ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

File Reference Number:
GAUT002/21-22/E3054

Project Title:
The development of a 3.2MWp Solar Photo Voltaic (PV) plant with associated infrastructure including inverters, vehicle service tracks, lighting and fencing, on a 3.6ha footprint adjacent to the Unilever Boksburg factor, Boksburg East Ext 19, City of Ekurhuleni Metropolitan Municipality, Gauteng Province, South Africa.

Prepared for:
Applicant:
Mr. Jean-Paul De Villiers
Soventix South Africa (Pty) Ltd
Unit E2 and E3, 8 Quantum Road, Firgrove Business Park, Somerset West
7130
Tel: (021) 852 7333
Fax: (021) 852 5089
Cell: 082 550 6672
Email: jp.devilliers@soventix.com

Compiled by:
Ecoleges Environmental Consultants cc
Tel: 083 644 7179
Cell: 082 451 5608
Fax: 086 697 9316
P.O. Box 9005, Nelspruit, 1200
P.O. Box 516, Machadodorp, 1170
Email: justin@ecoleges.co.za

DOCUMENT CONTROL

Table 1: Document Control.

PHASE	AUTHOR	STATUS	REVISION	DISTRIBUTED ON	SIGNATURE
Author	Justin Bowers	Draft	00	09 November 2021	
Review	Justin Bowers	Draft	01	08 March 2022	
Approved					

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

EXECUTIVE SUMMARY

This Environmental Management Programme (EMPr) is developed in compliance with section 24N of the NEMA, 1998, as amended and contains those requirements prescribed in the EIA Regulations, 2014, as amended, including section 23 and Appendix 4 of GN No. R. 326 of 7 April 2017.

The EMPr has been developed in conjunction with the Basic Assessment Report (BAR) providing detail on the affected environment as well as an impact assessment for the anticipated environmental impacts and the General Authorisation (GA) to be issued under the National Water Act (Act 36 of 1998).

The developers propose to establish the project on erven 757 & 758 of the remainder of portion 127 of the farm Vogelfontein 84-IR, Boksburg East Extension 19.

Activities to be undertaken during the construction phase (operational & decommissioning phases are outside the scope of the Environmental Authorisation) include:

<u>Planning & Design, Pre-Construction and Construction Phase</u>

- Site preparation;
  - Clearly delineate the construction footprint to avoid construction creep outside the approved development footprint;
  - Search and rescue for fauna/flora of conservation concern and protected status ahead of any construction activities;
- Transport components and equipment to site;
- Establishment of laydown areas;
- Establishment of ancillary infrastructure;
- Site rehabilitation; and
- Environmental management and monitoring throughout the construction process, inclusive of:
  - Continuous control and monitoring of alien invasive plant species;
  - Dust monitoring and management;
  - Storm water monitoring and management;
  - Erosion monitoring and remediation;
  - Fire management;
  - Hazardous substance monitoring and management, including detecting any leakage or spillage; and

The implementation of the EMPr within the project is not an optional additional or “add on” requirement. The EMPr is legally binding, integral to the contract and is as important as the engineering aspects of the contract. The EMPr is a working document to be used throughout the life of the project, until such time that closure is achieved.

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CHECKLIST

An environmental management programme (EMPr) must comply with section 24N of the NEMA, 1998, as amended and contain those requirements prescribed in the EIA Regulations, 2014, as amended, including regulation 23 and Appendix 4. The full suite of requirements is listed in Table 2, which have dictated the layout and content of this EMPr.

Table 2: Environmental Management Programme Checklist.

Content of Environmental Management Programme (EMPr)	Checked
1. (1) An EMPr must comply with section 24N of the Act and include-	☑
(a) details of	☑
(i) the EAP who prepared the EMPr; and	☑
(ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	☑
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	☑
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	☑
(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	☑
(i) planning and design;	☑
(ii) pre-construction activities;	☑
(iii) construction activities;	☑
(iv) rehabilitation of the environment after construction and where applicable post closure; and	☑
(v) where relevant, operation activities;	☑
(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to -	☑
(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	☑
(ii) comply with any prescribed environmental management standards or practices;	☑
(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and	N/A
(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	N/A

(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	☑
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	☑
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	☑
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	☑
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	☑
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	☑
(m) an environmental awareness plan describing the manner in which-	☑
(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	☑
(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	☑
(n) any specific information that may be required by the competent authority.	☑
(2) Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	N/A

ABBREVIATIONS / ACRONYMS AND DEFINITIONS

Table 3: List of terms for abbreviations used in this document.

Abbreviation / Acronym	Term
BA	Basic Assessment as provided for in NEMA (Act 107 of 1998) and EIA Regulations (2014), as amended.
CA	Competent Authority
CAR	Corrective Action Report
CLO	Community Liaison Officer
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment as provided for in NEMA (Act 107 of 1998) and EIA Regulations (2014), as amended.
EIR	Environmental Impact Assessment Report
EMPr	Environmental Management Programme
EM	Environmental Manager
IEA	Independent Environmental Auditor
GA	General Authorisation as per Section 39 of the National Water Act (Act 36 of 1998)
HSO	Health and Safety Officer
I&APs	Interested and Affected Parties
LA	Listed Activity (EIA Regulations, 2014)
LN1	Listing Notice 1: GN. No. R. 983, 4 December 2014, as amended in GN. No. R. 327, 7 April 2017.
LN2	Listing Notice 2: GN R. 984, 4 December 2014, as amended in GN. No. R. 325, 7 April 2017.
LN3	Listing Notice 3: GN R. 985, 4 December 2014, as amended in GN. No. R. 324, 7 April 2017.
MS	Method Statement
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
SACNASP	South African Council for Natural Scientific Professions

SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SEO	Site Environmental Officer
SOP	Standard Operating Procedure
WUL	Water Use License

Table 4: Definitions of some terms used in this document.

Term	Source	Definition
Aspect (environmental)	ISO 14001: 2015	Element of an organisation's activities or products or services that interacts or can interact with the environment. An environmental aspect can cause (an) environmental impact(s). A significant environmental aspect is one that has or can have one or more significant environmental impact(s).
Corrective Action	ISO 14001: 2015	Action to eliminate the cause of a non-conformity (or non-compliance in the case of an EMPr) and prevent recurrence.
Development	EIA Regulations (2014)	Means the building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.
Environmental Impact	ISO 14001: 2015	Change to the environment, whether adverse or beneficial, wholly or partially resulting an organisation's environmental aspects.
Maintenance	EIA Regulations (2014)	Means actions performed to keep a structure or system functioning or in service on the same location, capacity and footprint.

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Performance	ISO 14001: 2015	Measurable unit. Performance can relate either to quantitative or qualitative findings.
Regulated Area of a watercourse	National Water Act (Act 36 of 1998)	(a) The outer edge of the 1 in 100 year flood line and /or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam; (b) In the absence of a determined 1 in 100 year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or (c) A 500 m radius from the delineated boundary (extent) of any wetland or pan.
Significant impact	EIA Regulations (2014)	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 environmental quality standards, thresholds or targets 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.
Watercourse	EIA Regulations (2014)	(a)A river or spring; (b)A natural channel in which water flows regularly or intermittently; (c)A wetland, pan, lake or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998); and A reference to a watercourse includes, where relevant, its beds and banks.

SECTION 1: DETAILS & EXPERTISE OF THE EAP AND APPLICANT

Details of –

(i) The EAP who prepared the report;

Environmental Assessment Practitioner	Ecoleges Environmental Consultants
Contact Person	Justin Bowers
Postal Address	P.O. Box 516, Machadodorp, 1170 P.O. Box 9005, Nelspruit, 1200
Telephone	+27(0)83 644 7179
Facsimile	086 697 9316
Mobile	+27(0)82 451 5608
E-mail	justin@ecoleges.co.za

Details of the Applicant;

Project Applicant	Soventix South Africa (Pty) Ltd
Trading Name (if any)	
Contact Person	Mr. Jean-Paul De Villiers
Physical Address	Unit E2 and E3, 8 Quantum Road, Firgrove Business Park, Somerset West
Postal Code	7130
Telephone	+27(0)21 852 7333
Mobile	+27(0)82 550 6672
Fax	+27(0)21 852 5089
Email	jp.devilliers@soventix.com

(i) The expertise of the EAP to prepare the EMPr, including a curriculum vitae;

Abbreviated Curriculum Vitae of **Justin A. Bowers**

Name	Justin Bowers
Date of birth / ID No.	15 October 1972 7210155074089
Nationality	South African
Marital Status	Married with four children
Current Address	P O Box 516, Machadodorp, 1170. ● Redwing Farm, erf. Kaalbooi 368JT, Waterval Boven District, 1195, Mpumalanga, South Africa ● Cell: 082 451-5608 ● e-mail: justin@ecoleges.co.za
Languages	English, Afrikaans and Basic Zulu
Driver's Licence	Code EB, A & C1
Specialisations	Key Fields: Vegetation ecology, rehabilitation plans, environmental/ecological management plans, environmental auditing, Environmental Impact & Basic Assessment.
Qualifications & Courses Attended	**1998 – 2000** NATIONAL DIPLOMA: NATURE CONSERVATION, Technikon Pretoria **2001 – 2002** BACCALAUREUS TECHNOLOGIAE: NATURE CONSERVATION, Technikon Pretoria **2003 – 2007** MAGISTER TECHNOLOGIAE: NATURE CONSERVATION (CUM LAUDE), Tshwane University of Technology, Pretoria **2008** Environmental Law elective (MBA Programme), Rhodes University, Grahamstown. **2010 – Present** Certificate in Aquaculture, Department of Genetics & Aquaculture, University of Stellenbosch **2014** Implementing Environmental Management Systems, Centre for Environmental Management, North-West University, Potchefstroom. **2017** Transition ISO 14001 course, Centre for Environmental Management, North-West University, Pretoria locale. **2018** Lead Auditor's Course, Centre for Environmental Management, North-West University, Potchefstroom. **2020** Weed Control Course, Pest Control Industries Training Academy, Centurion, Pretoria.

Latest Publication	Sadie J. Ryan, Paul C. Cross, John Winnie, Craig Hay, Justin Bowers, Wayne M. Getz. 2012. The utility of normalized difference vegetation index for predicting African buffalo forage quality. *Journal of Wildlife Management* DOI: 10.1002/jwmg.407.
Countries worked	South Africa, United Kingdom.
Career Summary	**Jan 1995 – Jul 1997** Head Ranger (Idube Lodge, Sabi-Sands Wildtuin). **Dec 2000 – Dec 2001** Research student, Scientific Services, KNP. **Jan 2001 – Mar 2006** Senior Research Assistant, Mammal Research Institute, University of Pretoria. **Apr 2006 – current** Main Member, Ecoleges Environmental Consultants.

SECTION 2: INTRODUCTION AND BACKGROUND

Generation of "green" energy is being implemented at various Unilever facilities to reduce greenhouse gas emissions, reduce their environmental footprint and improve electricity supply assurance. The 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 3.2MWp on an approximate footprint of 3.6 hectares.

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).

At a local level, Unilever, as the end-user of the solar PV generated energy, has committed to augmentation of renewable energy at all of their South African facilities in an effort to reduce their carbon footprint, while improving electricity supply assurance with reduced Fossil Fuel dependency and minimising production interruptions.

The project outcomes align with the national, local, and regional planning objectives in terms of economic development and sustainability. The project will enable Unilever to deal with the disruptive impact of load shedding on the manufacturing sector 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 undeveloped land inside the urban area, making the area less fragmented (Equispectives, 2021).

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

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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 factory workers of Unilever. Additionally, temporary jobs will be created during the construction phase as well as several permanent jobs during operation (Equispectives, 2021).

The EMPr has been developed in conjunction with the Basic Assessment Report (BAR) providing detail on the affected environment as well as an impact assessment for the anticipated environmental impacts and the General Authorisation (GA) as water use authorisation.

SECTION 3: DESCRIPTION OF THE ACTIVITY

(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.

Table 5 describes all the activities that will be undertaken during the lifespan of this project including the identified listed activities and associated activities that do not require environmental authorization, but are needed to achieve the desired objective:

The development of a 3.2MWp Solar PV plant with associated infrastructure including inverters, vehicle service tracks, lighting and fencing, on a 3.6ha footprint adjacent to the Unilever Boksburg factory, Boksburg East Ext 19.

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Table 5. A description of the activities (including Listed Activities as per the EIA Regulations, 2014 as amended), aspects & potential impacts of the project that are covered by the EMPr.

