgrazing of moist grasslands. This species occurs in Maloti-Drakensberg Transfrontier Park and presumably several other protected areas.
 4. **Mammalia-Dasymys robertsii (African Marsh Rats)**
This species depends on intact rivers and wetland ecosystems. They have been recorded from a wide variety of habitats which include forest, savannah, swampland, and grasslands. They occur specifically in reed beds and among semi-aquatic grasses in wetlands or swampy areas or along rivers and streams, as well as in grassy areas close to water. The major threats to this species revolve around the habitat loss and degradation.

Aquatic Biodiversity

- The **Very High** Aquatic Biodiversity theme according to the Screening Report (Ecoleges, 2022) and owing to the study area being within a Strategic Water Source Area. According to the Gazetted Aquatic Biodiversity Assessment Protocol, it indicates that a very high aquatic biodiversity sensitivity theme requires an aquatic biodiversity specialist assessment to be undertaken on the preferred site.
- Even though the screening report indicated a very high Aquatic Biodiversity sensitivity theme, a low sensitivity theme is supported based on the site sensitivity verification report of the project area. An Aquatic Biodiversity Compliance Statement is still required. An Aquatic Risk Assessment will be undertaken with regards to the registration of Section 21(c) & (i) water uses under General Authorisation of the National Water Act (Act 36 of 1998).
- A low sensitivity theme is supported because the anticipated development will not directly affect any wetlands, and while it falls within a groundwater strategic water source area, no significant risks or impacts to the groundwater resource are expected.
- Moreover, the High aquatic screening sensitivity is assigned because of the SWSA that is based on 2017 data, but when using the 2021 data the site is not in a SWSA.

Biological aspect:

Ecosystem/Vegetation Type

- The footprint has low plant species theme sensitivity according to the screening report. According to the Terrestrial Plant Species Compliance statement, a low sensitivity is an indication of areas where no

natural habitat remains or natural areas where there is no suspected occurrence of SCC. Therefore, a compliance statement must be prepared.

- The site sensitivity verification report stipulated that the low sensitivity theme of the plant species is due to the heavily manipulated state of the vegetation, which is maintained as a manicured lawn, surrounded by predominantly exotic trees.
- The project area falls within the grassland biome (Mucina & Rutherford, 2006).
- The vegetation type in the project area is Tsakane Clay Grassland (bgisviewer.sanbi.org, 2018).
- The vegetation is short, with dense grassland which are dominated by a mixture of common highveld grasses such as *Themeda triandra*, *Heteropogon contortus*, *Elionurus muticus* and several *Eragrostis* species (Mucina & Rutherford, 2006). According to Mucina and Rutherford, the forbs of families Asteraceae, Rubiaceae, Malvaceae, Lamiaceae and Fabaceae are more prominent, and disturbance leads to an increase in the number of grasses *Hyparrhenia hirta* and *Eragrostis chloromelas*.
- The important taxa in that forms part of the Tsakane Clay Grassland are as follows (Mucina & Rutherford, 2006):
 - **Graminoids:** *Brachiaria serrata* (d), *Cynodon dactylon* (d), *C. hirsutus* (d), *Digitaria ternata* (d), *Elionurus muticus* (d), *Eragrostis chloromelas* (d), *E. patentipilosa* (d), *E. plana* (d), *E. racemosa* (d), *Heteropogon contortus* (d), *Hyparrhenia hirta* (d), *Microchloa caffra* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Trachypogon spicatus* (d), *Abildgaardia ovata*, *Andropogon schirensis*, *Cymbopogon caesius*, *Diheteropogon amplexans*, *Melinis nerviglumis*, *Panicum gilvum*, *Setaria nigrirostris*.
 - **Herbs:** *Acanthospermum australe*, *Ajuga ophrydis*, *Eriosema salignum*, *Euryops transvaalensis* subsp. *transvaalensis*, *Gerbera viridifolia*, *Helichrysum nudifolium* var. *nudifolium*, *H. rugulosum*, *Hermannia depressa*, *Lotononis macrosepala*, *Nidorella hottentotica*, *Pentanisia prunelloides* subsp. *latifolia*, *Peucedanum caffrum*, *Rotheca hirsuta*, *Selago paniculata*, *Senecio coronatus*, *S. inornatus*, *Sonchus nanus*, *Vernonia oligocephala*.
 - **Geophytic Herbs:** *Aspidoglossum ovalifolium*, *Hypoxis rigidula* var. *pilosissima*.
 - **Semiparasitic Herb:** *Striga asia-tica*.
 - **Low Shrubs:** *Anthospermum rigidum* subsp. *pumilum*, *Chaetacanthus setiger*, *Tephrosia capensis* var. *acutifolia*. *Semiparasitic*
 - **Shrub:** *Thesium impeditum*.
- Only 1,5% out of the 24% target is conserved in statutory reserves (Suikerbosrand, Olifantsvlei, Klipriviersberg, Marievale) and a small portion also in private nature reserves (Mucina & Rutherford, 2006).
- Tsakane Clay Grassland is a threatened ecosystem (bgisviewer.sanbi.org, n.d.) and is endangered (Mucina & Rutherford, 2006).
- The project area is not in an area where there is a high incidence of alien invasive species according to bgisviewer.sanbi.org (2010).
- Because Tsakane Clay grassland is endangered, it also falls under the red list of ecosystems (bgis.sanbi.org, 2022).
- The map on (figure 12) shows the vegetation types found on the study area (blue polygon).

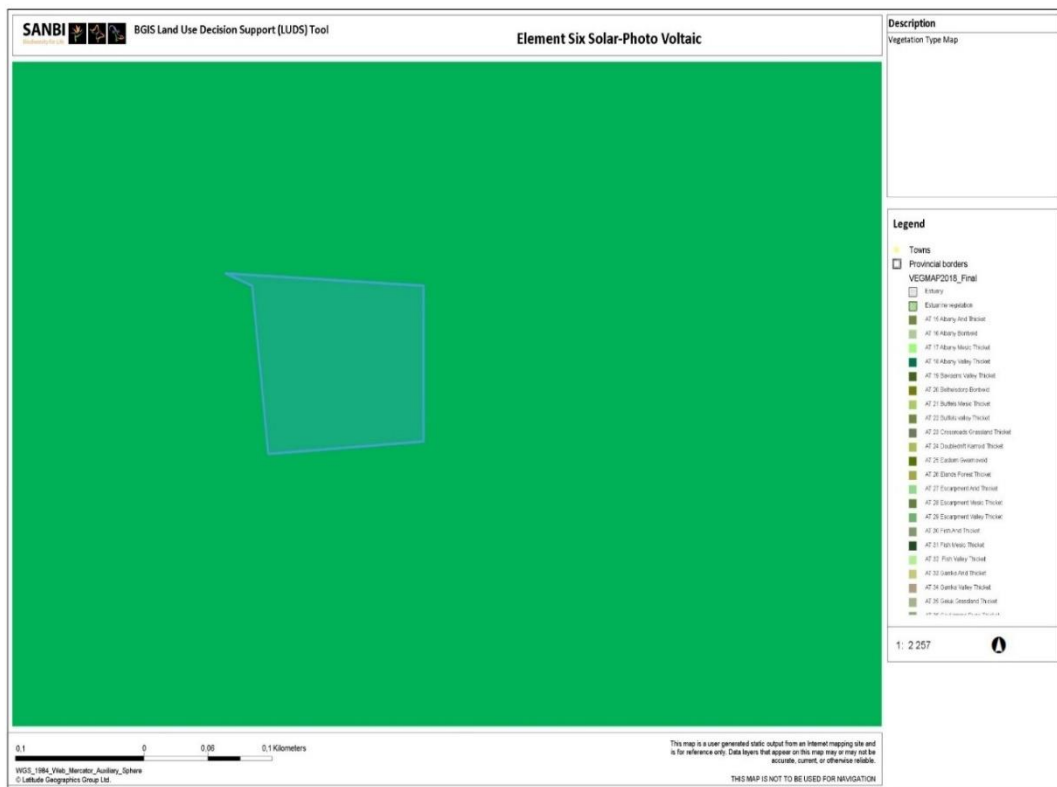


Figure 12. Vegetation map associated with the proposed project area, falling within the Tsakane Clay Grassland vegetation type which is also an “Endangered” Ecosystem.

Important Bird Areas

- There is **Low** Avian theme according to the Screening Report results (Ecoleges, 2022).
- The site sensitivity verification report supports the low sensitivity it also indicated that the solar PV panels, infield transformers and overhead connecting powerlines, will not be extensive in length or height and therefore pose a low risk to avifauna.
- The study area is not within an Important Bird Area (IBA) (bgisviewer.sanbi.org, 2015)..
- The map on (figure 13) shows that the area(blue polygon). is not within any important bird area.

