ENVIRONMENTAL MANAGEMENT PROGRAMME

THE PROPOSED CONSTRUCTION OF RADIO ANTENNAE ON PORTION 8 OF FARM 148, NEAR MATJIESFONTEIN, LOCAL MUNICIPALITY, WESTERN CAPE PROVINCE

Prepared for:

The South African National Space Agency
SANSA Space Operations, PO Box 484, Silverton, 0127
Tel: 012 334 5118

Prepared by:

CES
Elta House, 3 Caledonian Road, Mowbray, 7700
Cape Town
Also in Grahamstown, Port Elizabeth, East London, Johannesburg and Maputo (Mozambique)

www.cesnet.co.za

OCTOBER 2020

REVISIONS TRACKING TABLE

CES Report Revision and Tracking Schedule

Document Title:	**Environmental Management Programme: The proposed construction of radio antennae on portion 8 of farm 148, near Matjiesfontein, Laingsburg Local Municipality, Western Cape Province, Coastal and Environmental Services (CES), October 2020, Cape Town.**		
Client Name & Address:	The South African National Space Agency SANSA Space Operations, PO Box 484, Silverton, 0127 Tel: 012 334 5118		
Status:	FINAL		
Issue Date:			
Lead Author:	Ms Skye Clarke-Mcleod		
Reviewer:	Ms Tarryn Martin (Pri. Sci. Nat)		
Study Leader/ Registered Environmental Assessment Practitioner – Approval:	**Dr Anthony (Ted) Mark Avis**		
Report Distribution	***Circulated to***	***No. of hard copies***	***No. electronic copies***
	Raoul Hodges		1
	Department of Environment Forestry and Fisheries		1
Report Version	***Date***		
Final	12 February 2021		

This document has been prepared in accordance with the scope of CES's appointment and contains intellectual property and proprietary information that is protected by copyright in favour of CES. The document may therefore not be reproduced, used or distributed to any third party without the prior written consent of CES. This document is prepared exclusively for use by CES's client. CES accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of CES. The document is subject to all confidentiality, copyright and trade secrets rules, intellectual property law and practices of South Africa.

CES
ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES
Info@cesnet.co.za
www.cesnet.co.za

LIST OF ACRONYMS

BAR	Basic Assessment Report
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EMS	Environmental Management System
GN	Government Notice
I&AP	Interested and Affected Parties
KPI	Key Performance Indicator
SOP	Standard Operating Procedure

TABLE OF CONTENTS

1. INTRODUCTION 6

1.1. CONSTRUCTION EMPR 6
1.2. OPERATIONAL AND MAINTENANCE EMPR 7

2. CONTENTS OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR) 8

3. BACKGROUND INFORMATION 10

3.1. PROJECT DESCRIPTION 10
3.2. ENVIRONMENTAL OBJECTIVES AND TARGETS 12
3.3. ENVIRONMENTAL LEGISLATION AND GUIDELINES 12
3.4. DETAILS OF EAP 12

4. EIR MITIGATATION AND MANAGEMENT MEASURES 13

4.1. SUMMARY OF IMPACTS ASSOCIATED WITH THE DEVELOPMENT 13
4.2. SITE SPECIFIC MITIGATION MEASURES 13

5. ENVIRONMENTAL MANAGEMENT SYSTEM 22

5.1. REPORTING 22
5.1.1. Administration 22
5.1.2. Record keeping 22
5.1.3. Document control 23
5.2. PLANNING AND DESIGN, PRE-CONSTRUCTION AND CONSTRUCTION PHASE 23
5.2.1. Clearing of the Site 23
5.2.2. Excavation, hauling and placement 23
5.2.3. Construction Activities and Equipment 23
5.2.4. Good housekeeping 24
5.2.5. SOLID WASTE MANAGEMENT 24
5.2.6. WATER USE 24
5.2.7. CONTAMINATED WATER 24
5.2.8. HAZARDOUS SUBSTANCES 25
5.2.9. CEMENT AND MIXING OF CONCRETE 25
5.2.10. FUEL (PETROL AND DIESEL) AND OIL 25
Fuel Storage 26
Refuelling 26
Used oil and hydrocarbon contaminated materials 26
5.2.11. ABLUTION FACILITIES 27
5.2.12. EATING AREAS 27
5.2.13. SITE STRUCTURES 27
5.2.14. LIGHTS 27
5.2.15. NOISE 28
5.2.16. DUST CONTROL 28
5.2.17. ENVIRONMENTAL AWARENESS TRAINING 28
Construction personnel information posters 29
5.2.18. FIRE CONTROL 29
5.2.19. EMERGENCY PROCEDURES 29
Accidental leaks and spillages 29
5.2.20. PROTECTION OF NATURAL FEATURES 30
5.2.21. PROTECTION OF FLORA AND FAUNA 30
5.2.22. PROTECTION OF HERITAGE FEATURES 30
5.2.23. VEGETATION CLEARANCE 31
5.2.24. ALIEN VEGETATION CLEARANCE 31
5.2.25. REVEGETATION 31
5.2.26. TOPSOIL STRIPPING AND STOCKPILING 31
5.2.27. STORMWATER MANAGEMENT 32
5.2.28. EROSION AND SEDIMENTATION CONTROL 32
5.2.29. AESTHETICS 33
5.2.30. COMMUNITY RELATIONS 33