Phase	Activity	Aspects	Impacts
Planning & Design	Compliance with legal requirements by acquiring authorisations, permits and/or licenses for activities/uses undertaken during construction and operation	Potential offences	It is illegal to work within the DWS Regulated Area in the absence of a section 21(c) & (i) authorisation
			Compliance with Municipal bylaws required including no wheeling of electricity across property boundaries.
			Construction inside registered servitudes, such as Eskom, Transnet, Rand Water Board, Sewer lines will require the relevant approvals.
		Protection of archaeological findings	Destruction of historical sites and sub-surface palaeontology artefacts and the need for relevant permits where necessary.
	Sustainable resource requirements (water, energy, human resources etc.) for lifespan of project.	Demand on human resources	Human resources (workers) will be required during construction and possibly operation. Job creation will generate income.
	Layout (or Location) and Design (or Size), including the consideration of alternatives & cumulative impacts	Heritage National Estate	Development of Alternative 2 will impact on a historical midden site
	Zoning	Consent Use	Special Consent Use requirement by GDARD for developing on Agricultural land
Pre-Construction	Effective communication and engagement	Surrounding communities	Community expectations around job creation
			Runaway fires pose a risk to the surrounding community and the project area

Phase	Activity	Aspects	Impacts
			Safety and security of surrounding community and increased risk of theft on site
	Site Preparation or Establishment (Layout & Design) incl. surveying and pegging	Scheduling	Impacts to avifauna life cycles
		Potential offences	Clearing operations may disturb or destroy indigenous flora, potentially including protected species in terms of the C-Plan (*Hypoxis* sp.)
		Development footprint	Risk of habitat fragmentation
			Potential impact on indigenous vegetation
			Impact on habitat contiguity
			Potential impact on sensitive receptors outside the project area
		Lighting	Lighting impacts on nocturnal species
		Sanitation/Ablutions	Inadequate sanitation facilities for work force
		Storage/Laydown Area	Impacts to sensitive environments
Construction Phase	Environmental Management & Monitoring	SEO & ECO	Wetlands outside the development footprints can be affected in the absence of adequate environmental site staff
			Lack of familiarity of SEO & ECO with rock/soil formations and probability of fossils
			Risk of not meeting set Environmental Objectives

Phase	Activity	Aspects	Impacts
	Staff/Employees	Harvest medicinal plant and/or poaching	Potential illegal harvesting of wildlife
	Clearing/Grubbing and Grading for laydown & stockpile areas	Effects on Species of Conservation Concern (SCC)	Impacts on fauna and avifauna SCC
			Plants SCC may be affected by the development
		Habitat integrity & Sediment balance	Increased runoff and sediment input into the water courses
			Input of toxicants
			Smothering and subsequent loss of instream habitat due to sediment inputs
			Flow path modification
	Generation of solid and liquid waste	Handling or Disposal (littering, illegal dumping, burning)	Waste accumulation on site
			Illegal disposal
		Waste Storage	Ineffective and inadequate waste storage
	Earthworks (incl. Excavating, backfilling and moving soil)	Incidental trapping of fauna	Excavation, trench & hole impacts on small fauna
		Heritage National Estate	Damage to sub-surface fossils during excavations
	Operation of vehicles & equipment, incl. transporting/driving	Vehicle speeds	Incidental road kills
		Generating noise	Noise impacts on nocturnal species
		Generating dust	Impacts of dustfall and entrainment
		Affected traffic	Negative impacts on local traffic
		Leaks & spills of hydrocarbons	Impact of hydrocarbons on in situ soil
		Heritage National Estate	Threats are earth moving equipment/machinery (for example haul trucks, front end loaders, excavators, graders, dozers) during construction, the sealing-in,

Phase	Activity	Aspects	Impacts
			disturbance, damage or destruction of the fossils by development, vehicle traffic, and human disturbance.
		Effects on man-made stormwater channels	Potential contamination of stormwater with contaminants (e.g. petrochemicals, concrete mixing) should leaks and spills occur
			Movement of vehicles and plant may cause damage to the existing stormwater structures, which in turn may affect their ability to transport water across the footprint.
	New internal haul & access roads and widening of existing roads	Roads and paths usage	Increase in roads, service tracks and paths
	Post-Construction Landscaping & Rehabilitation	Rehabilitation	Potential for increased erosion from exposed surfaces
			Risks associated with removal of vegetation cover
			Indiscriminate dumping of rubble and construction material
			Inappropriate/Inadequate waste management measures
		Alien invasives plants	Alien invasive plant recruitment on disturbed surfaces
		Mulching	Impacts on soil integrity following exposure
	Installation of solar panel arrays, inverters, wiring strings, etc.	Effects on man-made stormwater channels	Vegetation clearing associated with ram piling, inverters & wiring with associated exposure of soil, increased risk of erosion and associated sedimentation of stormwater channel and downstream watercourses (Aquatic Specialist)
			Risk of water (especially stormwater) pollution
		Reflection from panels	Visual disturbances due to glare from the panels

Phase	Activity	Aspects	Impacts
			The proposed PV landscape has the potential to generate higher levels of colour, form, texture and line contrast to the existing agricultural landscape
		Exposed electrical cables	Risk of electrocution to fauna
	Construction of stormwater management infrastructure around PV Area	Flow dynamics	Erosion of exposed surfaces
			Alteration to flow patterns and velocities
			Management of excess in situ rock
			Increased hydraulic loading on stormwater channels
	Storage of chemicals, construction materials, fuel and machinery	Water quality	Physical changes (e.g. turbidity)
			Chemical changes (e.g. pH, salinity toxicants and heavy metals) to stormwater quality from inadequate/inappropriate storage of chemicals with associated leaks

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SECTION 4: LAYOUT MAP OF PROPOSED ACTIVITY

(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers.

"The Environmental Management Programme (EMPr) to be submitted as part of the EIAr must include the following:
ii. The final site layout map.
iv. An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.
v. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map."

Figure 1 provides a map of the final site layout and how they fit into the preferred alternative footprints. **Figures 2-4** provides a map of the proposed preferred development footprint in the context of the surrounding environmental sensitivities. The preferred footprint development has been determined through an iterative process, to ensure that it remains outside of all sensitive receptors assessed, including buffer zones (where applicable).

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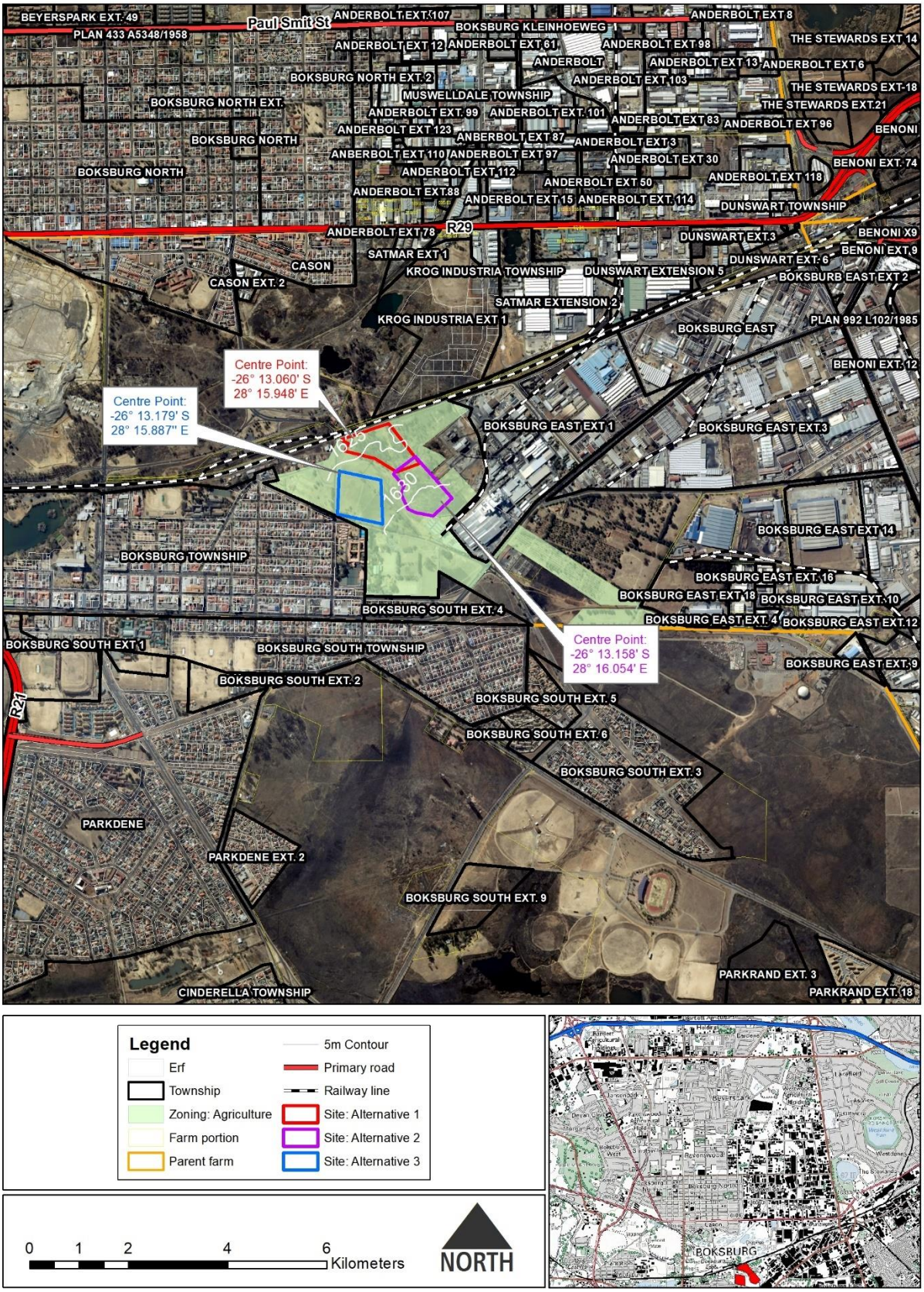

Figure 1. Site layout map.

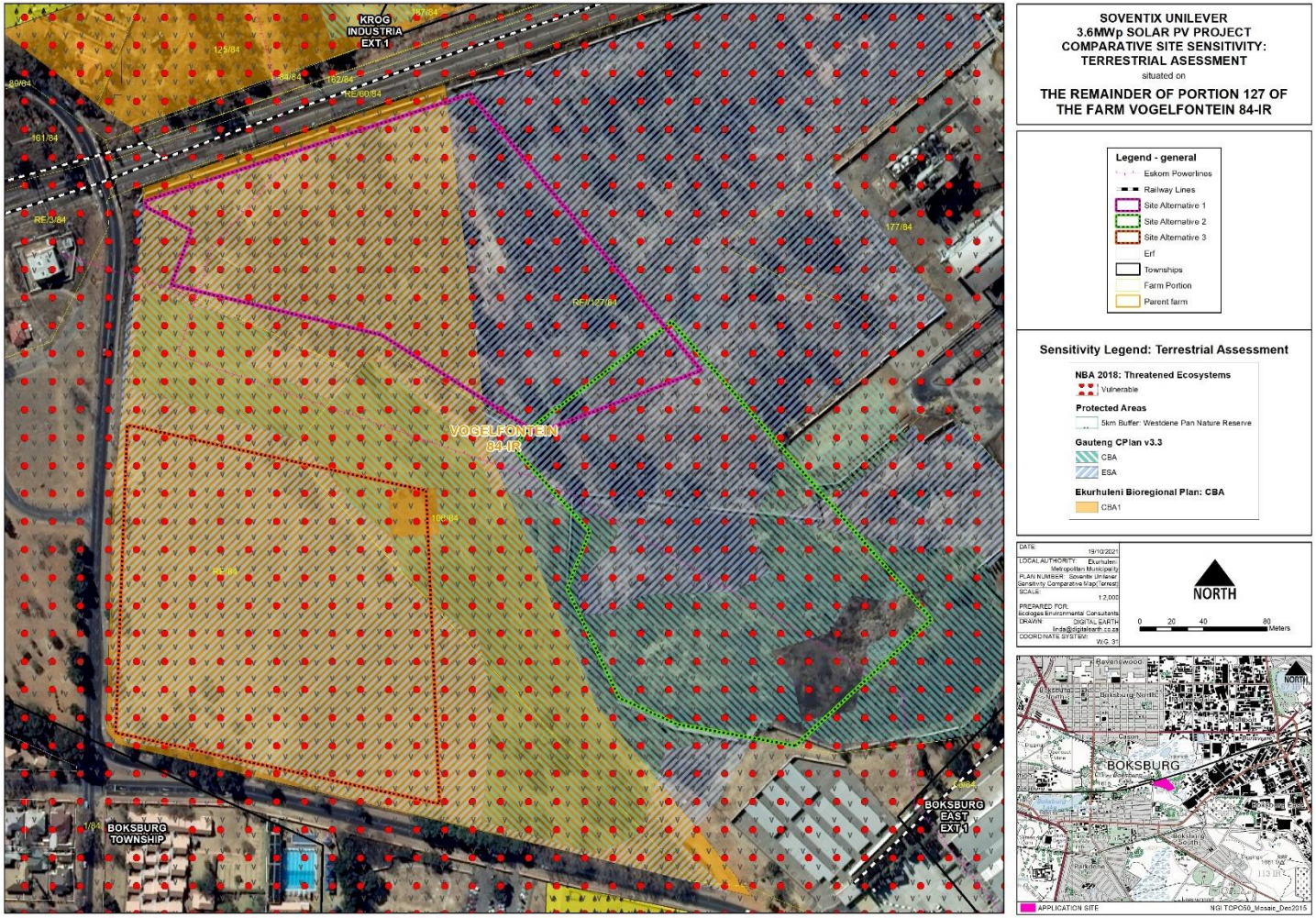

Figure 2. Terrestrial Biodiversity site sensitivity map including proposed site development footprints.