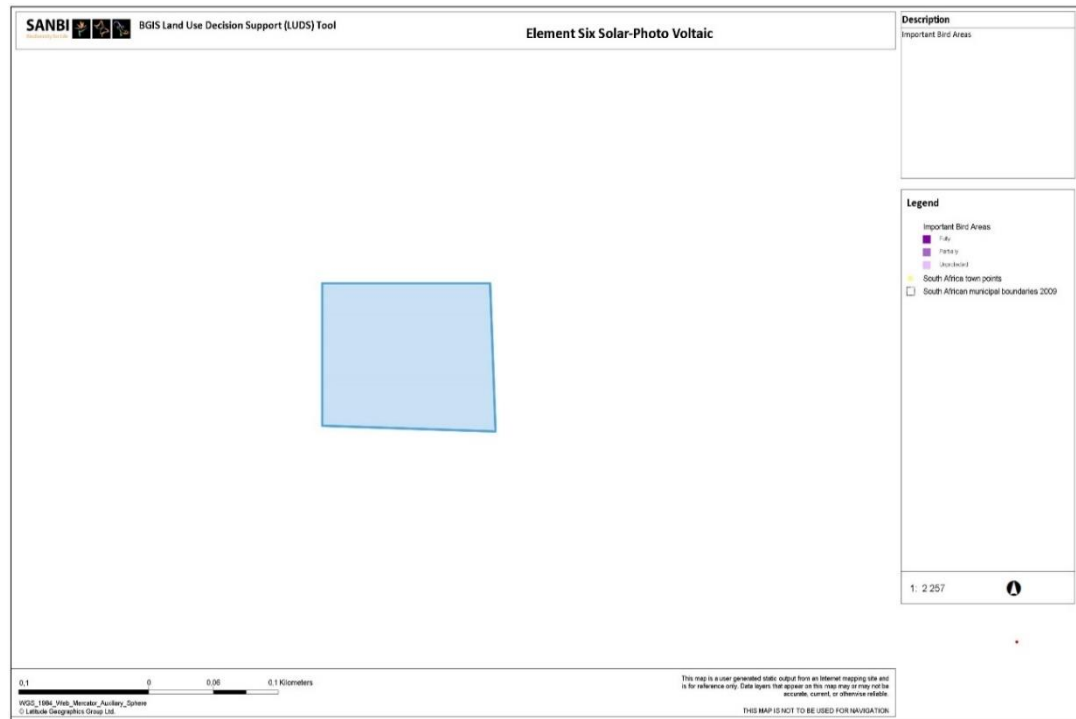


Figure 13. Important Bird Area map. The white background indicates the site is outside of any IBAs.

Socio Economic aspect

- The project area is in Springs one of the towns in the city of Ekurhuleni. This city has approximately two million inhabitants occupying nine small towns and 17 townships (www.ekurhuleni.gov.za, 2020/2021).
- The official map of Springs was registered in Pretoria on the 16th of September 1884 (APelser Archaeological Consulting, 2023).
- In 1904, Springs was founded as a coal and gold mining town and the discovery of coal and gold, and its subsequent mining increased the value of the land considerably (APelser Archaeological Consulting, 2023). Before that, the land's value was equal to R20. That is one of the reasons “Springs is currently one of the industrial centres of the Witwatersrand and the Eastern Gateway of Gauteng towards Mpumalanga and Northern KwaZulu Natal. Mining has been replaced by manufacturing and engineering industries of economic importance; products of the region include processed metals, chemicals, paper, and foodstuffs” (APelser Archaeological Consulting, 2023).
- In 2018, the working age in the city was 2.47 million which increased from an average annual rate of 2.08% since 2008 (www.ekurhuleni.gov.za, 2020/2021)
- It is important to note that a higher working age population group contributes to the growth of the economy and “people of working age tend to uphold higher consumption patterns and a denser concentration of working age people is supposed to decrease dependency ratios given that the additional labour which is offered to the market, is absorbed” (www.ekurhuleni.gov.za, 2020/2021).
- In the first quarter of 2019, the unemployment rate in South Africa was at 27,6% which had increased when comparing it to the 0.5% in Q4:2018. “The Ekurhuleni unemployment however remained above the national and provincial rates even though there was a 1.1% decline to 30.1% in Q1:2019 from 31.2% in Q4:2018” (www.ekurhuleni.gov.za, 2020/2021).
- According to the Integrated Development of the City of Ekurhuleni, unemployment in the city remains a challenge. This is indicated by the rate of jobless individuals which exceeds the provincial average by more than 1%, at 30.1%.
- The number of formally employed individuals in the city in 2018 was reported to be 1.05 million, which was about 85.72% of total employment (www.ekurhuleni.gov.za, 2020/2021).

- The number of individuals employed in the informal sector in 2018 was counted to be 176 000, which is 14.28% of the total employment (www.ekurhuleni.gov.za, 2020/2021). But informal employment in Ekurhuleni increased from 135 000 in 2008 to an estimated 176 000 in 2018.
- In 2018, it was reported that there were 1.71 million people living in poverty in the city of Ekurhuleni and this was 15.49% higher than the 1.48 million in 2008. But the percentage of people living in poverty has since decreased from 51.98% in 2008 to 47.80% in 2018, which shows a decrease of 4.18 percentage points.

Visual

- There is a **Very High** Landscape (Solar) theme according to the Screening Report.
- Even though the screening report indicated a very high sensitivity theme, the site sensitivity verification report supports a low to medium sensitivity rating because the proposed development is located within an industrial setting, surrounded by large offices and factories as well as one side of the footprint having an intact wall. The wall is on the north side of the footprint, which will help absorb most of the reflection from the solar panels.
- A visual impact assessment will be conducted.

Civil Aviation

- There is a **medium** Civil Aviation theme according to the Screening Report. The site sensitivity verification report also supports the sensitivity theme rated by the screening report.
- Based on the Civil Aviation Compliance Statement published in the Government Gazette, having a medium civil aviation sensitivity theme in a project area means that there is low potential for negative impacts on the civil aviation installation and if there are impacts there is a high likelihood of mitigation. Further assessment of the potential impacts may not be required (Anon., 2020). And the site sensitivity verification report for the development area supports the current sensitivity.

Defense

- The **Low** Defence theme according to the Screening Report.
- According to the Defense Compliance Statement published in the Government Gazette, if there is low sensitivity in the study area, then it means there are no negative impacts on the defence installation that would be expected and it is unlikely for further assessment and mitigation measures to be required (Anon., 2020).

Heritage and cultural aspect:

- When dealing with heritage and cultural aspects: palaeontological and archaeological features, the National Heritage Resources Act no 25 of 1999 needs to be considered.

Archaeology and Heritage

- The study area is not within a World Heritage Site or within 10 km of a World Heritage Site. And the screening report indicated a low Archaeological and Cultural Heritage Sensitivity theme (Ecoleges, 2022).
- The site sensitivity verification report also supported the low sensitivity rating stipulated by the screening report, it further indicated that based on the Gazetted general Requirement Assessment Protocol, a low sensitivity is associated with a compliance statement and exemption application.

Paleontology

- The project footprint has a **Very High** Palaeontology theme according to the Screening Report, but the site sensitivity verification report supported a high rating of the sensitivity theme. The Gazetted general Requirement Assessment Protocol indicated that if the sensitivity of the site is high or very high, then a specialist assessment is required.
- Ecoleges Environmental Consultants in conjunction with Soventix South Africa (Pty) Ltd, appointed APelser Archaeological Consulting cc (APAC cc) to provide a motivation for Exemption from a Full Phase 1 HIA comprising a Cultural Heritage, Archaeology & Palaeontology Compliance Statement, related to the proposed Element Six Solar PV development by Soventix SA.
- **The following information was taken from the Motivation for Exemption from a full Phase I Heritage Impact Assessment - Proposed development by Soventix SA of a 1.8MWp solar PV for Element Six, Nuffield, Springs, City of Ekurhuleni, Gauteng Province prepared by APelser Archaeological Consulting cc (APelser Archaeological Consulting, 2023):**

"In terms of the National Heritage Resources Act, no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that prior to development it is incumbent on the developer to ensure that a Heritage Impact Assessment

is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling, and dating sites that are to be destroyed, must be done as required.

The quickest process to follow for the archaeological component is to contract an accredited specialist (see the web site of the Association of Southern African Professional Archaeologists www.asapa.org.za) to provide a Phase 1 Archaeological Impact Assessment Report. This must be done before any large development takes place. The Phase 1 Impact Assessment Report will identify the archaeological sites and assess their significance. It should also make recommendations (as indicated in section 38) about the process to be followed. For example, there may need to be a mitigation phase (Phase 2) where the specialist will collect or excavate material and date the site. At the end of the process the heritage authority may give permission for the destruction of the sites.