5.3. OPERATION PHASE 33
5.3.1. EMERGENCY PROCEDURES 33
Fire *33*
5.3.2. AESTHETICS 33
5.3.3. NOISE 33
5.3.4. FUEL STORAGE 34
5.3.5. REFUELLING 34
5.3.6. CONTAMINATED WATER 35
5.3.7. SOLID WASTE MANAGEMENT 35
5.3.8. WATER USE 35
5.3.9. ABLUTION FACILITIES 35
5.3.10. LIGHTS 36
5.3.11. PROTECTION OF NATURAL FEATURES 36
5.3.12. PROTECTION OF FAUNA 36
5.3.13. STORM WATER MANAGEMENT 36
5.4. DECOMISSIONING PHASE 36
5.4.1. REHABILITATION 36

6. ENVIRONMENTAL MANAGEMENT PROTOCOL **37**

6.1. ROLES AND RESPONSIBILITIES 37
6.1.1. APPLICANT/DEVELOPER 37
6.1.2. CONTRACTOR 37
6.1.3. ENVIRONMENTAL CONTROL OFFICER 37
6.1.4. ENVIRONMENTAL AUDITOR 38
6.2. COMPLIANCE MONITORING AND CORRECTIVE ACTION 39
6.3. ADDITIONAL MITIGATION MEASURES 39
6.3.1. PRE-CONSTRUCTION 39
6.3.2. CONSTRUCTION PHASE 40
6.3.3. OPERATIONAL PHASE 40
6.4. MONITORING 40

7. ENVIRONMENTAL AWARENESS **41**

8. CONCLUSION **42**

ANNEXURE 1: METHOD STATEMENTS **43**

ANNEXURE 2: BASIC ENVIRONMENTAL EDUCATION COURSE OUTLINE **46**

ANNEXURE 3: DETAILS AND CVS OF THE PROJECT TEAM **49**

ANNEXURE 4: SITE SENSITIVITY MAP: **50**

ANNEXURE 5: ANTENNA INFRASTRUCTURE IMAGES **53**

ANNEXURE 6: ADDITIONAL INFORMATION AND GUIDANCE **56**

1. INTRODUCTION

An Environmental Management Programme (EMPr) must consist of a set of mitigation, monitoring and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The plan also includes the actions needed to implement these measures.

An EMPr can be defined as, "*an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the project are enhanced*". The EMPr is an important tool used to ensure the sound environmental management of projects, provided the specifications are implemented and the user understands the contents of the report and the reasons for the implementation of certain specifications.

The EMPr has the following objectives:

- To state standards and guidelines which are required to be achieved in terms of environmental legislation;
- To set out the mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts and where possible to improve the condition of the environment;
- To provide guidance regarding method statements which are required to be implemented to achieve the environmental specifications;
- To define corrective actions, this must be taken in the event of non-compliance with the specifications; and
- To prevent long-term or permanent environmental degradation.

There are four broad categories of EMPrs: Design EMPr, Construction EMPr, Operational EMPr and Decommissioning EMPr. The objectives of these EMPrs are all the same and include identifying the possible environmental impacts of the proposed activity and developing measures to minimise, mitigate and manage the negative impacts while enhancing the positive ones. The difference between these EMPrs is related to the different mitigation measures required for the different stages of the project life cycle.

The proposed radio antennae will not be decommissioned in the foreseeable future, and thus the decommissioning phase for this development is not assessed further in this report. Each remaining category of the EMPr is discussed in more detail below.

1.1. CONSTRUCTION EMPR

The Construction EMPr details the environmental management system/framework within which construction activities will be governed for the Construction Phase. The Construction EMPr consists of various actions, initiatives and systems (such as a Standard Operating Procedure – SOP, or a Method Statement) that the contractor will have to ensure are in place and are implemented and complied with. The Construction EMPr consists of both a management system (in so far as it explains responsibilities and lines of reporting), and environmental specifications which contain detailed specifications related to achieving specific mitigation measures that will need to be undertaken or adhered to by the contractor.

The Construction EMPr must be developed in parallel with the final design stages, and constructive input must be invited from the selected contractor. This is required not to soften the document, but rather to ensure that the requirements in the Construction EMPr are practical, cost effective and implementable. Sound environmental management is orientated around pragmatic, unambiguous but enforceable guidelines and specifications, and for this reason it is imperative that the contractor, while being bound by the EMPr, fully understands it and has had input into its final development. For this reason the final construction EMPr will need to be signed off after input from the selected contractor, and prior to the initiation of construction activities. It should, however, be noted that the contractor must tender on the existing document and that in areas of uncertainty, a precautionary approach to the environmental guidelines and specifications must be adopted (by, for example, providing Prime Cost and Provisional Sum amounts).

1.2. OPERATIONAL AND MAINTENANCE EMPR

The operational phase EMPr provides specific guidance related to operational activities associated with a particular development. Operational EMPrs are sometimes referred to as an Environmental Management System (EMS). Impacts during the operational phase of a development of this nature (i.e. Radio Antennae) will be few in number and low in intensity. By taking proactive measures during the construction phase, potential operational phase environmental impacts will be minimised. Monitoring of certain issues, such as the stormwater runoff, erosion control and waste management will be necessary in the operational phase. The final Operational EMPr must be developed in conjunction with any other relevant stakeholders prior to the adoption thereof.