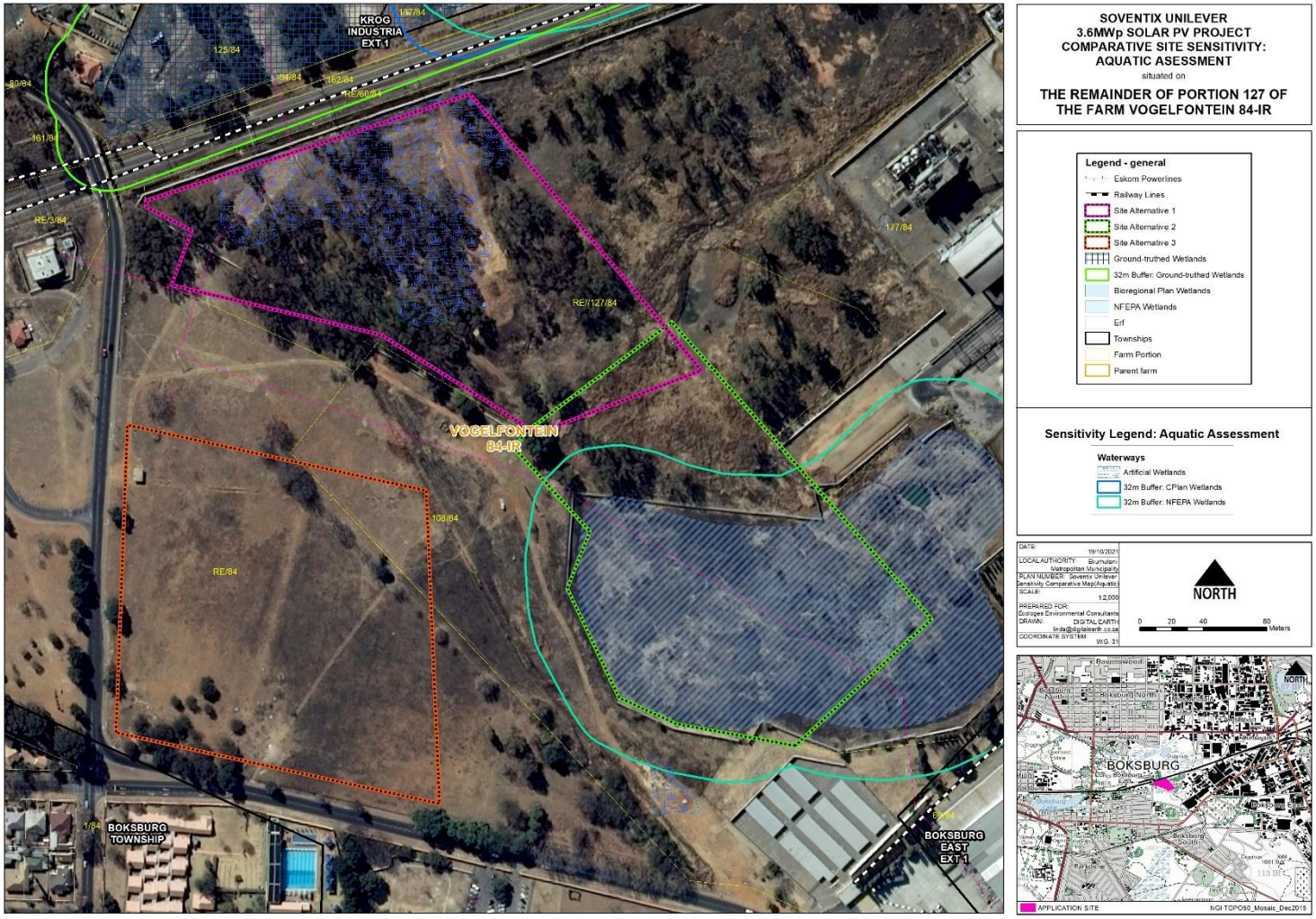

Figure 3. Aquatic Biodiversity site sensitivity map including proposed site development footprints.

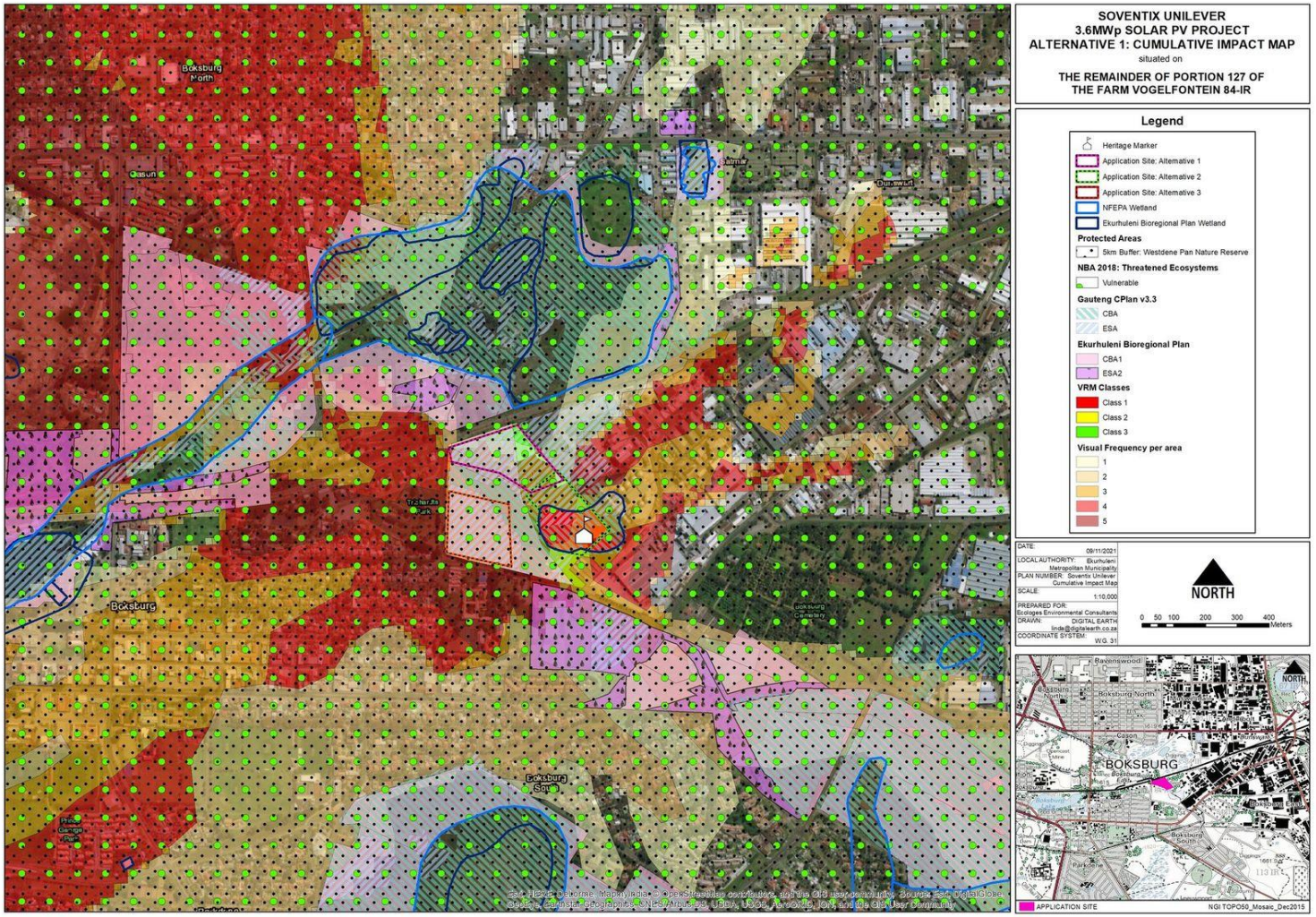

Figure 4. Cumulative impact map for all proposed site development footprints.

SECTION 5: ACTIVITIES, ASPECTS AND IMPACTS AND THEIR MANAGEMENT, MITIGATION & DESIRED OUTCOMES

(d) a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed, and mitigated as identified through the environmental impact assessment process for all phases of the development including-
(i) planning and design;
(ii) pre-construction activities;
(iii) construction activities;
(iv) rehabilitation of the environment after construction and where applicable post closure; and
(v) where relevant, operation activities;

(e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d),

(f) a description of proposed impact management actions, identifying the way the impact management objectives and outcomes contemplated in paragraph (d) and (e) will be achieved, and must, where applicable, include actions to -
(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
(ii) comply with any prescribed environmental management standards or practices;
(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and
(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;

(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);
(l) a program for reporting on compliance, considering the requirements as prescribed by the Regulations;
(m) an environmental awareness plan describing the manner in which-
(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and
(ii) risks must be dealt with to avoid pollution or the degradation of the environment; and
(n) any specific information that may be required by the competent authority.

The impacts are considered within the scope of the project, including but not limited to the Listed Activities. The relevant impacts resulting from listed activities and associated activities, including environmental, socio-economic and cultural heritage, are informed by a predetermined list of potential environmental impacts (generated by way of a Leipold Matrix), comments received from Interested and Affected Parties and the findings contained in specialist studies that were used to generate the EIR.

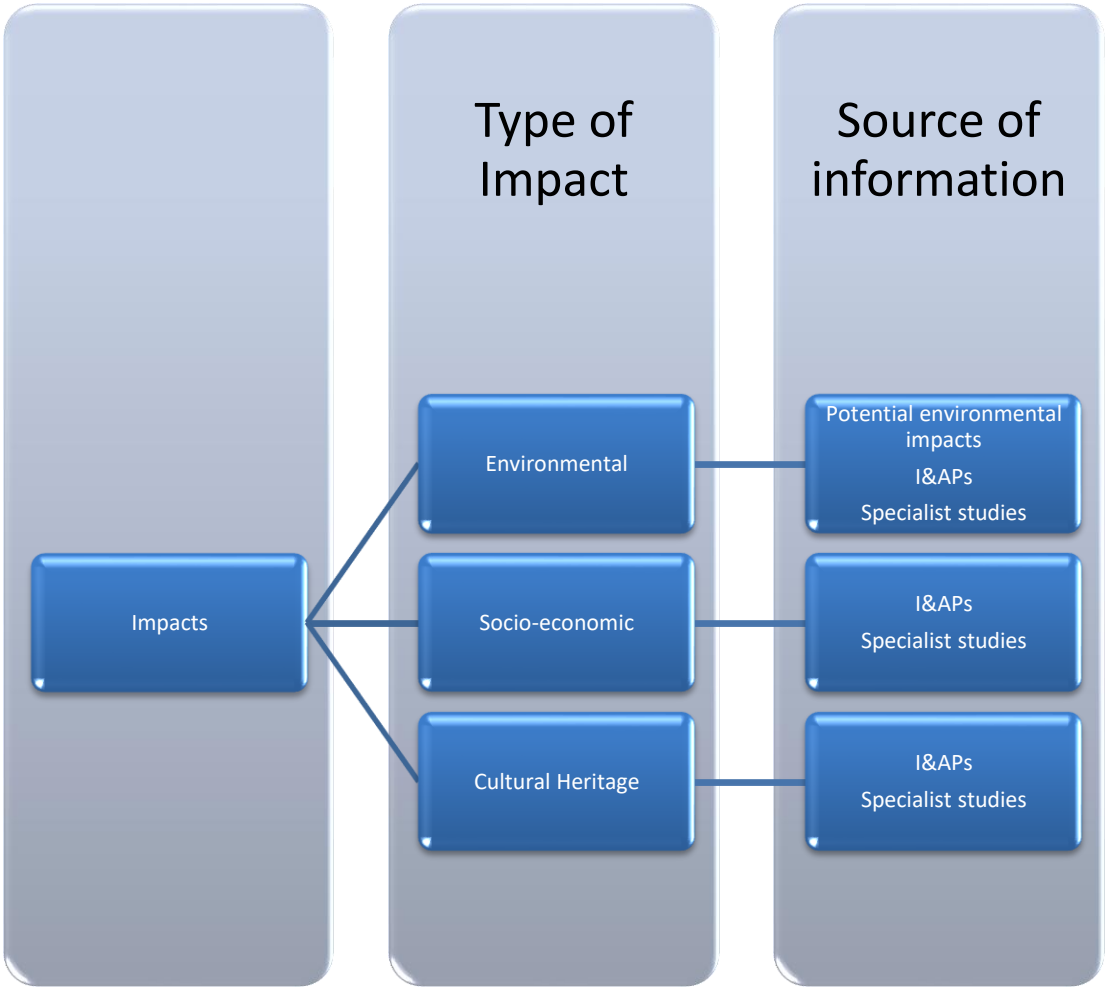

Figure 5. A breakdown of the different types of impacts including the resources used to identify them.