Where bedrock is to be affected, or where there are coastal sediments, or marine or river terraces and in potentially fossiliferous superficial deposits, a Palaeontological Desk Top study must be undertaken to assess whether the development will impact upon palaeontological resources - or at least a letter of exemption from a Palaeontologist is needed to indicate that this is unnecessary. If the area is deemed sensitive, a full Phase 1 Palaeontological Impact Assessment will be required and if necessary, a Phase 2 rescue operation might be necessary. Please note that a nationwide fossil sensitivity map is available on SAHRIS to assist applicants with determining the fossil sensitivity of a study area.

If the property is small or disturbed and there is no significant site, the heritage specialist may choose to send a letter to the heritage authority motivating for exemption from having to undertake further heritage assessments. Any other heritage resources that may be impacted such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewsapes must also be assessed."

- In the motivation for exemption letter, APelser Archaeological Consulting cc indicated that the development footprint and its surrounding area has been extensively disturbed in the recent past by urban residential and industrial activities, and the original natural and historical landscape nearly completely transformed as a result. If there was any cultural heritage (archaeological and/or historical) sites or features that existed there in the past they would have been extensively disturbed or even destroyed as a result and the likelihood of any being present here is highly impossible.
- There are also no known Stone Age sites or artifacts present in the study area, the closest known Stone Age sites are those of Linksfield, Primrose, Waldrif and others (Bergh 1999: 4) and if any Stone Age artifacts are to be found in the area, then it would more than likely be single, out of context, stone tools.
- There are no Iron Age sites, features or objects existing in the study area. If there was a presence of those features, extensive disturbances of the recent past would have destroyed all evidence.
- There are some aerial images (Google Earth) of the site of the proposed development area footprint, they show the heavily disturbed nature of the area (due to urban related residential and industrial activities), while no real sites, structures or any remains of cultural heritage significance are visible on these images, except some structures that have been demolished somewhere between 2002 & 2008. The age and nature/function of these structures are unknown, but these likely existed before this image (the earliest Google Earth view available) was taken, and it can hardly be determined if these are structures are older than 60 years of age or not, but if they were older than 60 years, then their near completed demolition between 2002 and 2008 have totally weakened any possible cultural heritage significance if indeed it existed. There are no real traces of remains on the site, therefore an on-site assessment is not recommended.
- Recent historical (mainly urban related residential and industrial) activities contributed to the complete destruction of any historical origin if they did exist on the site in the past and would have been disturbed or destroyed to a large degree, thus it is highly unlikely that any significant sites, features or material of cultural heritage (archaeological and/or historical) origin and/or significance will exist in the study area & proposed development area.
- The onsite pile testing report prepared for the footprint indicated that the area has been previously disturbed or built upon as there were areas with building rubble materials identified and the loose nature of the soil in parts looked to have been filled in the past.

8. RECOMMENDATION OF THE PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the Environmental Assessment Practitioner as bound by professional ethical standards and the code of conduct of EAPASA).

<u>YES</u>	NO
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If "NO", indicate the aspects that require further assessment before a decision can be made (list the aspects that require further assessment):

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

A suitably qualified, experienced & independent Environmental Control Officer (ECO) must be appointed prior to commencement of construction and remain employed until completion of rehabilitation and any post-construction monitoring.

Environmental Incidents must be addressed in terms of section 30 of the National Environmental Management Act, 107 of 1998 including quantifying what constitutes an incident as described in the GUIDELINES ON THE ADMINISTRATION OF INCIDENTS, published by the Department of Environmental Affairs, 2019.

Any formal stormwater structures must include inter alia permeable hard structures to increase infiltration and ensure a rate of release which will not impact negatively on the natural flow capacity of rivers, wetland and streams in accordance with the Gauteng Environmental Management Framework (GEMF), 2018; nor exceed the hydrological capacity of existing services.

9. THE NEEDS AND DESIREBILITY OF THE PROPOSED DEVELOPMENT (as per notice 792 of 2012, or the updated version of this guideline)

1. How will this development (and its separate elements / aspects) impact on the ecological integrity of the area?

The results of the screening report generated by the DFFE website indicated a very high terrestrial biodiversity theme on the study area and the sensitivity is of endangered ecosystems. Even though the screening report rated terrestrial biodiversity with a high sensitivity, the site sensitivity verification report supports a rating of low to medium sensitivity terrestrial biodiversity within the development footprint and the map generated on the DFFE National Screening tool for Ekurhuleni terrestrial critical biodiversity showed that the area is not in any CBA or ESA. However, it is surrounded by an ESA1 and CBA1. This means that there is no species of ecological importance in the area or any species that needs to be conserved or protected. This also means that the development will not have any impact on areas classified as ESAs, CBAs.

The ecosystem of the project area will be altered through disturbance of the land and in situ vegetation due to the construction of the solar PV, but in the medium to long-term, it is possible that due to the creation of microclimates created beneath the solar panel arrays, a higher net primary production may result.

The site is also relatively small and is already surrounded by other approved developments, it is not likely to be viewed as a current priority for formal conservation expansion or any other form of conservation.

1.1. How were the following ecological integrity considerations taken into account?

1.1.1. Threatened Ecosystems

The project area lies in the Tsakane Clay Grassland vegetation type which is included in the Gauteng protected area expansion as one of the protected areas. Tsakane Clay Grassland is endangered according to the book published by Mucina and Rutherford titled "The Vegetation of South Africa, Lesotho and Swaziland" and the book also highlights the target conservation percentage for the vegetation type area which is 24%, but only 1,5% of it is protected. Since the study area is not in any protected area, we can conclude that it is in the unprotected portion of the vegetation type. The Ecosystem status is also rated Endangered in the 2022 revised National List of Threatened Terrestrial Ecosystems.

The map generated on the DFFE National Screening tool for the city of Ekurhuleni Wetland CBAs, indicates that there are no NFEPA wetlands occurring with the footprint. The site sensitivity verification report of the project footprint also supported the screening report result. It also indicated that even though there are no wetlands within the site, there is still two wetlands within 500m to the site. The map on the environmental attributes sections also indicated the position of the project area relative to the two wetlands. These wetlands are categorized as ESA1 Priority for restoration. According to the draft Bioregional Plan of the City of Ekurhuleni, wetlands under the ESA1 Priority for restoration category must be maintained in their natural state because they perform essential role in terms of land scape and aquatic connectivity.

When viewing the Project area on the Ekurhuleni Metropolitan Municipality ArcGIS webmap application, you can see that even though the site is near the NFEPA wetlands, there is already other development areas that are between the site and the wetlands. The project footprint is also already in the premises of the Element Six property which is already based in an industrial zone.

1.1.2. Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.

The potential impacts were assessed by the following appointed specialists in relation to sensitive, vulnerable, highly dynamic, or stressed ecosystems, and a Compliance Statement issued:

- Terrestrial Ecology Assessment; and

- Aquatic Biodiversity Impact Assessment.

The project area is not in a vulnerable ecosystem since it falls under an endangered ecosystem that is partially or not protected which was highlighted by the map on the BGIS mapviewer of SANBI which showed that the area does not fall in a protected area. Meanwhile the screening report showed a very high terrestrial biodiversity sensitivity theme and a medium animal species sensitivity theme. The site sensitivity verification report supported a low to medium sensitivity rating for terrestrial biodiversity and a low sensitivity rating for animal species. Because the proposed footprint has a limited number of suitable habitats for the affected species, which includes manicured lawn surrounded by a few sparse exotic trees. There is no wetland within the site that can provide a habitat for many of the animal species of conservation concern listed. There is still going to be an effect caused by the development project because there will be removal of the manicured lawn and the exotic trees, leaving the soil bare which will lead to erosion, production of dust, fire, alien vegetation introduction and proliferation, poor waste management resulting in increase in pest numbers, as well as chemical spills. The fewer species that are already there they will also be affected by the removal of the exotic trees.

The wetlands will hardly be affected by the proposed development even though they are within 500m from the development project because the study area is already within the premises of Element Six there is already other developed areas or buildings between the wetlands and the Element Six premises. The aquatic species will also be hardly impacted because the site sensitivity verification report supported a low sensitivity rating for aquatic biodiversity because there are no wetlands within the study area, even though the screening report indicated a very high aquatic biodiversity sensitivity theme. The map on the BGIS map viewer of SANBI there is no alien invasive species in the development area, hence there will be no impact on them.