2. CONTENTS OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

The contents of the *Environmental Management Programme (EMPr)*, as defined the 2014 Environmental Impact Assessment (EIA) Regulations published as Government Notice (GN) No R. 982 (amended in 2017 in GN R 326) and Chapter 5 of the National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended) is presented in Table 1 below.

TABLE 1: Contents of an EMPr

EMPr REQUIREMENTS ACCORDING TO APPENDIX 4 OF THE 2014 EIA REGULATIONS (AS AMENDED IN APRIL 2017)	SECTION OF REPORT
An EMPr must comply with section 24N of the Act and include- *a. Details of:* *i. the EAP who prepared the EMPr; and*	Section 3.5 and Annexure 3
ii. the expertise of that EAP to prepare an EMPr, including a curriculum vitae.	Annexure 3
b. a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Chapter 3
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;	Annexure 4
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 activates* *iv. rehabilitation of the environment after construction and where applicable post closure; and* *v. where relevant, operation activities;*	Chapter 4
f. description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to - *a. avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;* *b. comply with any prescribed environmental management standards or practices;* *c. comply with any applicable provisions of the Act regarding closure, where applicable; and* *d. comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;*	Section 3.2 – Section 3.4 and Chapter 5
g. the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Chapter 5 and Chapter 6
h. the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Chapter 6
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- *a. the applicant intends to inform his or her employees of any environmental risk which may result from their work; and* *b. risks must be dealt with in order to avoid pollution or the degradation of the environment; and*	Section 5.2.17

n. any specific information that may be required by the competent authority.	Nothing specified at this stage

3. BACKGROUND INFORMATION

3.1. PROJECT DESCRIPTION

Two areas within portion 8 of Farm 148 Koenie Kraal have been selected for the development and will be referred to as Site A and Site B (Figure 3-1).

The infrastructure within Site A will consist of 4, large Deep Space Navigation antennae which will not exceed 45m in height. Each of these are anticipated to have a physical footprint of 360m² as well as 3 smaller planned radio antennae up to 12m in height Each of these antennae are expected to have a physical footprint of 100m². There will also be an 18 m Ka Band antenna which will be up to 30m in height and have a footprint of 400m² (20mX20m) seen in below.

Other associated infrastructure will consist of a guard house at the site entrance, signal processing building which will house the signal processor room, operations and control room, lobby, reception, kitchen and ablution facility and is anticipated to have a physical footprint of 525m², with an accompanying 900m² curbed, gravel parking area.

Alongside the main building will be a 70 000l water storage tank as part of a fire management system and a conservancy tank for temporary wastewater and sewerage storage which will be serviced regularly by a licenced waste hauling company.

On the western edge of the site, a power station is planned which will be of similar size to the main building on the eastern edge. The power station will consist of the stores, workshop, generators and fuel storage and will also have an accompanying 900m², curbed parking area. An overhead powerline (not exceeding 22kv), 750m in length is planned to connect the power station to the existing Eskom substation outside the site. The generators will be installed in phases as the site expands. The first generator of four will be 1200 KVA and be housed in the generator room(Total capacity 4800KVA)

Electricity will be distributed within the site through underground cables from the power station to the antennas and buildings, these will be at a depth of 1m with a 200mm covering of river sand, a layer of danger tape and backfilled with the original soil.

The diesel storage at the power station has a combined storage capacity of 280 000lt. This will be stored above ground in self-bunded, moveable systems. These self-bunded (tank within a tank) diesel storage tanks will have a 69 000 litre volume, with a length of 12,192 m, a width of 2,438m and a height of 2.896m as is specified for their make. Each bunded tank holds 70 000lt and will be connected to one another as the site grows and the power capacity needed increases.

Water will be sourced from a municipal water point approximately 2km from the site and will need connection via underground pvc piping 50mm in diameter. It is expected that between 50 and 100 kilo litres of water will be needed daily during the civil work phase of construction and for dust suppression and 3000 litres will be needed for the general operations.

New access roads will need to be constructed within the site and are anticipated to be 4m wide, graded and compacted with overlain gravel.

PVC ducting will be lain to connect the fibre to the control room and to each antennae. This will be lain at 600mm below ground surface, consisting of 4x100mm PVC pipes with a PVC manhole at 50m intervals for maintenance.

The entire site will be fenced, with either diamond mesh with flatwrap on top or clearvu fencing.
All construction spoil, including excavation and clearing will be taken to the Matjiesfontein solid waste disposal site

Site B will house 2 scientific instruments known as short/long laser rangers (S/LLR), each with a footprint of 14.2m² (the size of a Shipping container) and an administration booth with a footprint of 9m² (3mX3m). Solar panels will form part of the roofing of the infrastructure in order to supply power to the equipment. The scientific instruments will each be individually fenced by a standard 3m high, 10m x10 diamond mesh fence with flat rap at the top. The existing access roads to this site will remain unchanged, however new internal gravel roads, 4m wide, will be needed to access the infrastructure

It is expected that the project infrastructure will be constructed in a phased manner. Within the first 3 years, the buildings, S/LLR's, utilities, roads and one DSN antenna will be constructed. For every two years which proceed, one additional antenna will be constructed. The maximum time expected for the completion of the project is estimated at 17 years.