As stipulated in regulation 1(1)(d) of Appendix 4 of the EIA regulation (2014), as amended; the setting of desired impact management outcomes forms the principle objective of an EMPr. Outcomes are driven by impact management actions including measures and mitigations to avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; to comply with any prescribed environmental management standards or practices, including legal requirements and in some cases, “best practices” that the Implementer aspires to fulfil (e.g. Equator Principles). The outcomes are achieved by implementing and achieving measurable Targets (both quantitative and qualitative). Management and mitigation measures are set to afford guidance and parameters to the implementer to achieve the set outcomes.

Tables 6 to 8 provide a tabulated list of the aspects associated with the proposed activity that are covered by the EMPr, colour-coded by their risk significance assessed during the Impact Assessment process. Aspects are highlighted by colour by their assessed pre-mitigation & post-mitigation risk. These tables will further assist with future ECO and compliance audits of the EMPr, specifically where the auditor has to comment on the EMPr's ability to address Section 3(1) (e) of Appendix 7 of the EIA Regulations (2014) as amended specifically:

"an indication of the ability of the EMPr, and where applicable, the closure plan to—

(i) sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an ongoing basis;

(ii) sufficiently provide for the avoidance, management and mitigation".

Table 6: Extent, magnitude, duration and significance of each aspect and impacts anticipated during the Planning & Design Phase pre- and post-mitigation, including the probability of the impact occurring.

PRE-MITIGATION						POST-MITIGATION				
ASPECT	**EXTENT**	**MAGNITUDE**	**DURATION**	**SIGNIFICANCE**	**PROBABILITY**	**EXTENT**	**MAGNITUDE**	**DURATION**	**SIGNIFICANCE**	**PROBABILITY**
PLANNING PHASE	Regional	High	Short-Term	Medium	Probable	Regional	Very Low	Short-Term	Very Low	Improbable
Potential offences	Regional	High	Short-Term	Medium	Improbable	Regional	Very Low	Short-Term	Very Low	Improbable
Heritage National Estate	National	High	Long Term	High	Probable	National	Low	Long Term	Medium	Improbable
Consent Use	Regional	High	Short-Term	Medium	Probable	Regional	Medium	Short-Term	Medium	Improbable

Table 7: Extent, magnitude, duration and significance of each aspect and impacts anticipated during the Pre-Construction Phase pre- and post-mitigation, including the probability of the impact occurring.

	PRE-MITIGATION					POST-MITIGATION				
ASPECT	**EXTENT**	**MAGNITUDE**	**DURATION**	**SIGNIFICANCE**	**PROBABILITY**	**EXTENT**	**MAGNITUDE**	**DURATION**	**SIGNIFICANCE**	**PROBABILITY**
PRE-CONSTRUCTION PHASE	Local	Low	Short-Term	Very Low	Improbable	Local	Very Low	Short-Term	Very Low	Improbable
Surrounding communities	Local	Medium	Medium Term	Medium	Probable	Local	Low	Medium Term	Low	Probable
Scheduling	Regional	Medium	Short-Term	Medium	Probable	Local	Low	Short-Term	Very Low	Improbable
Development footprint	Local	Low	Short-Term	Very Low	Improbable	Local	Very Low	Short-Term	Very Low	Improbable
Lighting	Local	Medium	Long Term	Medium	Probable	Local	Low	Long Term	Low	Probable
Sanitation/Ablutions	Local	Low	Short-Term	Very Low	Improbable	Local	Very Low	Short-Term	Very Low	Improbable
Storage/Laydown Area	Local	Low	Short-Term	Very Low	Improbable	Local	Very Low	Short-Term	Very Low	Improbable

Table 8: Extent, magnitude, duration and significance of each aspect and impacts anticipated during the Construction Phase pre- and post-mitigation, including the probability of the impact occurring.

PRE-MITIGATION					POST-MITIGATION				
ASPECT	**EXTENT**	**MAGNITUDE**	**DURATION**	**PROBABILITY**	**EXTENT**	**MAGNITUDE**	**DURATION**	**SIGNIFICANCE**	**PROBABILITY**
CONSTRUCTION PHASE	Local	Medium	Short-Term	Probable	Local	Very Low	Short-Term	Very Low	Improbable
SEO & ECO	National	High	Short-Term	Improbable	National	Medium	Short-Term	Medium	Improbable
Harvest medicinal plant and/or poaching	Regional	High	Short-Term	Improbable	Local	Very Low	Short-Term	Very Low	Improbable
Effects on SCC	Local	Low	Short-Term	Improbable	Local	Very Low	Short-Term	Very Low	Improbable
Habitat integrity & Sediment balance	Local	Medium	Short-Term	Probable	Local	Very Low	Short-Term	Very Low	Improbable
Handling or Disposal (littering, illegal dumping, burning)	Local	High	Short-Term	Probable	Local	Low	Short-Term	Very Low	Improbable
Waste Storage	Local	High	Short-Term	Probable	Local	Very Low	Short-Term	Very Low	Improbable

Incidental trapping of fauna	Local	Low	Short-Term	Improbable	Local	Very Low	Short-Term	Very Low	Improbable
Heritage National Estate	National	Medium	Short-Term	Probable	Regional	Low	Short-Term	Low	Improbable
Vehicle speeds	Local	Medium	Short-Term	Improbable	Local	Low	Short-Term	Very Low	Improbable
Generating noise	Local	Medium	Short-Term	Probable	Local	Very Low	Short-Term	Very Low	Improbable
Generating dust	National	Medium	Short-Term	Probable	National	Low	Short-Term	Low	Improbable
Affected traffic	Local	Medium	Short-Term	Probable	Local	Low	Short-Term	Very Low	Improbable
Leaks & spills of hydrocarbons	Local	Medium	Short-Term	Probable	Local	Low	Short-Term	Very Low	Probable
Effects on man-made stormwater channels	Local	Medium	Short-Term	Probable	Local	Low	Short-Term	Very Low	Improbable
Roads and paths usage	Local	Medium	Short-Term	Probable	Local	Low	Short-Term	Very Low	Improbable
Rehabilitation	Local	Medium	Short-Term	Probable	Local	Very Low	Short-Term	Very Low	Improbable
Alien invasive plant recruitment on disturbed surfaces	Local	High	Short-Term	Probable	Local	Low	Short-Term	Very Low	Probable

Mulching	Local	Low	Short-Term	Probable	Local	Very Low	Short-Term	Very Low	Improbable
Reflection from panels	Regional	Medium	Long Term	Probable	Regional	Medium	Long Term	High	Probable
Exposed electrical cables	Local	Medium	Short-Term	Improbable	Local	Very Low	Long Term	Low	Improbable
Flow dynamics	Local	Medium	Long Term	Probable	Local	Low	Medium Term	Low	Probable
Water quality	Local	High	Short-Term	Probable	Local	Medium	Short-Term	Low	Probable

The following section describes management programmes for the different environmental attributes pertaining to the Project. As part of the Management Programmes, the section describes the potential environmental impacts which may result from the identified aspects / activities, the desired outcomes of mitigating these impacts as well as the targets used to measure the level of environmental compliance and performance.

The following legislation, guidelines, departmental policies, environmental management instruments and / or other decision-making instruments that have been developed or adopted by a competent authority in respect of activities associated with a development of this nature, were identified and considered in the preparation of the Basic Assessment Report and this EMPr:

1. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
2. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)
3. The Convention on Wetlands (RAMSAR Convention, 1971)
4. The National Environmental Management Protected Areas Act (Act No. 57 of 2003)
5. The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
6. The United Nations Framework Convention on Climate Change (UNFCC,1994)
7. Transvaal Nature Conservation Ordinance (Nature Conservation Ordinance, No 12 of 1983)
8. White Paper on Biodiversity
9. White Paper on Renewable Energy (2003)
10. White Paper on the Energy Policy of the Republic of South Africa (1998)
11. Conservation of Agricultural Resources Act (CARA, Act 43 of 1983). Government Gazette (GG) No. 8673, Government Notice (GN) No. 883, dated 27 April 1983; and subsequent regulations (including dealing with declared weeds and invader plants) under section 29 of the Act, in Government Notice R1048 in Government Gazette 9238, dated 25 May 1984, amended in Government Notice R2687 in Government Gazette 10029, dated 6 December 1985 and Government Notice R280 in Government Gazette 22166, dated 30 March 2001.
12. Constitution of the Republic of South Africa.
13. Convention on Biological Diversity (CBD, 1993).
14. DEA. 2010. Guideline on Need and Desirability, Integrated Management Guideline Series 9, Department of Environmental Affairs (DEA), Pretoria, South Africa.
15. DEA. 2010. Public Participation, Integrated Environmental Management Guideline Series 7, Department of Environmental Affairs, Pretoria, South Africa.
16. DEA. 2011. National list of ecosystems that are threatened and in need of protection. GN 1002, GG 34809, 9 December 2011.
17. DEA&DP Visual and Aesthetic Guidelines.
18. DEA&DP. 2010. Guideline on Alternatives, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning.
19. DEAT. 2002. Specialist Studies, Information Series 4, Department of Environmental Affairs and Tourism, Pretoria.
20. DWS. 2016. General Authorisation in GN No. 509, Government Gazette No. 40229 dated 26 August 2016.

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21. EIA Regulations, GG No. 38282, GN No. R. 982, 983, 984, 985, 4 December 2014, amended in GN No. R. 324, R. 325, R. 326, R. 327, R. 328 in GG No. 40772, 07 April 2017, GG No. 41766, GN No. 706, 13 July 2018 and GG No. 43358, GN No. 599, 29 May 2020.
22. Ekurhuleni Bioregional Plan (2020).
23. Electricity Regulation Act (Act 4 of 2006). Government Notice 660 in Government Gazette 28992 dated 5 July 2006. As amended by: Electricity Regulation Amendment Act 28 of 2007, Government Notice 23 in Government Gazette 30676, dated 21 January 2008.
24. Environment Conservation Act (Act 73 of 1989), including Schedules 4 and 5 of the National Regulations regarding Noise Control made under Section 25 of the Environment Conservation Act, 1989 (Act 73 of 1989) in GN No. R 154 of Government Gazette No. 13717 dated 10 January 1992. (Note that this particular section of the Environment Conservation Act is not repealed by NEMA (107 of 1998)).
25. Gauteng Department of Agriculture and Rural Development (GDARD): Checklist for Biodiversity Assessments.
26. GDARD Mining and Environmental Impact Guide.
27. GDARD Requirements for Biodiversity Assessments (Version 3, 2014a).
28. Guidelines for Landscape and Visual Impact Assessment (GLVIA), Second Edition.
29. IDP 2018 – 2021, City of Ekurhuleni.
30. Integrated Resource Plan, 2010.
31. Minerals and Petroleum Resources Development Act (Act 28 of 2002). Gazette No. 23922, Notice No. 1273 dated 10 October 2002. As amended by: Minerals and Energy Laws Amendment Act 11 of 2005, Gazette No. 27897, Notice No. 824 dated 15 August 2005. Mineral and Petroleum Resources Development Amendment Act 49 of 2008, Gazette No. 32151, No. 437 dated 21 April 2009. Mineral and Petroleum Resources Development Amendment Act 49 of 2008, Gazette No. 32151, No. 437 dated 21 April 2009.
32. Municipal Systems Act (Act No. 32 of 2000)
33. National Biodiversity Framework (NBF, 2009).
34. National Energy Act, 2008 (No. 34 of 2008).
35. National Environmental Management Act (NEMA, Act 107 of 1998), Gazette No. 19519, Notice No. 1540. As amended by: National Environmental Management Act 56 of 2002 - Gazette No. 24251, No. 97. Mineral and Petroleum Resources Development Act 28 of 2002 - Gazette No. 23922, No. 1273. National Environmental Management Act 8 of 2004 - Gazette No. 26570, No. 842. National Environmental Management Act 46 of 2003 - Gazette No. 26018, No. 175. National Environmental Management Act 62 of 2008 - Gazette No. 31789, No. 22. National Environment Laws Amendment Act 44 of 2008 - Gazette No. 31685, No. 1318. National Environment Laws Amendment Act 14 of 2009 - Gazette No. 32267, No. 617. National Environmental Management Laws Second Amendment Act 30 of 2013 - Gazette No. 37170, No. 1019, dated 18 December 2013. National Environmental Management Laws Amendment Act 25 of 2014 – Government Notice 448 in Government Gazette 37713, dated 2 June 2014. National Environmental Management Laws Second Amendment Act 30 of 2013 - Gazette No. 37170, No. 1019, dated 18 December 2013.
36. National Environmental Management: Air Quality Act (Act 39 of 2004). Gazette No. 27318, Notice No. 163. As amended by: National Environment Laws Amendment Act 44 of 2008 - Gazette No. 31685, Notice No. 1318. National Environment Laws Amendment Act 14 of

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2009 - Gazette No. 32267, Notice No. 617. National Environmental Management Laws Amendment Act 14 of 2013 – Gazette No. 36703, No. 530 dated 24 July 2013. National Environmental Management: Air Quality Amendment Act 20 of 2014 – Gazette No. 37666, No. 390 dated 19 May 2014; including the list of activities which result in atmospheric emissions which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage in Government Notice 893 in Government Gazette 37054 dated 22 November 2013. As amended by: Government Notice 551 in Government Gazette 38863 dated 12 June 2015. The National Dust Control Regulations are also relevant during the construction phase – GG No. 36974, GN No. R 827 dated 1 November 2013.