1.1.3. Critical Biodiversity Areas (“CBAs”) and Ecological Support Areas (“ESAs”)

The terrestrial biodiversity map and the wetland map for the development area, indicate that the project area does not overlap or is not in any CBA, ESA but is surrounded by those areas.

The following assessments were conducted, and Compliance Statements issued:

- Terrestrial Ecology Assessment
- Aquatic Biodiversity Impact Assessment; and
- Agricultural Assessment

1.1.4. Conservation targets

The Gauteng Conservation Plan (Version 3.3) (GDARD, 2014b) classified areas within the province based on their contribution to reaching the conservation targets within the province. These areas are classified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) to ensure sustainability in the long term. The CBAs are classified as either ‘Irreplaceable’ (must be conserved), or ‘Important’.

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near-natural state then biodiversity targets cannot be met (Terrestrial Ecology Statement, The Biodiversity Company).

The project area was not superimposed on the Gauteng Biodiversity Conservation Plan, as the maps generated indicated that the project area is not in any of the above-mentioned areas. Even though it might be located near those areas. Since the areas do not fall under protected portion of the Tsakane Grassland Vegetation type, therefore this means that these areas cannot realistically contribute towards the conservation plan's set targets given the location and context of the site.

Also, the following assessments were conducted, and Compliance Statements issued:

- Terrestrial Ecology Assessment;
- Aquatic Biodiversity Impact Assessment; and
- Agricultural Assessment

1.1.5. Ecological drivers of the ecosystem

A driver is any natural or human-induced factor that directly or indirectly causes a change in an ecosystem. A direct driver unequivocally influences ecosystem processes. An indirect driver operates more diffusely, by altering one or more direct drivers.

The proposed Solar PV plant construction is considered to have the potential to cause a slight change in the state of the ecosystem. The impacts and quantification of cumulative impacts were assessed by the following appointed specialists:

- Terrestrial Ecology: The site sensitivity verification report for the development footprint supports a low to medium Terrestrial Biodiversity sensitivity theme because the footprint is on a highly transformed location and within an industrial context and largely disconnected functionally from the rest of the landscape. It also supported a low sensitivity rating for animal species theme because there is a limited number of suitable habitats for the affected species on the proposed footprint, which includes manicured lawn surrounded by a few sparse exotic trees.
- Agricultural Assessment: The screening report showed a high Agricultural Sensitivity theme, but the site sensitivity verification report supported a low Agricultural Sensitivity theme because the development footprint is already in an industrialised setting which does not support agricultural activities.
- Aquatic Biodiversity Impact Assessment: Still waiting for specialist report.

1.1.6. Environmental Management Framework

The project area falls within a zone 5 land as indicated by the screening report and in the Gauteng Provincial Environmental Management Framework of March 2022, a zone 5 land mainly includes Industrial and large commercial areas. It also states that development in this area must be sustainable in respect to the capacity of the environment and specifically the hydrological system to absorb additional sewage and stormwater loads of increased densities; and it must identify any unmapped wetlands, especially seep areas that may occur on any site and when necessary, apply for the required water use licence. The solar energy falls under the preferred energy source that is allowed to be installed in this zone.

The 2008 EMF did also note that solar technologies 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.

1.1.7. Spatial Development Framework

Chapter 7, on page 213 of the 2020/21 Final IDP, is the Ekurhuleni Municipality SDF, which concludes that the Ekurhuleni MSDF seeks to align the Ekurhuleni spatial development with new legislation and with large-scale new developments in the region. As such, this plan should ensure that the future spatial development of the metropolitan area will be sustainable and that it will contribute to the wellbeing of all its citizens.

This solar PV project will help ensure an uninterrupted supply of electricity to the Element Six facility, which aligns with the SDF. The development project is also in line with the objectives of the spatial development framework which may include promotion of sustainable development; promotion of the development of a sustainable compact urban structure and optimising job creation capacity of the formal economy, just to mention a few.

1.1.8. Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.)

Climate change is one of the most important environmental issues facing the world today. The impact of climate change is a reality, and it cuts across all climate-sensitive sectors including the energy and agriculture sector. Fortunately, the proposed Solar PV Plant is not on a RAMSAR site, and the project will not contribute negatively to climate change. Instead, the project will help mitigate against climate change by reducing the Applicant's reliance on electricity generated by coal-fired power stations, which are a leading contributor to the emission of greenhouse gases responsible for global warming. It will also contribute to meeting the national renewable energy targets set by the Department of Energy (DoE).

Objectives of the White Paper were considered in the five major facilitative areas below:

Financial instruments

- To ensure that an equitable level of national resources is invested in renewable technologies, given their potential, and compared to investments in other energy supply.
- To set targets for directing of public resources for implementation of renewable energy technologies.
- To extend existing state financial support systems and institutions and introduce sustainable financing mechanisms for delivering renewable energy systems.
- To introduce suitable fiscal incentives for renewable energy.
- To create an investment climate for the development of the renewable energy sector, which would make it easy to attract foreign and local investors.

Legal instruments

- To develop an appropriate legal and regulatory framework for pricing and tariff structures to support the integration of renewable energy into the energy economy and to attract investors.
- To develop an enabling legislative and regulatory framework to integrate independent power producers into existing electricity systems.
- To develop an enabling legislative framework to integrate local producers of liquid fuels and gas from renewable resources into their respective systems.

Technology development

- To promote the development and implementation of appropriate standards and guidelines and codes of practice for the appropriate use of renewable energy technologies.
- To support appropriate research and development and local manufacturing to strengthen renewable energy technology and optimise its implementation.

Awareness raising, capacity building and education

- To promote knowledge of renewable energy and increase its use.
- To promote and stimulate the renewable energy market through dissemination of information on economic, environmental, social and trade benefits of renewable energy technologies and their applications. To persuade institutions to implement training and education programs on renewable energy.
- To actively involve women in decision-making and planning on renewable energy activities.
- To improve communication and interaction between Government and other institutions on renewable energy policies.

Governance

- The Department of Minerals and Energy (now the Department of Energy; DoE) would take overall responsibility for the development of renewable energy policy coordination in South Africa, but would work with the necessary government departments to create the required enabling environment, i.e. the devolution of responsibility to the most appropriate level of government;
- The National Energy Regulator, the South African Bureau of Standards and the Central Energy Fund are specifically cited as key role players (Page 32 & 33 of the State of Renewable Energy in SA, 2015).

1.2. How will this development disturb or enhance ecosystems and / or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?

An impact assessment will be undertaken to show that almost all identified impacts can be affectively mitigated, indicating that the cumulative impact effect will also be mitigated. Additional impacts and quantification of cumulative impacts were assessed by the following appointed specialists:

- Terrestrial Ecology: The site sensitivity verification report indicated a low to medium sensitivity terrestrial biodiversity there because of the limited number of suitable habitat which includes manicured lawn surrounded by a few sparse exotic trees. and there are no wetlands within the site, thus there will be no impact on wetland.
- Aquatic Assessment
- Visual Assessment
- Agricultural Assessment
- For the heritage and cultural aspects (Archaeology and Paleontology Assessment), Ecoleges Environmental Consultants in conjunction with Soventix South Africa (Pty) Ltd, appointed APelser Archaeological Consulting cc (APAC cc) to provide a motivation for Exemption from a Full Phase 1 HIA comprising a Cultural Heritage, Archaeology & Palaeontology Compliance Statement, related to the proposed Element Six Solar PV development by Soventix SA. The motivation indicated that the development footprint, and its surrounding area has been extensively disturbed in the recent past by urban residential and industrial activities, and the original natural and historical landscape nearly completely transformed as a result. If there was any cultural heritage (archaeological and/or historical) sites or features that existed there in the past they would have been extensively disturbed or even destroyed as a result the intense industrialization and the likelihood of any being present here is highly impossible. An aerial image of the development footprint in a disturbed state and completely demolished structures in the same area was included in the desktop study, this image was taken between 2002 & 2008. The age of these structures is unknown, and it can hardly be determined if they are older than 60 years of age due to their state. Their state since 2002 and 2008 has totally weakened any possible cultural heritage significance if indeed it existed. This means that the development within the site will not have an impact on the heritage and cultural features.

1.3. How will this development pollute and / or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimize and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?

An Impact Assessment was undertaken to address and tackle impacts that might occur, measures that were explored to avoid, reduce and/or remedy these impacts.

There are different sources of pollution during construction, but very little to no pollution during operation because, for example, there are zero emissions to the air when the sun's light is converted into electrical energy. Operation and maintenance activities are very low and therefore likely to produce minimal waste if any. However, a potential source of pollution can result from the disposal of solar PV panels once they have reached the end of their life.