Refer to Annexure 4 for infrastructure layout and sensitivity maps and Annexure 5 for antenna infrastructure images

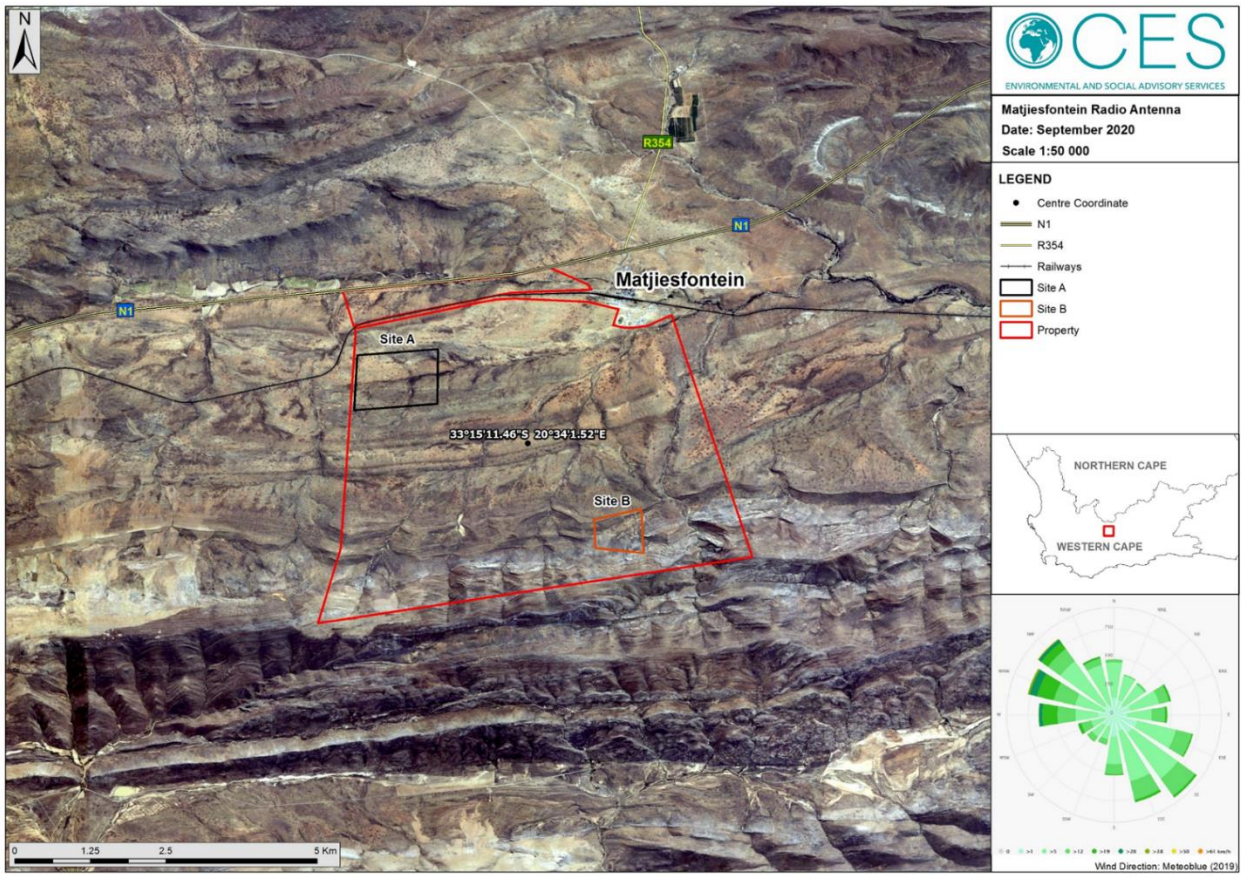


Figure 3-1: Locality map of proposed project area showing Site A and Site B in relation to the N1 and the town of Matjiesfontein

3.2. ENVIRONMENTAL OBJECTIVES AND TARGETS

In order to meet the commitments detailed within the Environmental Management Policy, as well as those included within the environmental specifications of this EMPr, the contractor must develop environmental objectives and targets. The objectives and targets must conform to, and comply with, the following criteria:

- The objectives and targets must constitute the overall goals for environmental performance identified in the environmental policy and strategy;
- When establishing objectives and targets, the contractor must take into account the identified environmental aspects and associated environmental impacts, as well as the relevant findings from environmental reviews and/or audits;
- The targets must be set to achieve objectives within a specified timeframe;
- Targets must be specific and measurable;
- When the objectives and targets are set, the contractor must establish measurable Key Performance Indicators (KPIs). The latter will be used by the contractor as the basis for an Environmental Performance Evaluation System, and can provide information on both the environmental management and the operational systems. Objectives and targets need to apply broadly across the contractor's operations, as well as to site-specific and individual activities; and
- Objectives and targets must be reviewed from time to time in view of changed operational circumstances and/or changes in environmental legal requirements, and need to take into consideration the views of the Interested and Affected Parties (I&APs).