37. National Environmental Management: Biodiversity Act (Act 10 of 2004). Gazette No. 26436, Notice No. 700. As amended by: National Environment Laws Amendment Act 14 of 2009 – Gazette No. 32267, No. 617. National Environment Laws Amendment Act 14 of 2009 – Gazette No. 32267, No. 617. National Environmental Management Laws Amendment Act 14 of 2013 – Gazette No. 36703, No. 530 dated 24 July 2013; including the alien and invasive species regulations in Government Notice R598 in Government Gazette 37885 dated 1 August 2014, and species lists in GN No.599, amended in GG No. 40166, GN No .864 dated 29 July 2016, amended in GG No. 43386, GN No. 627 dated 03 June 2020.
38. National Environmental Management: Waste Act (Act 59 of 2008) ("NEM: WA"). Gazette No. 32000, Notice No. 278. As amended by: National Environmental Management Laws Amendment Act 14 of 2013 – Gazette No. 36703, No. 530 dated 24 July 2013. National Environmental Management: Waste Amendment Act 26 of 2014, Government Notice 449 in Government Gazette 37714 dated 2 June 2014. National Environmental Management Laws Amendment Act 25 of 2014, Government Notice 448 in Government Gazette 37713 dated 2 June 2014.
39. National Forest Act (Act 84 of 1998). Gazette No. 19408, Notice No. 1388 dated 30 October 1998. As amended by: National Forest and Fire Laws Amendment Act 12 of 2001 – Gazette No. 22479, No. 660. Forestry Laws Amendment Act 35 of 2005 – Gazette No. 28602, No. 220.
40. National Heritage Resources Act (Act 25 of 1999).
41. National Protected Areas Expansion Strategy (NPAES).
42. National Spatial Biodiversity Assessment (NSBA)
43. Natural Scientific Professions Act (Act No. 27 of 2003)
44. National Veld and Forest Fire Act, 1998 (Act 101 of 1998). Government Gazette No. 19515 dated 27 November 1998.
45. National Water Act, 1998 (Act 36 of 1998). Gazette No. 19182, Notice No. 1091. As amended by: National Water Amendment Act 45 of 1999 – Gazette No. 20706, No. 1476. National Water Amendment Act 27 of 2014 – Government Notice 450 in Government Gazette 37715, dated 2 June 2014; including Sections 27, 28,29,30,31 and 39 (Sections dealing with General Authorisations and Water Use Licenses).
46. South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
47. Sustainable Utilisation of Agricultural Resources (Draft Legislation).
48. Sub-Division of Agricultural Land Act (Act 70 of 1970) as amended by Subdivision of Agricultural Land Amendment Act, No. 55 of 1972, Subdivision of Agricultural Land

Amendment Act, No. 19 of 1974, Subdivision of Agricultural Land Amendment Act, No. 18 of 1977, Subdivision of Agricultural Land Amendment Act, No. 12 of 1979, Subdivision of Agricultural Land Amendment Act, No. 18 of 1981, Subdivision of Agricultural Land Amendment Act, No. 33 of 1984, Constitution of the Republic of South Africa Act, No 200 of 1993 (Proc. No. 100 of 31 October 1995), General Law Amendment Act, No 49 of 1996, Abolition of Racially Based Land Measures Act, No. 108 of 1991 (Proc. No. 116 of 24 June 1994).

49. World Heritage Convention Act (Act No. 49 of 1999).

The following management programme aims to set management actions to achieve stated desired outcomes for each environmental aspect, including quantifying the measurable targets. While the impacts and management and mitigations have been addressed under the various project development phases, they are not intended to be mutually exclusive, and impacts from one phase are likely to occur in subsequent phases; but in the interest of reducing redundancy they have not been repeated for each phase. Any appendices to this EMPr form part of the EMPr which must be implemented accordingly.

TABLE 9: COMPLIANCE MANAGEMENT.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
9.1	**Planning & Design Phase**						
9.1.1	**Water Use Authorisation for Activities within a Watercourse**						
9.1.1.1	Contravention of section 21 (c) and (i) of the NWA.	The commencement of water uses that are authorised in terms of the NWA, 1998 (Act No. 36 of 1998).	Confirmation letter from DWS on relevant General Authorisation registration (GN. No. 665, GG. No. 36820, 6 September 2013).	The applicant shall adhere to the conditions of the water use authorisation (GA or license) for section 21(c) and (i) water uses for diverting, altering, or impacting the beds and banks of a watercourse.	Applicant / EAP.	Prior to commencement of construction.	Compliance to be verified by ECO & SEO.
9.1.2	**Compliance Monitoring**						
9.1.2.1	Commencement of construction prior to the appointment of an ECO.	Ensure compliance with the EA, EMPr & GA from the onset of	Proof of ECO appointment prior to commencement of construction.	A qualified, suitably experienced and independent ECO must be appointed to monitor and report to the competent	Applicant.	Prior to commencement of construction and until the rehabilitated	To be verified by SEO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		construction and until the rehabilitated development is handed over to the Applicant for operation.		authorities on compliance with the EA, EMPr & GA, and where necessary oversee or facilitate the identification and permitting / licensing of protected species prior to clearing of any vegetation.		development is handed over to the applicant for operation. The minimum frequency for ECO inspections is bi-monthly.	
9.1.3	**Wayleaves**						
9.1.3.1	Construction inside registered servitudes, such as Eskom, Transnet, Rand Water Board, Sewer lines will require the relevant approvals.	All wayleaves issued by registered servitude holders.	Wayleaves issued, with copies on site, prior to commencement of construction.	Ensure active consultation with all servitude holders and procure the requisite wayleaves.	Applicant / EAP.	Prior to commencement of construction.	Compliance to be verified by SEO.
9.1.4	**Land Use**						
9.1.4.1	Consent Use of zoned agricultural land.	Approved consent use by GDARD.	Approval of consent use prior to commencement of construction.	Ensure permissions for consent use of zoned agricultural land is in place prior to commencement.	Applicant / Land Owner.	Prior to commencement of construction.	Compliance to be verified by SEO.
9.1.5	**Heritage Resources**						

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
9.1.5.1	The preferred footprint Alternative 2 will impact on a historical site.	Completion of Phase 2 mitigation	Completion and submission of phase 2 report & permit issued by SAHRA for destruction of site.	No construction may commence on the Alternative 2 footprint which may affect any historical artefacts until the destruction from SAHRA has been issued.	Applicant / SEO.	Prior to commencement of construction.	Compliance to be verified by SEO & Archaeologist.

TABLE 10: CONSTRUCTION CAMP, LAYDOWN AREAS, STOCKPILES, STORES & EQUIPMENT.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
10.1	**Pre-Construction**						
10.1.1	Impacts on protected plants.	Comply with the relevant sections of the National Forest Act (NFA) (Act 84 of 1984), National Environmental Management: Biodiversity Act, 2004 (NEM:BA) (Act No. 10 of	Obtain and provide proof of issuance of necessary permits for any listed species under NFA, NEMBA & C-Plan.	The applicant shall apply for and obtain the relevant licenses / permits from the appropriate authorities (DFFE, and/or Provincial Authority) prior to disturbing or destroying any protected species.	Applicant / Contractor to appoint botanist/ ecologist where SEO does not have the requisite qualification or experience.	Prior to commencement of construction.	Compliance to be verified by ECO & SEO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		2004), and the Gauteng Conservation Plan.					
10.1.2	Degradation of the environment outside of the development footprint.	Zero construction creep into and subsequent degradation of areas outside the preferred or approved development footprints.	Approved and effectively implemented (demarcated on site layout plan) indicating all environmental sensitivities, especially no-go areas.	Permanent and temporary construction footprints must be designated, and sensitive terrestrial and aquatic habitats demarcated as no-go areas during construction, including required buffer zones (also considering existing services, servitudes & setback lines). The Contractor shall locate the construction camp on existing disturbed or the least sensitive sites. The project footprint must be clearly demarcated on the ground to ensure that no construction creep results toward any watercourses or defined sensitive	Applicant / Contractor	Prior to and ongoing enforcement during construction.	SEO & ECO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				areas. This may include the use of droppers, standards, wooden stakes or similar visible structures that can be easily removed upon completion of construction. Placement of infrastructure and laydown and stockpile areas must be done so as not to negatively affect surface water runoff in a way that leads to erosion and export of material to be deposited in any watercourses.			
10.2	**Construction Phase**						
10.2.1	Land surface pollution.	To avoid and reduce human induced environmental pollution.	Incident registers that indicate incidence and reduction in pollution events, from the operation of construction plant, equipment	Emergency breakdowns in the parking areas or along roads, must be addressed with immediate and adequate pollution containment measures including preventative measures that are not limited to drip trays and spill kits.	Applicant / Contractor	Throughout construction.	SEO & ECO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			or other vehicles, over time.	No washing of plant and equipment, and no repairs or servicing of construction plant, equipment or other vehicles, except for emergency breakdowns are permitted (with the necessary preventative containment measures in place). The contractor(s) and any sub-contractors, including their employees, are prohibited from entering the designated no-go areas for whatever reason and without the prior written consent of the SEO. Refuelling of vehicles and plant may only take place at a designated and permitted above-ground fuel storage tank (from local Fire Chief) or mobile fuel bowser, under the guidance of a			

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Specific Operating Procedure (SOP) that limits spillage and addresses remedial actions in the event of a spillage. The contractor shall restrict the following activities to the construction camp: - Sanitation, - Waste storage, - Parking, - Storing hazardous materials, - Emergency vehicle or plant repair and maintenance as far as practicable, - Designated concrete mixing area - Material stockpiles, and - Lay down areas. Use chemical toilets that contain the sewerage in a closed and			

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				removable 'tank', i.e. do not use open drums. Environmentally friendly toilets should also be considered e.g. E-loos. In the event that alternative ablution facilities are easily accessible, mobile ablutions will not be required. Washing of equipment including brushes shall not occur on site or in a watercourse but shall be restricted to the main construction camp where adequate containment measures are in place.			
10.2.2	Noise pollution.	To avoid nuisance noise and reduce noise impacts to the environment.	Noise must fall within the parameters set by: **1.** (SANS) Standard	Noise generation must be managed, including the use of radios and other music playing appliances.	Applicant / Contractor.	Following any noise complaints. Frequency of monitoring as stipulated in	SEO or appointed specialist service provider. Verification to

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			10103:2008: The measurement and rating of environmental noise with respect to annoyance and speech communication. **2.** DEA Regulations No. R.154. Noise Control Regulations promulgated in terms of Section 25 of the Environment Conservation Act, 1989 (Act No. 73 of 1989). GG No. 13717,	Vehicles and plant must be in a good state of repair to limit noisy operations. Noise generating activities must be contained to normal working hours to avoid creating nuisance conditions.		relevant regulation and standard, as amended from time to time.	be done by ECO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			10 January 1992.				
10.2.3	Degradation of the environment outside of the development footprint.	To avoid impacts to the biodiversity integrity and ecological function of areas outside the development footprint.	No impacts outside the development footprint. All contraventions to be recorded in incident register.	No residues of stockpiled material must be left on site, that can impede restoration of ecological function and remain a visual intrusion on the landscape. Disturbed habitats resulting from construction-related activities must be rehabilitated immediately after the cessation of those activities on or near the disturbed habitats. The alignment of fences or roads and the placement of potential impediments, such as walls, laydown and material stockpile areas must not alter surface water runoff patterns (i.e. impede or increase surface water runoff) in a way that will cause ponding	Applicant / Contractor.	Update to incident register following each contravention.	SEO & ECO.