The positive impacts of this development are solely for the applicant – continuous uninterrupted energy supply and temporary employment for the community. These can be enhanced by a positive outcome of this Environmental Authorisation application.

1.4. What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?

Construction waste, general waste and waste Solar PV panels are going to be generated by this development. Measures that were explored to minimize, reuse and/or recycle the waste are discussed in the Environmental Management Programme.

An integrated waste management approach will be implemented that is based on waste minimization and will incorporate reduction, recycling, re-use, and disposal where appropriate. Any solid waste, which will not be reused or recycled, will be disposed of at a landfill licensed in terms of section 20 (b) of the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008).

1.5. How will this development disturb or enhance landscapes and / or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimize and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?

A Visual & Heritage Impact Assessment was undertaken to address how this development will disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage.

Even though the screening report indicated a very high sensitivity landscape theme, the site sensitivity verification report supports a low to medium sensitivity rating because the proposed development is located within an industrial setting, surrounded by large offices and factories as well as one side of the footprint having an intact wall. The wall is on the north side of the footprint, which will help absorb most of the reflection from the solar panels.

There is not going to be any disturbance or impact on the nation's cultural heritage because according to the motivation for exemption from full phase I heritage impact assessment, there are no cultural heritage features in the site due to historical activities that completely transformed the site and its surroundings. If there was presence of any historical features in the development, they would have been completely disturbed or destroyed.

The following information was taken from the Motivation for Exemption from a full Phase I Heritage Impact Assessment - Proposed development by Soventix SA of a 1.8MWp solar PV for Element Six, Nuffield, Springs, City of Ekurhuleni, Gauteng Province prepared by APelser Archaeological Consulting cc:

- In the motivation for exemption letter, APelser Archaeological Consulting cc indicated that the development footprint and its surrounding area has been extensively disturbed in the recent past by urban residential and industrial activities, and the original natural and historical landscape nearly completely transformed as a result. If there was any cultural heritage (archaeological and/or historical) sites or features that existed there in the past they would have been extensively disturbed or even destroyed as a result and the likelihood of any being present here is highly impossible.
- There are also no known Stone Age sites or artifacts present in the study area, the closest known Stone Age sites are those of Linksfeld, Primrose, Waldrif and others (Bergh 1999: 4) and if any Stone Age artifacts are to be found in the area, then it would more than likely be single, out of context, stone tools.

- There is no Iron Age sites, features or objects existing in the study area. If there was a presence of those features, extensive disturbances of the recent past would have destroyed all evidence.
- There are some aerial images (Google Earth) of the site of the proposed development area footprint, they show the fairly heavily disturbed nature of the area (due to urban related residential and industrial activities), while no real sites, structures or any remains of cultural heritage significance are visible on these images, except some structures that have been demolished somewhere between 2002 & 2008. The age and nature/function of these structures are unknown, but these likely existed before this image (the earliest Google Earth view available) was taken, and it can hardly be determined if these are structures are older than 60 years of age or not, but if they were older than 60 years, then their near completed demolition between 2002 and 2008 have totally weakened any possible cultural heritage significance if indeed it existed. There are no real traces of remains on the site, therefore an on-site assessment is not recommended.
- Recent historical (mainly urban related residential and industrial) activities contributed to the complete destruction of any historical origin if they did exist on the site in the past and would have been disturbed or destroyed to a large degree, thus it is highly unlikely that any significant sites, features or material of cultural heritage (archaeological and/or historical) origin and/or significance will exist in the study area & proposed development area.

1.6. How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?

This development will have a huge positive impact on non-renewable natural resources, specifically coal, in the sense that it will use renewable energy, reducing dependency on coal. This is the measure that is being explored to ensure responsible and equitable use of the resources. This development will decrease the level or rate of non-renewable natural resources depletion, such as coal, because as time goes on, Element Six will switch to complete use of the renewable energy from the PV Facility. This Environmental Authorisation application is to legalise the development, to minimise and remedy the impacts, while enhancing the positive impact of not depending on coal for electricity generation.

1.7. How will this development use and / or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and / or impact on the ecosystem jeopardise the integrity of the resource and / or system considering carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?

The proposed development will not use or impact on any renewable natural resource or the ecosystem other than municipal water and sunshine. Consequently, the integrity of any natural resource within the ecosystem will not be jeopardized.

1.7.1. Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)

This development will reduce resource dependency, specifically on coal. Anticipated water usage during construction shall not exceed the municipality's capacity to supply said water. As such the use of this resource is not anticipated to impact on or jeopardise the integrity of the resource or system, etc. In terms of water requirements, the proposed project will utilise the municipal water access.

All nonrecyclable waste would be disposed of at the Boksburg or Ekurhuleni licensed landfill site.

1.7.2. Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)

It is our opinion that the use of the land to develop a solar PV facility does constitute the best use thereof, particularly if compared with the existing no-go option. Because it is vacant and is not being used for anything, even though it is kept in good condition and well maintained. Its controlled development and management will help secure the integrity of the land, and benefit existing and future generations indirectly

through climate change mitigation. Given the location of the land adjacent to the development area and within an industrial area, there can be no more important priority than to support the existing local economy whilst striving to do so in an environmentally sustainable manner.

- The proposed project will be undertaken and implemented in conjunction with the pre-existing land use practices, the opportunity costs associated with the combined land uses are greatly improved. But the potential impacts associated with the proposed project were nonetheless assessed by appointed specialists that will concentrate on appropriate environmental aspects related to the proposed activity. These will be on a bio-physical and socio-economic level to determine whether replacing the current land use or next best alternative will create an unacceptable loss in opportunity costs.
- South Africa experiences some of the highest levels of solar radiation in the world and this renewable resource holds great potential for the country. The total area of high radiation in South Africa amounts to approximately 194 000 km². With electricity production per square kilometre of mirror surface in a solar thermal power station being 30.2 MW, and just 1% of the high radiation area in the country being made available for solar power generation, the generation potential is approximately 64 GW. Solar energy has the potential to contribute quite substantially to South Africa's future energy needs. This would, however, require large investments in transmission lines from the areas of high radiation to the main electricity consumer centres. (Page 53 GG # 40445 - 25 November 2016).

1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?

Yes, the applicant will now depend less on Eskom or the Municipality for the supply of energy, meaning less use of coal. However, during construction, more water will need to be gathered from elsewhere.

Also, the project outcomes align with the national, local, and regional planning objectives in terms of economic development and sustainability. The project will enable Element Six to deal with the disruptive impact of load shedding on the manufacturing sector and assist in reducing the country's dependency on coal as source of energy. The project is in support of the manufacturing sector and is aligned with Ekurhuleni's 10 Point development plan in terms of manufacturing revitalization and use of land for strategic development. The development is making use of undeveloped land inside the urban area, making the area less fragmented.

1.8. How were a risk-averse and cautious approach applied in terms of ecological impacts?

A terrestrial biodiversity assessment and an aquatic study were undertaken to assess how the area is going to be affected and identify mitigations on how to avoid, minimise and mitigate the impacts. As mentioned before the site sensitivity verification report supported a low to medium terrestrial biodiversity theme due to the limited number of suitable habitats to support the species.

Ecological Risks (as opposed to impacts) were mitigated irrespective of whether they were significant or not. Furthermore, any residual risk after mitigation will be managed using additional mitigations appropriate to the residual risk. Impacts with a moderate or high nature (as opposed to low) will be assessed as significant and managed accordingly if they have >5% probability of occurring.

1.8.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?

The Impact Assessment and Specialists Studies undertaken list the gaps, uncertainties and assumptions associated with the project.

1.8.2. What is the level of risk associated with the limits of current knowledge?

Impact Assessment

Specialist Studies and the Impact Assessment have assessed the level of risk.

1.8.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?

An Environmental Management Programme (EMPr) with mitigations was formulated, including mitigations which help minimise risks associated with the limits and gaps in the knowledge or techniques used for the assessments.

1.9. How will the ecological impacts be resulting from this development impact on people's environmental right in terms following:

1.9.1. Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?

The project will not affect the environmental rights of any of the affected stakeholder groups and no-one's livelihoods will be affected in a negative manner. The project will not result in any unfair discrimination or affect the social and environmental rights of any of the stakeholder groups, should the mitigation measures be implemented as suggested. From a social perspective the positive impact that the project will have on the affected environment outweighs the negative impacts by far, and where there are negative impacts, it can be mitigated. The project has the potential to contribute to more integrative surrounding settlements. The proposed development is in a semi-industrial area and will assist in maintaining job security for the workers in the Element Six facility. Additionally, temporary jobs will be created during the construction phase as well as several permanent jobs during operation.

1.9.2. Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?