3.3. ENVIRONMENTAL LEGISLATION AND GUIDELINES

The Contractor must ensure that all South African legislation concerning the natural environment, pollution and the built environment is strictly enforced. Such legislation must include, but is not limited to the:

- The Constitution of the Republic of South Africa Act No. 108 of 1996;
- National Environmental Management Act No. 107 of 1998 as amended;
- National Heritage Resources Act, No 25 of 1999;
- National Environmental Management: Biodiversity Act 10 of 2004;
- National Environmental Management: Waste Management Act 59 of 2008;
- National Environmental Management: Air Quality Act 39 of 2004;
- The Environment Conservation Act No 73 of 1989;
- National Water Act, No 36 of 1998;
- National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004) – Alien and Invasive Species (AIS) Regulations; and
- All relevant provincial legislation, Municipal by-laws and ordinances.

3.4. DETAILS OF EAP

Environmental Assessment Practitioner (EAP): Dr Ted Avis
Company: Coastal and Environmental Services (CES)
Report Author: Ms Skye Clarke-Mcleod
Elta House, 3 Caledonian Road, Mowbray, 7700
Telephone: +27 21 045 0900
Website: www.cesnet.co.za
Email: cesct@cesnet.co.za

Please refer to Annexure 3 for the Curricula Vitae of the EAP

4. EIR MITIGATATION AND MANAGEMENT MEASURES

This section provides a summary of the post-mitigation significance of the social and environmental impacts that may result from the major activities associated with the development. It also provides site specific mitigation measures and recommendations from the BAR and specialist reports.

4.1. SUMMARY OF IMPACTS ASSOCIATED WITH THE DEVELOPMENT

The table below shows the significance of the impacts after mitigation is taken into account:

Table 4-1: Summary of impacts and their post mitigation significance

Impacts			Significance rating of impacts after mitigation (Low, Medium, Medium-High, High, Very High):
Planning, design and construction phases			
1.	General	Soil Compaction and Erosion	Low -
2.		Air pollution/Dust	Low
3.		Noise	Low -
4		Traffic	Moderate-
5.		On-Site fire Risks	Low -
6.		Site Contamination due to Hazardous Substances	Low -
7.		Construction Waste & Litter	Low -
8.		Sanitation	Low -
9.		Creation of temporary jobs	Moderate +
	Ecological	Loss of Vegetation Communities	
10		Loss of Shale Fynbos	Moderate-
11		Loss of Shale Renosterveld	Moderate-
12		Loss of Species of Conservation Concern (Flora)	Moderate-
13		Loss of Extent of Faunal Habitat for Species of Conservation Concern	Low-
14		Disruption of Ecosystem Function and Process/Habitat Fragmentation	Moderate-
15		Effects on Drainage Lines and Riparian Habitat due to Road Crossings	Low-
16		Invasion of Invasive Alien Plant Species	Low -
17		Disturbance of aquatic vegetation and habitat	Low-
18		Contamination of water sources from construction activities	Low-
19	Palaeontological	Palaeontological Resources	Low -
20	Archaeological	Archaeological Resources	Low -
21	Cultural/Visual	Aesthetic/ Sense of Place	Low -
Operation phases			
1.	General	Increased storm water runoff and erosion	Low-
2.		Sewerage and wastewater generation	Low-
3.		Solid waste generation	Low-
4		Noise	Negligible
5.		Employment Creation	Moderate +
6.	Ecological	Invasion of Alien Species	Low-
7.		Contamination of water sources from operation activities	Low-
8.		Potential Collisions/electrocutions with overhead powerlines	Low-
9.	Cultural/Visual	Aesthetic/ Sense of Place	Moderate-

4.2. SITE SPECIFIC MITIGATION MEASURES

Table 4-2 below provides the site specific mitigation measures which must be applied in order to negate and/or reduce each of the various impacts:

Table 4-2: Mitigation measures associated with each impact

Planning, Design and Construction Phases	
IMPACT	**MITIGATION MEASURES**
Loss of Biodiversity	• Clearing must be kept to a minimum and must not occur within the adjacent river or outside of the construction footprint. • All necessary permitting and authorisations must be obtained prior to the commencement of any construction activities; • Clearing must be kept to a minimum; • Top soil (20 cm, where possible) must be collected and used elsewhere on the property and for the rehabilitation of lay down areas and other impacted areas no longer required during the operational phase; • Only locally indigenous species must be used for rehabilitation. • Lay down areas must not be located within any watercourses or drainage lines; • Employees must be prohibited from making fires; • An alien management plan must be designed and implemented to prevent the spread of alien species; • Alien invasive species must be removed from the areas where development will not occur. The area must be actively managed to prevent the return of alien invasive species; • Prohibit all employees from harvesting plants; • Prohibit open fires; • Prior to construction an ecological walk-through of the site must be undertaken and the infrastructure micro-sited to avoid populations of SCC where feasible. Where this is not feasible, permits for the removal of Schedule 4 species will be required. • An in situ search and rescue plan must be developed and implemented for the numerous succulents and geophytes that will be impacted by the construction of the project site. Where feasible, species should be transplanted to degraded areas within or directly adjacent to the site. Where immediate translocation is not possible, species should be grown in a nursery and used to rehabilitate the site after construction is completed. It should be noted that not all species transplant well. • Where possible, ensure demarcated area to avoid populations of SCC. • An ECO must be employed to demarcate areas for use during construction, and to ensure that the construction activities remain within the designated area and that no unauthorised activities occur outside of the construction footprint. • A comprehensive Rehabilitation Plan should be compiled and implemented. Only locally indigenous plant species typical of the local vegetation should be used for rehabilitation purposes. It is recommended that individual specimens that will be lost by the placement of infrastructure are collected and kept in a nursery so that they can be used for rehabilitation purposes. • All necessary permitting and authorisations must be obtained prior to the commencement of any construction activities; • A suitably qualified ECO must be appointed prior to the commencement of the construction phase; • An ecological walkthrough (preferably during the flowering season) by an experienced botanist must be undertaken. If it is found that there are populations of SCC that will be affected, then the infrastructure must be moved to avoid these areas. In addition to this, during the walkthrough exercise, the botanist must identify indigenous plant species suitable for rehabilitation purposes and provide the ECO with a list. • A comprehensive Search and Rescue for fauna and flora should be conducted prior to vegetation clearance; • All SCC must be relocated to nearest appropriate habitat, preferably within the site; • An Erosion Management Plan must be developed prior to the commencement of construction activities in order to mitigate the unnecessary loss of topsoil and runoff; • Prior to the closure of the construction phase, a botanical specialist must assess the site and confirm that there are no introduced alien flora or fauna species on