No.	Potential Impacts	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				or erosion and sedimentation of a watercourse.			

TABLE 11. WASTE MANAGEMENT (generation, handling, storage, and disposal, including hazardous waste).

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
11.1	**Planning & Design Phase (including Pre-Construction)**						
11.1.1	Shortening the lifespan of the waste disposal site.	To minimise the generation of project-specific waste by implementing an effective waste management strategy based on the waste hierarchy.	Keep accurate records of waste volumes (litres, kg and / or m^3) generated by type in a waste recording system.	Implement an Integrated Waste Management Plan including avoidance, reduction, re-using, recycling and disposal, i.e. the production of hazardous waste can be **avoided** by providing drip trays, **reduce** waste by using the correct quantities, **re-use** excavated soil as back fill or **recycle** steel off-cuts and **dispose** of non-recyclable waste at a registered dump site.	Applicant / Contractor (SEO).	Prior to commencement of construction with ongoing maintenance and updates to Strategy.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Induct all labourers on the waste management strategy and enforce it through regular (at least weekly) toolbox talks. Keep accurate records of waste generated by type including building rubble, contaminated oil and general waste.			
11.2	**Construction Phase**						
11.2.1	Removal of inert waste and rubble. Loss of ecological function.	Maintain ecological function.	Zero concrete hard pan layers observed on the ground.	In the event of concrete hard pan layers, break up all concrete hard pan layers and dispose of appropriately (at a registered landfill site) or re-use the concrete (following permission from Competent Authority for reuse where required).	Applicant / Contractor (SEO).	For each disposal event.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
11.2.2	The high economic cost of disposing hazardous waste at authorised landfills, and potential contamination of land by illegal dumping.	The reduced generation of hazardous waste and the avoidance of environmental (land and water) contamination.	Indicators and trends in hazardous waste generation and management over time while considering amount of active construction to contextualise efforts. All waste waybills and landfill licenses in register and on file. Wastewater disposal according to relevant discharge/disposal regulations.	The contractor shall contain contaminated & dirty water for appropriate disposal. The contractor shall return used oil to the supplier or an oil recycling company.	Applicant / Contractor (SEO).	Throughout construction.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
11.2.3	Solid and liquid waste can be harmful to fauna if swallowed / ingested or if the creature becomes entangled or impaled.	Healthy animals.	Zero incidence (in the incident register) of waste induced harm to wildlife. No litter observed in the development footprint and no-go areas.	Designate a temporary waste storage area and provide sufficient scavenger proof dust bins with black bags inside the construction camp.	Applicant / Contractor (SEO).	Throughout construction.	ECO.
11.2.4	Improper handling, storage or disposal of waste can cause toxicity – the introduction of toxic or hazardous substances into a watercourse - spills can be washed into the watercourse by storm water run-off.	To ensure sound waste management practices that do not affect any aquatic environments.	Zero incidence (in the incidence register) of waste induced impacts on aquatic environments.	Hard-surfaces (e.g. concrete aprons, compacted soils) and parking areas with storm water outlets should not channel litter, oil, and fuel spills into a watercourse, causing water pollution. The contractor is prohibited from discharging wastewater, including domestic water from	Applicant / Contractor (SEO).	Throughout construction.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				sanitation facilities, into a watercourse. The contractor shall store and contain hazardous chemicals within a secure, safe and bunded facility at the construction camp, to ensure spillages do not enter any aquatic environments.			
11.2.5	Construction activities will produce solid and liquid waste, which can contaminate the ground (litter, spillage) if improperly handled, stored, or disposed of.	To reduce contamination of the soil through improper management of waste.	Low incidence of waste induced ground contamination, with a trend indicating constant improvement over time (not just quantities but procedural improvements too).	Do not mix concrete on open ground. Mix in a wheelbarrow, a mixing tray, on a level plastic sheet or similar containment measure. In the event of a leak or spill onto the ground, immediately remove contaminated soil to the depth of penetration and temporarily store in a	Applicant / Contractor (SEO).	Throughout construction.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			Suitable close-out of documentation and reviews of SOPs & MS following significant contamination events.	designated solid hazardous waste container until sufficient volume warrants disposal at a registered hazardous waste dump site. Alternatively, onsite treatment of contaminated soil should be considered with a registered hazardous waste management company by way of bioremediation. The burning, burying or illegal dumping of waste is prohibited. When handling hazardous materials, the contractor shall implement appropriate precautionary measures, such as a ground cover or drip trays,			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				to prevent spills from contaminating the ground. The contractor shall prevent the run-off of slurry or cement contaminated water from concrete / plaster mixing sites. Adequate waste receptacles must be available, including those that track with the active work fronts, to ensure effective waste management. Remove ineffective danger tape / netting that has begun to litter the site or surrounding areas.			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Follow housekeeping rules to avoid littering (littering is likely to be more prevalent at designated eating / rest areas).			
11.2.6	The contamination of soil.	To reduce the amount of hazardous waste, specifically contaminated soil, that is generated during construction.	Sound management and disposal of contents of drip trays and / or utilisation of alternative hydrocarbon absorbents in drip trays. Zero sand observed in drip trays and bunds. Zero spills or leaks observed under or near stationary	Drip trays must be regularly emptied, or they can be filled with hydrophobic hydrocarbon absorbent material to avoid the content from overflowing during rainfall events.	Applicant / Contractor (SEO & Plant Operators).	Throughout construction.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			construction plant and equipment.				
11.2.7	The contamination of soil (and generation of waste) by undesirable practices.	To reduce the amount of hazardous waste, specifically contaminated soil, that is generated during construction.	Zero observations of spills covered with soil.	Do not cover spills with virgin soil. It merely increases the disposal cost for a greater volume of hazardous waste.	Applicant / Contractor.	Throughout construction.	ECO.

TABLE 12: FAUNA AND FLORA MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
12.1	**Planning & Design Phase (including Pre-Construction)**						
12.1.1	The establishment of laydown areas, stockpiles and expansion of service roads can destroy plants of	To reduce the impacts of construction activities including laydown areas, stockpiles and roads on fauna and flora.	The successful relocation of plants of conservation concern into suitable habitats.	Prior to the development or expansion of any roads, a search and rescue must be conducted by a suitably qualified specialist for protected fauna and flora and those of conservation concern, which must then	Applicant / Contractor.	Prior to & during construction.	SEO & ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	conservation concern.			be transplanted outside the works area in a comparative habitat type. Ascertaining similar habitat types may require soil sampling and analysis over and above above-ground similarities.			
12.2	**Construction Phase**						
12.2.1	Increased risk of alien plant invasion to the detriment of the local ecology.	To effectively control the invasion of any alien plants.	No new alien plant recruitment (directly or indirectly resulting from construction activities) within the development footprint and neighbouring no-go areas or immediate surroundings.	All aggressive alien species should be removed. In terms of the Conservation of Agricultural Resources Act (CARA, Act No. 43 of 1984), and NEMBA (Act 10 of 2004) and Alien Invasive Regulations (GN No. 627 of 3 June 2020), alien species need to be managed and controlled in terms of their respective categories, where category 1 must be removed. Species specific	Applicant / Contractor.	Throughout construction.	SEO & ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				and area specific eradication recommendations: • Control involves killing the plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. • Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.			
12.2.2	Construction activities (i.e. clearing and grading) have the potential to directly	To reduce *in situ* losses of protected and conservation	Spatially explicit "Search and Rescue" register indicating the nature & position of all	All fauna and flora that are protected or of conservation importance must either be cordoned off and protected or translocated outside of	Applicant / Contractor. All search & rescue & translocation	Pre-Construction.	SEO & ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	impact, that is damage / injure and destroy / kill, local fauna, and flora. (The impacts are exacerbated when the species affected are classified as protected, sensitive, rare, or threatened and endangered).	important flora & fauna.	translocated flora & fauna.	the site establishment and development footprint, into habitats of a similar nature. Avoid direct contact with fauna, through clearing and grading as it can cause injury or death.	activities must be carried out by suitably qualified specialists.		
12.2.3	Harvesting of: - indigenous plants for muthi - firewood; and - poaching of animals.	To ensure no harvesting of natural resources within and adjacent to the development footprint.	Zero incidence of harvesting/poaching. All incidences recorded in the incident register including close-out actions.	The harvesting or collection of any natural product(s) from the environment is strictly forbidden. "Problem" animals must be handled with assistance from the provincial conservation authority and in accordance with the Norms and Standards for	Applicant / Contractor.	Throughout construction and operation.	SEO & ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				the management of damage-causing animals (GN No. 749, 10 November 2016). Except for search and rescue operations, no mammal, bird, reptile, invertebrate or fish shall be intentionally caught, hunted or poached, within the development footprint and no-go areas.			

TABLE 13: WATER USE & MANAGEMENT (INCLUDING WATERCOURSES).

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
13.1	**Construction Phase**						
13.1.1	Altering bed, banks, or course of a watercourse. Impediments to surface water runoff of the man-made drainage systems and surrounding network of wetland areas which could be impacted adversely by the proposed project activities.	Prevent impacting the flow and water quality of the man-made drainage channels due to construction activities.	No physical and structural damage to the man-made drainage channels.	No covering of material or dumping of any rubble will be allowed into the drainage channels. Water flow in drainage lines and wetland systems must not be obstructed.	Applicant / Contractor.	Throughout construction.	SEO & ECO.
13.1.2	Soil erosion and siltation of watercourses from disturbing the soil during the construction of roads, clearing	To retain as far as possible surface water hydrology.	Limited signs of erosion along haulage roads or resulting from the construction activities.	The contamination of water leaving the site could be controlled by the use of silt-fencing, rows of hessian bags, mulch, brushwood and deflection berms.	Applicant / Contractor.	Throughout construction.	SEO & ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	areas, and creating bare patches, channelling stormwater and road run-off.		Due to the proximity of the drainage channels and associated wetland areas, erosion and siltation originating from construction activities could be impacted adversely by the proposed project activities.	In any areas where the risk of erosion is evident, appropriate temporary or permanent works and water energy dispersion structures must be installed. Cleared or bare areas prone to erosion should be monitored and rehabilitation should be implemented wherever indications of potential erosion become evident.			

TABLE 14: AIR QUALITY MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
14.1	**Construction Phase**						
14.1.1	Old and poorly maintained vehicles cause the most air pollution from cars, specifically GHG emissions that are released to the atmosphere, contributing to global warming and acid rain.	To reduce the level of car or other combustion-related pollutants entering the atmosphere (by keeping well-maintained plant and equipment).	Evidence of servicing at required intervals. No visible evidence of excessive emissions.	Construction plant and equipment shall be kept in a good state of repair to reduce combustion-related emissions.	Applicant / Contractor.	During construction.	Plant Manager, SEO & ECO.
14.1.2	Negative effects on floral photosynthetic functioning and potential increase in breathing ailments of site staff, surrounding communities, and fauna.	To manage dust entrainment on access roads which may not exceed the thresholds stipulated in the National Dust Control Regulations.	Full compliance with National Dust Regulations. Acceptable Dust fallout rate ($mg/m^2/day$):	Ensure the effective implementation of the National Dust Control Regulations. Excessive vehicle movement, and the transport and off-loading of dispersive materials shall be avoided during windy conditions, unless additional dust suppression methods will ensure that the dust	Applicant / Contractor.	During construction, monthly.	Monitoring of dust fallout to be undertaken by a professional service provider if excessive emissions evident or related

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			Residential area < 600 Non-residential area < 1200 Exceedance not more than twice in a year, not sequential months.	fallout does not exceed the acceptable limits. We suggest that the contractor take into consideration predicted wind speeds from a local weather station when planning construction-related activities with a high risk of generating dust. Dust suppressant must be prioritised for any drilling activities.			complaints received, compliance to be verified by ECO & IEA.
14.1.3	Safety risks and road accidents due to reduced visibility.	To reduce vehicular accidents due to poor dust-induced visibility.	Full compliance with National Dust Regulations.	Dust suppression must be carried out on access roads where high dust entrainment is evident.	Applicant / Contractor.	During construction. Dust fallout evaluation monthly and dust suppression as conditions dictate.	Monitoring of dust fallout to be undertaken by a professional service provider if excessive emissions evident or associated complaints

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
							received, compliance to be verified by ECO & SEO.
14.1.4	Unpleasant odours.	To reduce unpleasant odours often associated with ablution facilities.	Records of regular servicing, and daily cleaning log.	Chemical toilets shall be kept hygienic and cleaned daily to avoid unpleasant odours.	Applicant / Contractor.	During construction.	SEO, HSO & ECO.