Positive impacts include, but are not limited to:

- Creation of job opportunities; and
- Lesser burden on the City of Ekurhuleni's energy demand.
- Reduce dependence on coal-fired powered stations, and in so doing indirectly contribute to improved air quality, climate change mitigation, etc.
- The project outcomes also align with the national, local, and regional planning objectives in terms of economic development and sustainability.
- The project will enable Element six to deal with the disruptive impact of load shedding on the manufacturing sector and assist in reducing the country's dependency on coal as source of energy.
- The project is in support of the manufacturing sector and is aligned with Ekurhuleni's 10 Point development plan in terms of manufacturing revitalization and use of land for strategic development.
- The development is making use of undeveloped land inside the urban area, making the area less fragmented.

1.10. Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?

There are hardly any linkages as people do not have direct access to the site and the site does not show to contribute to the surrounding community in any meaningful way, there will also be no loss of heritage site as mention before the site is in a highly industrialised location and aerial images that were taken for the site and its surrounding structures between 2002 and 2008 show that the site was already highly disturbed state and there were no heritage features present due to the intense transformation of the area. If they were any at that time, they would have been demolished or destroyed. This means that there are no real traces of remains on the site.

The site for proposed PV facility is in an urban area. Very few impacts from a social nature are expected resulting from the construction and operation of a solar facility on the site. Given the positive impact the development will have in the sense that it will use renewable energy, avoiding manufacturing delays through the supply of electricity and the reducing dependency on coal, from a social perspective it is recommended that the project proceeds.

1.11. Based on all the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?

A terrestrial biodiversity impact assessment was undertaken in October 2021, and compliance statement concluded as follows:

The high terrestrial / biodiversity theme species sensitivity is disputed on the screening report and as mentioned before, we are still waiting for the assessment reports. As mentioned before the site sensitivity verification report for the development footprint supports a low to medium Terrestrial Biodiversity sensitivity theme because the footprint is on a highly transformed location and within an industrial context and largely disconnected functionally from the rest of the landscape. It also supported a low sensitivity rating for animal species theme because there is a limited number of suitable habitats for the affected species on the proposed footprint, which includes manicured lawn surrounded by a few sparse exotic trees.

Even though the site is surrounded by areas classified as ESAs, CBAs, the development on the site will hardly have an impact to these ecosystems because as the maps showed they are not occurring within the site. Furthermore, the location and context of the site proves that no impact will occur because the site already falls within the Element Six facility, the value of the site is also not considered exceptional.

1.12. Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the “best practicable environmental option” in terms of ecological considerations?

No alternatives were identified. The preferred alternative was chosen for its low ecological sensitivity, etc.

1.13. Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?

The Impact Assessment undertaken indicated that there are no significant cumulative impacts or risks expected.

2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?

2.1.1. The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area

Municipal IDP (page 82) lists “renewable/alternative energy” as one of its strategic interventions (for 2018/19 – 2020/21) to protect the natural environment and promote resource sustainability. On page 77 of the final integrated development plan, the city of Ekurhuleni also included the sustainable goals which they adopted on the 15th of September 2015. The use of renewable resources was amongst the other goals, and the Solar PV installation at Element six falls under sustainable development goals that the city strives for which is the usage of renewable energy.

The Ekurhuleni IDP's ultimate objective is the continuous improvement of the implementation of the Municipality's five-year objectives and ensuring improved service delivery and responsiveness to the citizens of the city. Chapter 10 of the IDP (2017/18 to 2020/21) highlighted five strategic objectives which include the following:

1. **Strategic objective 1: To promote integrated human settlements through massive infrastructure and services roll out:** The objective of this strategy is promoting integrated human settlements by ensuring universal access to basic services to improve the lives of people especially in informal settlements.
2. **Strategic Objective 2: To Build a Clean, Capable and Modernised Local State**
3. **Strategic Objective 3: To Promote Safer, Healthy and Socially Empowered Communities:** This strategic objective is to address issues related to access to healthcare, Early Childhood Development (ECD) embracing the needs of vulnerable groups and social development amongst others.
4. **Strategic Objective 4: To Protect the Natural Environment and Promote Resource Sustainability:** The objective of this strategy is to encourage the city to continue protecting the natural environment and promote resource sustainability. It also encourages the city to introduce alternative energy resources, such as the use of renewable energy which must be investigated and implemented. The Ekurhuleni waste minimization strategy will also be executed to reduce waste in the landfill sites and to improve the cleanliness of the City; this will also include intensifying the recycling project.
5. **Strategic Objective 5: To create an enabling environment for inclusive growth and job creation:** The objective of this strategy is to seek to drive a functional and inclusive economy with full scale implementation of the Aerotropolis and projects meaningfully linked to skills development, job creation and an innovation infrastructure by 2021.

2.1.2. Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.)

The proposed project will be located in Ward 32 of the City of Ekurhuleni Metropolitan Municipality in the Gauteng Province. Gauteng is divided into three metropolitan municipalities, namely City of Johannesburg, City of Tshwane, and City of Ekurhuleni, and two district municipalities, namely Sedibeng and West Rand.

The project outcomes align with the national, local, and regional planning objectives in terms of economic development and sustainability. The project will use a natural, renewable resource and assist with decreasing the country's reliance on coal as a source of energy. The project will not affect the environmental

rights of any of the affected stakeholder groups and no-one's livelihoods will be affected in a negative manner.

The project will not result in any unfair discrimination or affect the social and environmental rights of any of the stakeholder groups, should the mitigation measures be implemented as suggested. From a social perspective the positive impact that the project will have on the affected environment outweighs the negative impacts by far, and where there are negative impacts, it can be mitigated.

Also as mentioned before the project lies within an industrial setting and it is also in the Element Six facility, thus there will be no need for integration of segregated communities, need to upgrade informal settlements or need for densification, etc.

2.1.3. Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.)

The proposed project will be located in Ward 32 of the City of Ekurhuleni Metropolitan Municipality in the Gauteng Province. Gauteng is divided into three metropolitan municipalities, namely City of Johannesburg, City of Tshwane, and City of Ekurhuleni, and two district municipalities, namely Sedibeng and West Rand.

Ward 32 (2016 boundaries) consists of the suburbs of Parkrand, Cinderella, Libradene, Farrar Park, Parkdene, Plantation, Cason, Boksburg, Satmar, Boksburg East Industrial, Boksburg South. The project area is in Springs in Gauteng, and on Erf 256 Nuffield and Portion 20 of the original farm Daggafontein 1251R. The proposed site is within the Element Six facility. The proposed development site is located within an industrial context and is surrounded by various industrial, commercial, and residential developments.

An Archaeological and Heritage Impact Assessment was also completed to address the cultural landscapes and heritage resources of the project area and the findings were incorporated into the Basic Assessment report.

2.1.4. Municipal Economic Development Strategy ("LED Strategy")

Although the concept of renewable energy is included in the Municipal goals and strategies, this Solar PV Plant is solely for the benefit of the applicant to ensure that production is not only depended on coal for energy and that loadshedding does not affect production.

The project outcomes align with the national, local and regional planning objectives in terms of economic development and sustainability. The project will use a natural, renewable resource and assist with decreasing the country's reliance on coal as a source of energy. The project will not affect the environmental rights of any of the affected stakeholder groups and no-one's livelihoods will be affected in a negative manner. The project will contribute to livelihood strategies of stakeholders in the area – directly through job creation and secondary economic opportunities, and indirectly through enterprise and socio-economic development by means of a community trust. Should the mitigation measures be implemented as recommended, the contribution to long-term sustainable outcomes will be significant. The project will complement the socio-economic benefits in the area.

2.2. Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?

The project will enable Element Six to deal with disruptive impact of load shedding on the manufacturing sector and assist in reducing the country's dependency on coal as source of energy. The project is in support of the manufacturing sector and is aligned with Ekurhuleni's 10 Point development plan in terms of manufacturing revitalization and use of land for strategic development. The development project falls under the electricity sector included in the final IDP of the city of Ekurhuleni, and the electricity sector is one of the key enablers of other economic activities.

2.2.1. Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?

The project's approval and success will contribute to city's economic development initiatives target which is creating income earning opportunities through developing business development infrastructure; stimulating and revitalising township economies; developing industry-related skills and job creation. Hence strengthening the economic state of the municipality.

2.3. How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?

The proposed development is in an industrial area and will assist in maintaining job security.

2.4. Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?

Yes, the development will result in equitable (intra- and inter-generational) impact distribution, as well as socially and economically sustainable in the short- and long-term because of the job creation and possible selling of energy to the municipality for the neighbouring factories and surrounding areas.

The most severe impacts will be in the construction phase, and more positive impacts will continue through the life of the project. Given the nature of the development and the potential long term positive social impacts it can be seen as a sustainable project.