	site. If at any stage during the construction phase any such species are noted by the ECO they should be eradicated using suitable methods. Confirmation of eradication of all such species must be recorded within the last monitoring report.
	• The construction site must be fenced with appropriate fencing to reduce the risk of animal species gaining access to the site and speed limits of 30km/h must be enforced along access roads
	• Staff induction must include information on speed limits and that vehicles must stop when they encounter a tortoise crossing the road. The vehicle must wait until the tortoise has moved off the road before continuing on.
	• The ECO must observe earth moving earth moving activities and remove fossorial fauna that are exposed
	• Individuals must be recorded (photographs and GPS location) and relocated elsewhere within the property, out of harms way. The relocation location must be recorded (GPS and photograph) and placed on iNaturalist.
	• Any mortalities must be collected and donated to SANBI with GPS co-ordinates
	The ECO must check trenches daily for faunal species that may have fallen inside. If faunal species are found, these must be recorded and removed to suitable habitat out of harms way.
	• If it is determined that an alien invasive management plan is required, it must include the following:
	  ○ Map of the locations of invasive alien plants in relation to the development areas;
	  ○ A timeframe and strategy for the removal of alien plants. This should include a recommendation on the best months of the year to destabilise and remove the alien plants, based on weather conditions/patterns;
	  ○ A list of potential methods of clearing (i.e. herbicides or cutting) appropriate for each identified species); and
	  ○ A list of possible alien invasive species that occur commonly (with pictures of these species) within the construction sites in an arid ecosystem
	• A comprehensive Rehabilitation Plan should be compiled and implemented. Only locally indigenous plant species typical of the local vegetation should be used for rehabilitation purposes. It is recommended that individual specimens that will be lost by the placement of infrastructure are collected and kept in a nursery so that they can be used for rehabilitation purposes.

Loss of extent of faunal habitat	• Caution should be taken during bird SCC breeding season, particularly Ludwig's Bustard (Neotis ludwigii) (EN) (primarily between August-December), Black Bustard (Eupodotis afra) (VU) and Secretary bird (Sagittarius serpentarius) (VU) to prevent disruption to mating and damage to nests and eggs. Should these species be identified immediately prior to construction avoid the area and commence activities following fledglings leaving the nest. • Contact the Endangered Wildlife Trust - Riverine Rabbit Programme and ensure no known populations occur in the area. • The construction site must be fenced with appropriate fencing to reduce the risk of animal species gaining access to the site. • Prevent staff from persecuting or poaching any faunal species during the construction phase; • Relocate any Karoo Dwarf Tortoise (Homopus boulengeri) found during earth moving activities; • Demarcate areas for use during construction and ensure that the construction activities remain within the designated area; • Ensure that no activities occur within areas designated as no-go areas. • Speed limits of 30km/h must be enforced along access roads • Staff induction must include information on speed limits and that vehicles must stop when they encounter a tortoise crossing the road. The vehicle must wait until the tortoise has moved off the road before continuing on. • The ECO must observe earth moving earth moving activities and remove fossorial fauna that are exposed • Individuals must be recorded (photographs and GPS location) and relocated