TABLE 15: SOIL MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
15.1	**Pre-Construction Phase**						
15.1.1	Loss of valuable topsoil.	To minimise disturbance and contamination of topsoil.	Compliance with site layout plans.	Clearing, and the location of topsoil stockpiles and / or windrows, shall take place in pre-authorised and clearly defined areas only.	Applicant / Contractor.	Prior to and during construction.	SEO & ECO.
15.2	**Construction Phase**						
15.2.1	Disturbing the soil during the construction of roads, clearing	To reduce erosion induced soil losses and consequential	To record all areas prone and affected by erosion and	Areas disturbed and rehabilitated during construction shall be monitored for signs of erosion and if found to occur, immediately	Applicant / Contractor (SEO).	During construction.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	areas and creation of bare patches, channelling storm water and road run-off, will cause soil erosion.	ecosystem degradation.	implement suitable pre-emptive and remedial measures.	corrected ('source') and repaired ('symptom'). Bulk shape the areas where material is introduced to mimic or blend in with the surrounding, natural topography. Do not fine shape or rake because an uneven surface will impede surface water run-off and facilitate infiltration. Correct any cause of erosion at the onset thereof by controlling / diverting storm water run-off, immediately repairing and stabilizing / rehabilitating impacted areas in the most appropriate manner. Ensure a quick and adequate cover with indigenous and local grass species.			

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Ensure storm water run-off is adequately controlled on disturbed sites before rehabilitating them (ripping, replacing the topsoil and mulching/brush packing), i.e. cut-off berms. Grading of access roads must not be promoted, but tracks must be utilised as far as possible. Sediment traps may be necessary to prevent erosion and soil movement if there are topsoil or other waste heaps present during the wet season.			
15.2.2	Decline in soil organisms.	To maintain the biological integrity of disturbed soil.	Reinstatement of indigenous, locally-occurring plant species in place of exotic	Hydro- or hand-seed disturbed areas after construction with grass seeds of the naturally occurring plant species to create a functional and protective covering of exposed soil.	Applicant / Contractor (SEO) / Agronomist.	Following construction or construction induced disturbance.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			species, chosen for rehabilitation.	A suitable fertiliser design must be compiled by a qualified soil scientist/agronomist where extensive areas have been affected.			
15.2.3	Loss of valuable topsoil.	To retain all disturbed and cleared topsoil.	Comparative quantification of cleared and reinstated topsoil volumes.	Any topsoil removed during the establishment of parking areas, temporary roads, or any other cleared areas, must be quantified to ensure the same volume is reinstated at the end of construction; and must be protected from vehicular and construction impacts. Do not mix topsoil with cement and / or subsoil or let it be pulverised by trucks.	Applicant / Contractor (SEO).	During initial clearing and prior to reinstatement of topsoil.	ECO.
15.2.4	Potential sterilisation of the soil.	To maintain soil viability.	Use of only selective, environmentally friendly herbicides.	Where possible, refrain from using non-selective herbicides to control vegetation, depending on the active ingredient, it can sterilise the soil.	Applicant / Contractor (SEO).	Every treatment episode.	ECO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				Application of herbicides may only be applied by or under the supervision of a Certified Pest Control Officer.			
15.2.5	Soil contamination.	To reduce and avoid soil contamination.	Separately stockpiled / windrowed / designated soil horizons.	Soil horizons must be stockpiled or windrowed separately during excavation to ensure they can be reinstated in reverse order and ensure restored soil structure.	Applicant / Contractor (SEO).	During construction.	ECO.

TABLE 16: SOCIAL-ECONOMIC MANAGEMENT (HEALTH, SAFETY & SECURITY & COMMUNICATION).

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
16.1	**Planning & Design Phase (including Pre-Construction)**						
16.1.1	Community confusion, frustration, and lack of information.	To avoid creating false hope where job creation opportunities are concerned.	Development of an effective job seeker database.	Implementation of a community relations strategy until all activities on site cease and rehabilitation is completed. Develop a job seeker database to ensure job seekers' details are captured. As positions become	Applicant / Contractor / Operator	Prior to and during construction and operation.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				available, this database can be searched for suitable skills within the local populous before positions are outsourced. These measures will reduce the potential nuisance factor to the landowner, caused by job seekers reverting to visiting the proposed site of development.			
16.2	**Construction Phase**						
16.2.1	Increase in crime including damage to infrastructure and vandalism.	Reduce impacts associated with crime.	No perpetuating criminal activity. Improvements to security must be demonstrated following an incident.	Security must be appointed throughout construction to discourage criminal elements and trespassers accessing the project area.	Applicant / Contractor / Operator.	At commencement of construction, especially site establishment.	ECO & SEO.
16.2.2	Potential social pathologies (social unrest).	Reduce impacts associated with disgruntled staff.	No strike actions by staff.	Ensure effective communication and engagement with staff and surrounding community *via inter*	Applicant / Contractor / Operator (CLO).	At commencement of construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
			Improvements to engagement with staff must be demonstrated following an incident.	alia the appointment of a suitably qualified CLO. Transparent communication through the right channels to communicate with the community as to when and how their contracts will come to an end.			
16.2.3	Injury to site staff from construction, demolition and blasting activities.	To ensure effective Health and Safety implementation.	Appointment of a suitably qualified HSO and compliance monitoring against the OHSA (Act 85 of 1993).	Implement a safety plan, access protocols, grievance mechanism and compensation policy. All staff must undergo a site induction that outlines the socio-environmental and health & safety constraints of the site.	Applicant / Contractor (HSO).	Construction.	Health & Safety Audits biannually.
16.2.4	Injury to trespassers resulting in possible lawsuits.	To avoid inadvertent injuries to trespassers.	No recorded injuries to trespassers.	Adequate signage must be placed around the development warning uninformed people of the potential hazards and dangers associated with the project.	Applicant / Contractor.	Throughout construction	ECO & SEO.
16.2.5	Negative effects on the wellbeing of the	To avoid negative impacts on the	Effective implementation	AIDS / HIV & COVID-19 awareness training must be	Applicant / Contractor.	Ongoing	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	local inhabitants and site staff as well as the potential outbreak of disease (including HIV/AIDS & COVID-19).	health of the residents and occupiers.	of awareness training including measures to assess effectiveness of training.	undertaken to ensure that the labour force is well informed on these matters. Dangerous fumes, noise, dust and water impacts must be avoided that may affect both the labour force and surrounding landowners and users.			
16.2.6	Potential increase in pedestrian and wildlife accidents.	To reduce impacts and injuries to pedestrian and wildlife.	No injuries recorded in incident register. Close-out Reports must demonstrate improvements to avert a recurrence.	An awareness must be fostered to drive carefully to avoid killing or injuring people or animals and damage to property. Open excavations & holes must be secure and cordoned off to avoid accidental injury to humans and animals alike.	Applicant / Contractor.	Ongoing awareness.	ECO & SEO.

TABLE 17: CULTURAL, HERITAGE, ARCHAEOLOGICAL & PALEONTOLOGICAL MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
17.1	**Planning & Design Phase (including Pre-Construction)**						
17.1.1	Lack of awareness of heritage resources.	To promote awareness about heritage resources and their potential presence within the development area.	Procedures for incidental discovery of heritage artefacts in site induction and toolbox and awareness talks.	Include an awareness of heritage resources in the environmental induction & toolbox talks. Categories of heritage resources include, inter alia: • Evidence of archaeological sites or remains include remnants of stone-made structures, indigenous ceramics, bones, stone artifacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations. • Archaeological or paleontological sites over 100 years old, • Sites of cultural significance associated with oral histories, • Significant cultural landscapes or viewscapes, • Burial grounds, unmarked human burials, graves of victims of conflict, and/or graves older than 60 years,	Applicant / Contractor.	Throughout construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
				• Structures older than 60 years, • Fossils.			
17.2	**Construction Phase**						
17.2.1	Loss of archaeological and palaeontological valuable artefacts.	To ensure construction activities do not disturb know or incidental heritage sites.	No loss of archaeological valuable artefacts. Any incidental "heritage" sites within the development footprint are suitably cordoned off.	All areas of heritage value must be demarcated and avoided. Incidental discoveries during clearing and grubbing must be disclosed to site management with immediate cessation of activities until their significance can be assessed by a qualified heritage specialist. Any archaeological artefacts unearthed during excavations must be protected and left *in situ*. Works must cease until the significance of the finding can be assessed by a qualified archaeological specialist.	Applicant / Contractor.	Throughout construction.	ECO & SEO.
17.2.2	Loss of cultural and heritage value to society.	To ensure correct procedures are followed following	Adherence to protocols specified in	Contact a professional archaeologist or Palaeontologist, depending on the nature of the	Applicant / Contractor.	Throughout construction.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
		chance finds to preserve the heritage resource.	management actions following a chance find.	finds, as soon as possible to inspect the findings. In the event of discovering a heritage resource, stop reconstruction activities and alert the SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit immediately. Nokukhanya Khumalo, Heritage Officer T: +27 21 462 4502 | F: +27 21 462 4509 | C: +27 82 507 0378. E: nkhumalo@sahra.org.za			

TABLE 18: INFRASTRUCTURAL & TRAFFIC MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
18.1	**Construction Phase**						
18.1.1	Parking and driving carelessly can increase collisions with mammals, birds, reptiles, amphibians and insects – collectively referred to as "roadkill's".	To avoid and minimise impacts from traffic on animals residing on and around the property.	Compliance to speed limits. No recorded project vehicle associated animal mortalities.	Drivers shall always adhere to the relevant speed limit(s) (on the existing road network) and restrict their movements to the existing and / or approved roadway or servitude. The speed limit on the property shall be 30 km/h and 20km/h within the development footprint. A register must be maintained of all animal mortalities recorded on the property and localised access roads.	Applicant / Contractor.	During construction.	Compliance to be verified by ECO & SEO.
18.1.2	Contamination from spills when refuelling, parking, driving, emergency repairing, operating plant or equipment to soil or nearby or	To reduce contamination of soil from leaking plant and vehicles and upon occurrence is remediated promptly.	Spills are removed within 48 hours of event. Records of servicing by off-site workshop.	Oil and fuel spills on roadways and parking areas must be removed to depth of penetration following their discovery and placed in a designated hazardous container for safe disposal.	Applicant / Contractor.	During construction.	Compliance to be verified by ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
	within the watercourse.		Drip tray issued to all plant and recorded in a register.	Drip trays must be placed under all plant that is parked overnight and extended periods not in operation.			
18.1.3	Impact to local road users.	The effective implementation of measures to negate impact on local road users and ensure the safe haulage of material to site.	Development of a traffic management plan.	A traffic management plan needs to be developed following the detailed design process. This plan must include the following: • Traffic accommodation signage is to be implemented. • Flagmen must be positioned at intersections during days when deliveries are expected. • Daily checking of vehicles must be done to confirm they are clean, road worthy and have operational amber construction lights. • Construction lights on trucks must be visible from back and front of the vehicle by other vehicles behind or approaching.	Applicant / Contractor / Logistics company.	During construction and deliveries.	Compliance to be verified by SEO & ECO.

TABLE 19: VISUAL ASPECT MANAGEMENT.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
19.1	**Construction Phase**						
19.1.1	Impact of construction on visual receptors, including road users and local homesteads.	To manage the facility in a way that minimised its visual impacts on the surrounding environment.	Demonstration of effects to minimise visual impacts.	Have minimal placements that can be visually intrusive to sensitive receptors. Utilise fencing options that do not create a significant visual barrier. Managing the visual nuisance impact (glare) through erecting visual barriers such as trees. This should be done in consultation with the potentially affected parties. Tall trees can be planted to form a barrier or a screen between the receptors and the source of the nuisance. The trees should be planted a distance away from the panels as to not interfere with their working. Furthermore, the proponent should enter into consultation with the school and the SPCA to determine the	Applicant.	During Construction with many of the measures to persist throughout the project lifecycle.	ECO & SEO.

No.	Potential Impact	Desired Outcomes	Targets & Indicators	Management Actions & Mitigation Measures	Responsibility	Timeframe / Frequency	Monitoring
19.1	**Construction Phase**						
				nuisance potential and whether any other measures may be suitable. The houses in the immediate area may also be affected. The Boksburg Roads and Storm Water Depot is directly adjacent to the SPCA. Planting further trees along Kruger and St Dominic's would assist in reducing the intensity of the PV views to some degree, in consultation and following approval from the property owner (Department of Public Works). All proposed buildings should be painted a grey-brown colour. Fencing needs to be the Truview type and black in colour. This offers some visual screening, as well as stopping wind-blown litter.			