2.5. In terms of location, describe how the placement of the proposed development will:

2.5.1. result in the creation of residential and employment opportunities near or integrated with each other

The approval of this Solar PV Plant will create employment opportunities for the local community, not so much residential opportunities, as this is already an industrial area.

2.5.2. reduce the need for transport of people and goods

Given that the Solar PV Plant construction will be on private land, thus this proposed project will have no impact on the need for transport of people and goods.

2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport)

The proposed project will not result in densification and the achievement of thresholds in terms public transport.

2.5.4. compliment other uses in the area

The proposed Solar PV Plant is solely for the use and/or use of the applicant to ensure continued operation, even in the inconveniencing times of loadshedding and will therefore not compliment other uses in the area.

The development will complement the needs of the manufacturing sector in the area.

2.5.5. be in line with the planning for the area

It is in line with manufacturing development in the area.

- Energy is essential to many human activities and is critical to the social and economic development of a country. One of the key objectives of the Department of Energy (DoE) is to ensure energy security which, in essence, is about ensuring the availability of energy resources, and access to energy services in an affordable and sustainable manner, while minimising the associated adverse environmental impacts. Many factors pose potential threats to energy security including scarce and depleting energy resources, geopolitical instability, inadequate energy infrastructure and, more recently, natural disasters. To ensure continued security of energy supply, it is essential that a co-ordinated and integrated approach to energy planning, which takes into account these complex issues, is undertaken (Page 11 & 12 of GG # 40445 - 25 November 2016).

- 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. From the myriad of factors which had to be considered and addressed during the Integrated Energy Planning process, eight key objectives were identified:

- 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.

(Page 26 & 27 of GG # 40445 - 25 November 2016).

2.5.6. for urban related development, make use of underutilised land available with the urban edge

The development is making use of a vacant land that is underutilised inside the urban area, making the area less fragmented.

2.5.7. optimise the use of existing resources and infrastructure

Sunlight will be used as natural resource, and the development will enhance the use of existing electricity infrastructure.

Electricity will be obtained from Eskom or the municipality via the existing supply to the site. The proposed project will strengthen the applicant's electricity grid for the facility and thus improve the available electrical services.

In terms of water requirements, the proposed project will utilize municipal water, already connected to the Element Six facility.

All non-recyclable waste would be disposed of at the Boksburg or Ekurhuleni licensed landfill site.

2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement)

This development is not provided for in the infrastructure planning of the municipality, as it is solely for the benefit of the applicant but will not have an impact on the infrastructure planning.

2.5.9. discourage "urban sprawl" and contribute to compaction/densification

The proposed project will use an undeveloped land within the Element Six facility to reduce fragmentation and avoid unnecessary urban sprawl into undisturbed areas.

2.5.10. contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure more than current needs

The project is solely for the benefit of the applicant, his workers (in terms of jobs and economic sustainability) and to ensure continual operation even in times of load shedding. It will have no effect on historically distorted spatial patterns as the area will remain an industrial dominated area.

2.5.11. encourage environmentally sustainable land development practices and processes

The proposed solar PV plant will provide renewable energy, which in a way encourages environmentally sustainable land development practices and processes by minimising the use of coal to produce energy, therefore also reducing the carbon footprint.

2.5.12. consider special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.)

The project area is in an industrial area and this preferred site is within the Element six facility, which is favourable to the applicant's energy needs and access.

2.5.13. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential)

The proposed project will ensure both temporary and permanent job and income for the people in the area.

The investment will bring significant social development and economic opportunities to the area and will diversify the economy.

2.5.14. impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area

Because the development footprint is in a industrialised and already disturbed location, thus Ecoleges Environmental Consultants in conjunction with Soventix South Africa (Pty) Ltd, appointed APelser Archaeological Consulting cc (APAC cc) to provide a motivation for Exemption from a Full Phase 1 HIA comprising a Cultural Heritage, Archaeology & Palaeontology Compliance Statement, related to the proposed Element Six Solar PV development by Soventix SA. The motivation indicated that the development footprint, and its surrounding area has been extensively disturbed in the recent past by urban residential and industrial activities, and the original natural and historical landscape nearly completely transformed as a result. If there was any cultural heritage (archaeological and/or historical) sites or features that existed there in the past they would have been extensively disturbed or even destroyed as a result the intense industrialization and the likelihood of any being present here is highly impossible. An aerial image of the development footprint in a disturbed state and completely demolished structures in the same area was included in the desktop study, this image was taken between 2002 & 2008. The age of these structures is unknown, and it can hardly be determined if they are older than 60 years of age due to their state. Their state since 2002 and 2008 has totally weakened any possible cultural heritage significance if indeed it existed. This means that the development within the site will not have an impact on the heritage and cultural features or socio-cultural and cultural-historic characteristics.

2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?

The project is solely for the benefit of the applicant, his workers (in terms of jobs and economic sustainability) and continual operation within the facility despite load shedding.

2.6. How were a risk-averse and cautious approach applied in terms of socio-economic impacts?

The project is solely for the benefit of the applicant and his workers (in terms of jobs and economic sustainability) and is unlikely to pose or have a risk-averse and cautious approach applied. The 1,8MWp Solar PV will be in a 2,2-ha area within the Element Six facility which indicates that it is not fairly a large photovoltaic plant and this is because it is solely for the applicant, it will be used within the facility. Construction of it will not pose any socio-economic impacts.

Moreover, the proposed solar PV plant will provide renewable energy, which in a way encourages environmentally sustainable land development practices and processes by minimizing the use of coal to produce energy, therefore also reducing the carbon footprint which in turn contributes to the socio-economy of the country.

2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?

- Apart from the mandatory PPP, no stakeholder consultation was conducted.
- The social environment constantly changes and adapts to change, and external factors outside the scope of the project can offset social changes, for example changes in local political leadership, droughts or economic conditions. It is therefore difficult to predict all impacts to a high level of accuracy, although care has been taken to identify and address the most likely impacts in the most appropriate way for the current local context within the limitations. In addition, it is also important to manage social impacts for the life of the project, especially in the light of the changing social environment.
- Social impacts can be felt on an actual or perceptual level, and therefore it is not always straightforward to measure the impacts in a quantitative manner.
- Social impacts commence when the project enters the public domain. Some of these impacts will occur irrespective of whether the project continues or not. This project is not going to be benefiting the public domain when it comes to distribution of electricity because it is for the applicant's access.
- Social impacts are not site-specific, but take place in the communities surrounding the proposed development. In this case the proposed development is solely for the applicant and it is in an area that is industrialized with less or no residential areas. We can therefore conclude by stating that there are no gaps, uncertainties and assumptions that must be clearly stated.

2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?

The level of risk is low and can be minimized or avoided, through the monitoring and/or adherence of the EMP. As minimal as the risks are, mitigations were sought and tailored to counteract the project-specific impacts and achieve goals and objectives in line with environmental best practices.

2.6.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?

The activities associated with the project were identified, before their impacts could be predicted. Safety nets were considered to capture those elements that were unidentified. Finally, mitigations were sought and tailored to counteract the project-specific impacts and achieve goals and objectives in line with environmental best practices. Finally, an Environmental Management Programme was formulated to help minimize and/or avoid any risks that might occur.

2.7. How will the socio-economic impacts be resulting from this development impact on people's environmental right in terms following:

2.7.1. Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimize, manage and remedy negative impacts?

The applicant is likely to keep his existing workforce and a similar situation for the contractor who is likely to be on site for no longer than ten (10) months. During which the daily/weekly toolbox talks will include but will not be limited to health, safety, environment and social.

Soventix and its contractors must develop an induction programme that includes a Code of Conduct for all workers (including sub-contractors). The induction programme must include HIV/AIDS awareness,

substance abuse programmes and education about alcohol abuse and gender-based violence. Any person that works on site must sign the Code of Conduct and presented with a copy.

If workers are found to be in contravention of the Code of Conduct, which they will be required to sign at the beginning of their contract, they will face disciplinary procedures that could result in dismissal. Stock theft should be noted as a dismissible offence.

2.7.2. Positive impacts. What measures were taken to enhance positive impacts?

The findings of assessments will be included in the Basic Assessment Report and an Environmental Management Programme will be formulated.

2.8. Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?

The project is solely for the benefit of the applicant, his workers (in terms of jobs and economic sustainability) and continual operation even in times of load shedding. And because the proposed development is completely within the applicant's facility, It is likely to have less or no social impacts. Thus, low to no significant ecological impacts.

2.9. What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?

Given the positive impact the development will have in the sense that it will use renewable energy, avoiding operation delays through the supply of electricity and the reducing dependency on coal, which will in turn contribute towards the City's economic development. From a social perspective there is not much differentiation between the sites because as mentioned before the site is already within an industrial setting.