	elsewhere within the property, out of harms way. The relocation location must be recorded (GPS and photograph) and placed on iNaturalist. • Any mortalities must be collected and donated to SANBI with GPS co-ordinates • The ECO must check trenches daily for faunal species that may have fallen inside. If faunal species are found, these must be recorded and removed to suitable habitat out of harms way. • EWT must be contracted prior to construction to conduct a site assessment and micro site the antenna placement. • Should EWT require camera trapping, it is recommended that SANSA sponsor two camera traps for installation on the same property as the antennae
Disruption to Ecosystem Function and Process	• Rehabilitate laydown areas. • Where feasible, use existing access roads and upgrade these where necessary rather than building new roads. • It is recommended that a botanical survey of the area must be undertaken to identify indigenous plant species suitable for rehabilitation purposes.
Invasion of Invasive Alien Plant Species	• An invasive alien plant management plan must be designed and implemented. This plan must designate management units and prescribe the most effective method of removing the species. • Prior to the closure of the construction phase, a botanical specialist must assess the site and confirm that there are no introduced alien flora or fauna species on site. If at any stage during the construction phase any such species are noted by the ECO they should be eradicated using suitable methods. Confirmation of eradication of all such species must be recorded within the last monitoring report. • If it is determined that an alien invasive management plan is required, it must include the following: ○ Map of the locations of invasive alien plants in relation to the development areas; ○ A timeframe and strategy for the removal of alien plants. This should include a recommendation on the best months of the year to destabilise and remove the alien plants, based on weather conditions/patterns; ○ A list of potential methods of clearing (i.e. herbicides or cutting) appropriate for each identified species); and ○ A list of possible alien invasive species that occur commonly (with pictures of these species) within the construction sites in an arid ecosystem.
Disturbance of aquatic vegetation and habitat	• No removal of vegetation is to take place within 50m of any river, artificial or natural wetland, except for the control of alien vegetation. • Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint. • Activities within 32m of a watercourse must obtain the necessary Water Use License prior to the commencement of such activities. • Rehabilitate laydown areas. • Use existing access roads. • Ensure all riparian areas and water courses are identified as no-go areas and that no substrate is placed in these areas during construction. • Stormwater run-off and soil disturbance might affect the watercourse, especially in periods with high run-off. For that reason, the activity must seek to minimize and manage water and pollution run-off as follows. ○ Ensure that all stormwater outlets have diffuse flow, multiple if steep or frequent, and permeable pavements areas. ○ All stormwater runoff within the development area must be managed in a manner as to minimise or prevent erosion. ○ Discharging stormwater directly into the watercourse, without reducing velocity and concentration must be prohibited. Areas susceptible to erosion must be protected by installing the necessary temporary or permanent structures. The stormwater management designs must include and mitigate natural events as the Karoo is susceptible to flash flooding.

Contamination of water from construction activities	• No machinery must be parked overnight within 50 m of the rivers/wetlands. • All stationary machinery must be equipped with a drip tray to retain any oil leaks. • Chemicals used must be stored safely on bunded surfaces in the site camp. • Cement mixing must take place on a contained and impermeable surface, should it be undertaken on site. • Emergency plans, and spill kits, must be in place in case of accidental spillages on site. • No ablution facilities must be located within 50 m of any river or wetland system. • Chemical toilets must be regularly maintained/ serviced to prevent ground or surface water pollution. • Any hazardous substances/waste must be stored in impermeable bunded areas or secondary containers 110% the volume of the contents within it. • All general waste temporarily stored on site must be done so in windproof/sealable containers before being disposed of at a registered landfill site. Laingsburg is the nearest waste disposal facility.
Erosion	• Take measures to counter erosion. • Roads and stormwater gulleys must be maintained. • Cleared areas must be exposed for the minimum amount of time possible. • Any erosion sites must be rehabilitated as soon as possible, and water run-off directed to a safe collection point should erosion become evident on site.
Air Quality and Dust Control	• Dust generated during the construction phases must comply with the National Dust Control Regulations (GN No. R. 827 of 1 November 2013), promulgated in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004). These regulations prohibit a person from conducting any activity in such a way as to give rise to dust in such quantities and concentrations that the dust, or dust fall, has a detrimental effect on the environment, including health. • The Contractor must be responsible for the continued control of dust arising from his operations. The Contractor must take all reasonable measures to minimize the generation of dust as a result of construction activities to the satisfaction of the ECO. • Given that the site is located within a water scarce region, commercial dust binders (such as Hydropam or Dustex), planting of cleared space, rotovating straw bales, and scheduling of dust-generating activities must be the preferred mitigation measures for alleviating dust. The use of water for spraying and dampening must be used as a last resort. Potable water must not be used. • Dust levels must be kept to a minimum to avoid smothering of sensitive areas by windblown sediments. • During windy periods un-surfaced and un-vegetated areas must be dampened down. • Vegetation must be retained where possible as this will reduce dust travel. • Excavations and other clearing activities must only take place during agreed working times and permitted weather conditions to avoid drifting of sand and dust into neighbouring areas.
Noise	• During construction, activities which include the movement of construction vehicles and the operation of machinery must be restricted to normal working hours (07:00am – 17:00pm).
Visual	• The development must be strategically placed behind environmental features so as to minimise the amount seen from the N1. • Where practical and feasible, the visible parts of the development must be painted a light colour, grey or camouflage so as to best blend in with the natural surroundings • The perimeter treatment and fencing must be sensitive to the natural context and must be appropriately coloured to blend into the surrounding vegetation- silver and bright green fencing must not be used. • Where safety and technical standards permit, colours that blend into the natural environment and vegetation must be used for the antennae and associated infrastructure. These must be darker, duller colours that can disguise the infrastructure in the landscape. In the case of the reflective areas of the four large antennae, a naturally coloured tint must be considered for the working surface. • Buildings must be made from local materials where possible and must draw from existing building traditions.