SECTION 6: ENVIRONMENTAL AWARENESS PLAN

This section of the report is included in compliance with Section 24N(3)(c) of the NEMA and the EIA Regulations (2014) as amended.

The EMPr needs to include, inter alia:
An environmental awareness plan describing the manner in which-
(i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and
(ii) Risks must be dealt with to avoid pollution or the degradation of 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 EMPr actions.

This section of the report focusses on the environmental awareness training. It provides a guideline as to the possible environmental risks that may be experienced as part of the project as well as way to avoid the risks and subsequent environmental degradation. The aim is to provide a guide to developing a comprehensive yet easily understandable awareness plan to present to employees of all education and skill levels which should be presented to the employees at least one week prior to commencement of construction. The following pointers are given for the environmental awareness training course:

- Environmental awareness training should be undertaken by the environmental and / or health and safety representative with the input of an EAP or ECO if required;
- Environmental awareness reminders should be undertaken at least bi-annually to ensure that employees and Contractors are kept aware of the risks and management thereof;
- It is recommended that awareness posters be developed and placed on site in highly visible areas to provide the required information when it needs to be referred to as well as reminding employees of their obligations regarding environmental protection;
- A slideshow can also be developed for initial awareness induction and for use as a reminder of the environmental risks and responsibilities at the site or induction of future Contractors; and
- Throughout the presentations (posters, meetings, slideshows, etc.), it is recommended that visual aids be used to explain the potential risks and management thereof as thoroughly as possible.

Should any new personnel be contracted or arrive on site during the construction period, they should attend the environmental awareness course. The environmental awareness training should be provided to all labourers, technical staff and any other Contractor appointed.

The awareness training forms part of this EMPr and should be implemented as part of the conditions of environmental management and risk prevention. Refer to the management measures in Tables 6 through 16 above for proposed management and mitigation actions to be

undertaken to prevent or minimise the risks described below. Attention should be focussed on the following areas of sensitivity during the construction phase:

- Removal of vegetation during site clearance within a critical biodiversity area;
- Covering and clearing of riverine habitat leading to fragmentation;
- Altering bed, banks or course of seepage lines and riverine wetland network;
- Animal habitat disturbance due to vegetation clearance and noise;
- Soil erosion, siltation, and pollution of watercourses;
- Soil compaction;
- Health and safety;
- Degradation of roads; and
- Fire risks.

Other elements to be taken into consideration by the employees during both the construction and operational phases include:

- The presence of animals on site;
- Disturbances to neighbours due to noise and traffic;
- The positive impacts, of the greener technology being implemented, on the biophysical and socio-economic environments; and
- Awareness should be raised regarding the possible occurrence of sensitive plant and animal species and heritage features.

The awareness training for this project should aim to prevent, and where prevention is not possible, mitigate detrimental environmental impacts. It should promote awareness of environmental risks and management thereof. It should furthermore promote green thinking and provide information on alternative energy sources and energy consumption reduction.

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SECTION 7: RESPONSIBILITIES OF ROLE PLAYERS

The approved EMPr shall be printed, completed, and kept in an on-site file designated for all matters pertaining to environmental management. Co-operation is required between the applicant, contractor, and ECO to ensure that activities are managed in an amicable and responsible manner and in accordance with the philosophies of environmental legislation and principles of the EMPr.

This EMPr is predominantly compiled for the management of construction, once the Planning and Authorisation phases are complete. The tabulated management programmes assign responsibilities to one or more role player, the below descriptions identify responsibilities and accountabilities in the case of any uncertainty.

Applicant

The applicant remains ultimately accountable for ensuring that the development is implemented according to the requirements of the EMPr. Although the applicant delegates specific responsibilities to role players to perform functions on his / her behalf, the ultimate accountability cannot be delegated. The developer is responsible for ensuring that sufficient resources (time, financial, manpower, equipment, etc.) are available to the other role players (e.g. the contractor, SEO, etc) to efficiently perform their tasks in terms of the EMPr. The responsibility of restoring the environment in the event of any negligence, which leads to damage of the environment, also falls to the applicant.

The applicant must ensure that the EMPr is included in any documents (tender, appointment etc.) so that any contractor who is appointed is bound to the conditions of the EMPr. The applicant must appoint an independent Environmental Control Officer (ECO) prior to commencement of construction, to help identify pre-construction & construction criteria that need to be fulfilled timeously, to avoid non-compliance with the overarching authorisation conditions and/or legislation.

Contractor

The contractor, as the developer's agent on site, is bound to the EMPr conditions through his/her contract with the developer and is responsible for ensuring that she/he adheres to all the conditions of the EMPr. The contractor shall be responsible for the actions undertaken by all their employees including sub-contractors. The contractor must thoroughly familiarise him/herself with the EMPr requirements before coming onto site and must request clarification on any aspect of these documents, should they be unclear. The contractor must ensure that he/she has provided sufficient budget for complying with all EMPr conditions at the tender / appointment stage.

The contractor must comply with all instruction (whether verbal or written) given by the environmental manager, project manager or site engineer in terms of the EMPr.

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Site Environmental Officer (SEO)

The Site Environmental Officer (SEO) shall be appointed by the contractor to implement the EMPr daily. The SEO shall ensure that all construction activities are carried out in accordance with the relevant conditions of the EMPr, Environmental Authorisation (EA), General Authorisation (GA) (under the National Water Act), wayleaves, provincial ordinances and provincial bylaws.

Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) is appointed by the applicant as an independent monitor of the implementation of the EMPr, EA, and GA. He/she must form part of the project team and be involved in all aspects of the project planning that can influence environmental conditions on the site.

The ECO must attend relevant project meetings, conduct inspections to assess compliance with the EMPr, EA, and GA and be responsible for providing feedback on potential environmental problems associated with the development. In addition, the ECO is responsible for:

- Liaising with relevant authorities;
- Liaising with contractors regarding environmental management; and
- Undertaking routine monitoring and appointing a competent person / institution to be responsible for any specialist monitoring (if required).

The ECO has the right to enter the site and undertake monitoring and auditing at any time, subject to compliance with health and safety requirements applicable to the site (wearing safety boots, head gear, mouth mask etc.).

Independent Environmental Auditor (IEA)

An IEA shall be appointed by the Applicant to undertake EMPr, EA, and GA compliance audits at intervals stipulated in the EA and/or GA alternatively in accordance with Regulation 54A(3) of the EIA Regulations (2014), as amended. The purpose of conducting a periodic compliance audit would be to systematically check and evaluate progress on EMPr, EA, and GA implementation. The environmental audit will serve as a 'snapshot' of the environmental situation and progress at a given point in time. The purpose of the audit is to illustrate whether there has been any improvement or change over time.

The IEA will fulfil the auditing requirements by systematically auditing the Project's performance and compliance against the requirements of the EA, EMPr, and GA in a process that is carefully planned, structured and organised. The audit process must, on a sampled basis, track past actions, activities, events, and procedures through using existing documentation, conducting interviews with managers and personnel, and observing practices on site.

SECTION 8. COMMUNICATION

At least monthly site meetings should be held where feedback can be given, and any potential problems identified and remedied. If they cannot be remedied then construction in that area should be stopped, until a suitable remedy is identified.

Monitoring Compliance

Pre-construction, Construction and Post-construction monitoring:

The ECO will be responsible for monitoring and reporting on compliance of the activity from pre- to post-construction.

Inspections and resulting compliance reports shall be a systematic, independent, and documented process for obtaining compliance evidence and evaluating it objectively to determine the extent to which the compliance criteria are fulfilled. The compliance criteria (or reference) against which the compliance evidence is compared shall include this EMPr, the Environmental Authorisation, and General Authorisations (under then National Water Act).

The ECO must undertake monthly inspections of the site and submit monthly environmental compliance reports to the Competent Authority) for this project, unless otherwise prescribed in the EA. The compliance reports must identify the actual and potential transgressions, describe the impacts, provide verifiable evidence (photographs, records, or statements) and recommend corrective and preventive actions (including completion dates). The compliance reports must measure the applicant/contractor's level of compliance against the aforesaid criteria. Performance scoring/reporting is optional.

The SEO shall maintain an on-site diary to record environmental aspects (elements of the construction activities that can interact with the environment) and environmental impacts (any change to the environment, whether adverse or beneficial, wholly or partially resulting construction activities), daily.

Environmental Awareness Plan

The applicant shall ensure that his project team, contractor, and labourers are adequately trained about the implementation of the EMPr, EA, & GA throughout construction.

Pre-construction

Environmental Awareness Inductions shall be targeted at two distinct levels of employment: management (applicant, architect, engineer, contractor / site agent) and labourers (including the site foreman). The SEO shall be responsible for preparing and presenting inductions appropriate to the audience. Inductions shall be undertaken prior to the commencement of construction. Where possible the presentation will be conducted in the language of the employees.

The Environmental induction for management shall include mitigations that are relevant to or require management's involvement prior to implementation including, but not limited to, the following:

- Measures required during the planning and design, and pre-construction phase, and
- Site establishment.

The Environmental induction for the contractor's labourers and foreman shall, as a minimum, include the following:

- A description of the actual and potential environmental impacts,
- Standard operating procedures for undertaking construction activities (i.e. mixing concrete, driving, etc.) that can have an environmental impact,
- Staff conduct including sanitation and movement,
- The integrated waste management strategy,
- The steps to be taken should any item of perceived environmental importance including archaeological artefacts be located or unearthed, and
- The environmental emergency plans.

Construction

The SEO and ECO shall undertake an informal training needs analysis throughout construction to identify appropriate environmental topics and the appropriate labourers to target. The analysis shall be informed by the findings contained in the site diary and compliance reports. Training shall be given during toolbox talks.

The SEO and ECO shall keep records of the environmental inductions and subsequent toolbox talks in an on-site file designated for all matters pertaining to environmental management.

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SECTION 9: ENVIRONMENTAL EMERGENCY PLAN FOR THE CONTROL OF ENVIRONMENTAL INCIDENTS

Definition of an 'Environmental Incident'

1. An unexpected sudden occurrence including a major emission, fire or explosion leading to danger to the public or potentially serious pollution of or detriment to the environment whether immediate or delayed (NEMA, 1998, section 30 (1) (a)).

2. Any incident or accident in which a substance-
   (a) pollutes or has the potential to pollute a water resource or
   (b) has, or is likely to have, a detrimental effect on a water resource (NWA, 1998, section 20 (1))

Procedure

The contractor shall ensure that emergencies are reported and controlled in accordance with the sequence of events prescribed for spillages in a watercourse, on land and fire, including:

- Action to be taken
- Removal and remediation measures to be implemented
- Internal and external communication plan
- Prescribed reporting procedure

The measures prescribed in the tables to follow will need to be checked and compared to prevailing legislation, especially the NEMA & NWA, which are updated from time to time.
The contractor shall ensure that their employees are adequately trained to react to environmental emergencies in accordance with this procedure.
The SEO shall complete the table of contact numbers, erect them in a conspicuous place within the construction camp and make its whereabouts known to all the contractor's staff.

Equipment

The following equipment is required to successfully implement this procedure. It must be ensured that the equipment is supplied to or is readily available for all site offices, kitchen areas, workshop areas, stores and on site.

1. A spill kit including absorbent fibres, mats, and booms
2. A net
3. A whistle
4. Adequate lighting for night shifts
5. Spades
6. Sandbags
7. Designated hazardous waste drums
8. (Trained personnel with) protective clothing for extinguishing fires
9. Fire extinguishers
10. Fire beaters
11. Water carts/tankers with pumps and hoses
12. Water pumps and pipes (for fires started at the watercourse crossings)

Contact Numbers

Organisation	Name	Telephone/cell Number
Project Personnel		
Applicant		
Engineer		
Contractor		
HSO		
SEO		
ECO		
Interested and Affected Parties		
Landowner		
Adjacent Landowner		
Adjacent Landowner		
Emergency Services		
Spill Clean-up Service Provider		
Fire Department		
Chief Fire Officer (Fire Chief)		
SA Police Services		
Disaster Management Centre		
Local Municipality		
District Municipality		
Irrigation Board		
Water Catchment Management Agency		
Water Treatment Works		

DWS (Regional Head of Department / Chief Director)		
DWS (Regional Director: Water sector Regulation & Use)		
DEFF (Provincial Head of Department)		
DEFF (Director: Environmental Impact Management)		
DEFF (Director General)		
DEFF (Director: Environmental Impact Evaluation)		