2.10. What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)?

Given the distance of the project from communities, the adverse environmental impacts do not have social or environmental justice implications. Renewable energy is a clean form of energy and benefits the greater society. The DoE requires that local communities must benefit from these kinds of development.

2.11. What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?

The public participation process has identified all relevant interested and effected parties to ensure all aspects and potential concerns have been received and addressed in the final report.

The environmental resources affected by the proposed development are not used by local communities. The project aims to provide clean energy to the applicant's facility and therefore it assist with protecting ecosystem services.

2.12. What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?

Responsible persons were identified for each of the mitigations in the EMP, as well as a requirement for the independent monitoring of implementation by an ECO and IEA. Responsibility is maintained after construction, that is during rehabilitation by appointed personal to oversee monitoring of the site relating to, for example, erosion and alien plant recruitment.

2.13. What measures were taken to:

2.13.1. ensure the participation of all interested and affected parties

The public participation process, through the following, identified all relevant interested and effected parties to ensure all aspects and potential concerns received and addressed in the final report.

- A Notification/Background Information Document (BID) was distributed to all potential Interested and Affecter Parties (I&APs) on the 26th of January 2023.
- A newspaper advert was published on the Ekurhuleni News on the 26th of January 2023.
- Two Site Notices were erected on the fence boundary of the entrance and by the parking lot outside the reception on the site on 24th of January 2023.
- The 30 day-Registration of I&APs period ran from 26 January 2023 to 27 February 2023.

2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation

The area didn't require further understanding, skills and capacity to participate because the working class in an industrial area are generally well educated and literate.

2.13.3. ensure participation by vulnerable and disadvantaged persons

It was not deemed necessary to undertake additional measures to ensure the participation of vulnerable or disadvantaged persons as the project area is in an industrial area and populated mostly by generally well-educated and literate employees during business or working hours.

The previous Public Participation Processes that have been undertaken have proven that there are no vulnerable and disadvantaged persons.

2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means

This project is to reduce the dependency of the Element Six facility on coal-based energy sources by increasing its energy mix to include renewable energy through solar photo voltaic generation and in so doing reducing its long-term operational costs and Greenhouse Gases emissions.

It will decrease Element Six's dependency on Eskom's energy, allowing the community more energy and because the Basic Assessment Report will be available for public viewing, the community can learn the advantages and/or benefits of having another energy source, other than Eskom or the Municipality.

2.13.5. ensure openness and transparency, and access to information in terms of the process

Openness and transparency is maintained through the PPP, and specifically the distribution of draft reports for comment.

2.13.6. ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge

There actual PPP ensures that the interests, needs and values of all interested and affected parties are taken into account, and that adequate recognition is given to all forms of knowledge, including traditional and ordinary knowledge, by allowing for a 30day commenting period above the 30day registration period where the I&APs are given the opportunity to pose questions and requests clarity on the information given.

2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein where be promoted?

The environmental and water use authorisation processes were largely undertaken by qualified female practitioners, one of whom is enrolled as an intern, and learning from experienced mentors.

2.14. Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?

The project will solely benefit the applicant, unless the municipality provides the applicant with a mutually beneficial offer that he supplies part of the industrial area.

2.15. What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?

A section on social, health and safety has been incorporated into the Impact Assessments as well as the Environmental Management Plan The workforce will have relevant toolbox talks daily and everyone will be required to attend an induction before commencing work on the project.

2.16. Describe how the development will impact on job creation in terms of, amongst other aspects:

2.16.1. the number of temporary versus permanent jobs that will be created

There is going to be 40% of new skilled and 40% of new unskilled employment opportunities created in the construction phase of the project. There is going to be 66,67% of new skilled and 16,67% of new unskilled employment opportunities created in the operational phase of the project. The number of new employment opportunities during the operational phase will also be 6.

2.16.2. whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area)

The contractor will most likely bring his own technical team and hire from the local community for general workers and labourers.

2.16.3. the distance from where labourers will have to travel

The area is an existing industrial area. There is access to public transport to and from the site.

2.16.4. the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits)

It is considered that the proposed project will increase the benefits to the local community. The costs will be the applicant's responsibility and that equitable distribution of costs and benefits will be considered.

2.16.5. the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.)

The Department of Energy (DoE), through the RFP document, requires that all renewable energy bidders must illustrate how the Project will benefit the local community. At present, the DoE is stipulating that one percent of revenue generated by the project must be contributed towards socio-economic development. In accordance with the relevant BBBEE legislation and guidelines, up to four percent of profit after tax could be used for community development over and above that associated with expenditure in the area. The BBBEE Scorecard specifies the following contributions (totalling four percent):

- Enterprise development – maximum of 15 points awarded for the contribution of three percent of profit after tax, or more; and
- Socio-economic development – maximum of five points awarded for the contribution of one percent of profit after tax, or more.

Moreover, the contractor is likely to keep his technical and skilled workforce, and perhaps be requested to hire within the local communities for the general workers and or semi-skilled labourers.

A comparative opportunity cost is difficult to determine, in terms of job creation as it was vacant - unproductive land.

2.17. What measures were taken to ensure:

2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment.

Intergovernmental co-ordination was not required, because this is not an integrated application.

2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?

No conflicts of interests have arisen because of this project.

2.18. What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?

The site will not be exploited for any natural resources other than sunlight, and the management or maintenance of the development will retain the integrity of the land relative to the no-go option which is currently undeveloped.

2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?

The mitigation measures proposed are realistic and ensures proper rehabilitation. The environmental legacy will be to retain the integrity of the land for future generations and prevent it from degrading further. There will be no managed burden left, nothing like a mine's waste rock or acid mine drainage, for example. The only managed burden may relate to proper disposal or recycling of solar panels upon their expiry and the loss of jobs to those that will have secured temporal employment.

2.20. What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?

The Impact Assessment and Environmental Management Programme was formulated to cover ways and means of ensuring that all the stakeholders (applicant, contractor & ECO) take responsibility in combating harming the environment. Throughout the construction and operational phases environmental as well as health and safety awareness training should be provided to all employees to promote the effective implementation of the EMP actions. Furthermore accountability is enforced through section 28 of NEMA (Duty of Care) and will be enforced through the environmental authorisation.

2.21. Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?

All the specialists appointed identified sensitive areas which assisted in selecting the best practicable environmental options.

2.22. Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?

Positive: The project outcomes align with the national, local, and regional planning objectives in terms of economic development and sustainability. The project will use a natural, renewable resource and assist with decreasing the country's reliance on coal as a source of energy. The project will not affect the environmental rights of any of the affected stakeholder groups and no-one's livelihoods will be affected in a negative manner. The project will not result in any unfair discrimination or affect the social and environmental rights of any of the stakeholder groups, should the mitigation measures be implemented as suggested. From a social perspective the positive impact that the project will have on the affected environment outweighs the negative impacts by far, and where there are negative impacts, it has been mitigated.

Negative: The solar panels may cause a glare at certain times of the day which may be very disruptive for people in the area or in the direction they will be facing. The community may have certain expectation around the project, such as job creation or other economic opportunities (Community Expectations). During the construction phase there may be an increase in construction vehicles to the area, which may cause congestion for workers already working in the facility. Criminals may target the construction material during the construction phase and the solar panels during the construction and operational phases (Safety and Security).

Conclusion:

The proposed development will not compromise the ecological integrity of the area; however, temporary employment opportunities are guaranteed and the Applicant will always have energy available, in spite of loadshedding and will decrease the load on coal usage for energy generation.

**10. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED
(CONSIDER WHEN THE ACITIVTY IS EXPECTED TO BE CONCLUDED)**

Five years from date of authorization.

11. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) (must include post construction monitoring requirements and when these will be concluded.)

If the EAP answers "Yes" to Point 7 above then an EMP is to be attached to this report as an Appendix

EMPr attached

Yes

SECTION F: APPENDICES

The following appendixes must be attached as appropriate (this list is inclusive, but not exhaustive):

It is required that if more than one item is enclosed that a table of contents is included in the appendix

Appendix A: Site plan(s) – *(must include a scaled layout plan of the proposed activities overlain on the site sensitivities indicating areas to be avoided including buffers)*

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Route position information

Appendix E: Public participation information

Appendix F: Water use license(s) authorisation, SAHRA information, service letters from municipalities, water supply information

Appendix G: Specialist reports

Appendix H: EMPr

Appendix I: Other information

CHECKLIST

To ensure that all information that the Department needs to be able to process this application, please check that:

- Where requested, supporting documentation has been attached;
- All relevant sections of the form have been completed.

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