	• A landscape plan must be developed for avenue or block planting of gum trees or similar that fit into the cultural landscape to screen the proposed infrastructure from the Provincial Heritage Site. This planting must be focused on the south and eastern side of the railway line. • Wanton stripping of vegetation that causes scarring on the landscape must be avoided. • Waterwise and indigenous planting and green-star building practices must be used. • Equipment must not be placed on the upper southern slopes of the perched valley in Site B that have a long distance view of Matjiesfontein. • Lighting must be minimised and carefully controlled and must be developed with sensitivity to the rural landscape. • Security lighting must be as dim as possible and low lighting i.e. place near to the ground and point downwards.
On-Site Fire Risk	• All flammable substances must be stored in dry areas which do not pose an ignition risk to the flammable substances. • Smoking must only be permitted in a designated smoking area and must not be permitted near flammable substances. • All cooking must be done in demarcated areas with a low fire risk. • No open fires will be allowed on site, unless in a demarcated area. • All construction personnel and contractors must be educated regarding fires and fire management. • Fire extinguishers and other firefighting equipment deemed suitable must be available on site at all times.
Site Contamination due to hazardous Substances	• During the construction phase all oils, fuel and other maintenance equipment and supplies must be stored in a secure, bunded area with a compacted surface. • Maintenance of vehicles or machinery must not take place within 50 m of any watercourse and drip trays must be used. Ideally all maintenance must take place off site, where such maintenance is normally done. • Spill kits must be kept on-site and maintained. • Cement and concrete must only be mixed in designated areas and on an impermeable surface. No concrete mixing must take place within 32 m of any watercourse.
Construction Waste and Litter	• Rubble and other construction waste produced must be re-used if possible and, where it is not possible, must be disposed of at the nearest registered waste disposal facility; • Rubble, which will not be reused, must be removed from site on a regular basis; • If rubble is stored on site, it must be stored on designated portions of land away from any sensitive areas; • Litter must be controlled during construction – adequate bins must be made available on site at all times. These must be made scavenger and weatherproof and must be emptied on a regular basis; • Construction materials stored at the site camp must be secured – i.e. plastics must be covered to prevent being blown off site; • The construction area must remain litter free and regular inspections for litter must be conducted. The activity must not contribute to any surrounding windblown litter; • Waste skips must be covered and emptied regularly; • Waste manifests must be provided by the Contractor to prove legal disposal; • Empty cement bags must be kept in a sealed waste container; • Waste must not to be buried or burned.
Sanitation	• During the construction phase adequate sanitary facilities must be provided for construction workers. • The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution. • Sanitation facilities must not be located within 100 metres of any watercourse.
Contamination from Pollutants	• Strict management of hazardous chemicals must be implemented. • Prevention of hydrocarbon spills from machinery and vehicles by the use of drip-trays and permanent bunded areas for overnight parking. This must include any temporary

	workshops envisaged for the project. In addition, workshops must be fitted with oil traps and sumps to ensure that no contaminated water/hydrocarbons are allowed to escape. • Domestic effluent from the construction camps must be stored temporarily in a safe manner (unlikely to leak or be breached) and must be removed by approved contractors weekly. • All contaminated water run-off from the site must be contained and treated prior to discharge.
Heritage	Based on the available information, there is no objection to the proposed development on condition that: • Alternative 2 (Area A2 and Area B) is the preferred development alternative in terms of impacts to heritage • The HWC Chance Finds Procedure must be adopted during the construction phase due to the high palaeontological sensitivity of the area • The recommendations included in the VIA be implemented including: • The perimeter treatment and fencing must be sensitive to the natural context and must be appropriately coloured to blend into the surrounding vegetation. Silver, black and bright green fencing should not be used. • Where safety and technical standards permit, colours that blend into the natural environment and • vegetation must be used for the antennae and associated infrastructure. These should be darker, duller • The heritage Western Cape Chance Finds Procedure must be adopted during the construction phase due to the high palaeontological sensitivity of the areas The Environmental Control Officer (ECO) for the project should be alerted to the potential for, and scientific significance of, new fossil finds during the construction phase. Should important new fossil remains - such as vertebrate bones and teeth, plant-rich lenses or layers, fossil shells, fish remains or dense fossil burrow assemblages - be exposed during construction, the responsible Environmental Control Officer should safegaurd them and alert Heritage Western Cape, HWC as soon as possible (Contact details: Protea Assurance Building, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 086-142 142. Fax: 021-483 9842. Email: hwc@pgwc.gov.za). This is so that appropriate action can be taken in good time by a professional palaeontologist at the developer's expense. Palaeontological mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as of associated geological data (*e.g.* stratigraphy, sedimentology, taphonomy). The palaeontologist concerned with mitigation work will need a valid fossil collection permit from HWC and any material collected would have to be curated in an approved repository (*e.g.* museum or university collection). All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (*e.g.* data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies developed by SAHRA (2013) and Heritage Western Cape (2016). Procedure to follow if it is likely that the material identified is a fossil: i. The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found; ii. The ECO or site agent must inform HWC of the find immediately. This information must include photographs of the findings and GPS co-ordinates; iii. The ECO or site agent must compile a Preliminary Report and fill in the Fossil Discoveries: HWC Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including: ● The date ● A description of the discovery ● A description of the fossil and its context (e.g. position and depth of find) ● Where and how the find has been stored ● Photographs to accompany the preliminary report (the more the better):

	➔ A scale must be used ➔ Photos of location from several angles ➔ Photos of vertical section must be provided ➔ Digital images of hole showing vertical section (side); ➔ Digital images of fossil or fossils. Upon receipt of this Preliminary Report, HWC will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary. iv. Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags. This protection must allow for the later excavation of the finds with due scientific care and diligence. HWC can advise on the most appropriate method for stabilisation. v. If the find cannot be stabilised, the fossil must be collected with extreme care by the ECO or the site agent and put aside and protected until HWC advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs. No work can continue in the vicinity of the find until HWC has indicated, in writing, that it is appropriate to proceed.
Operational Phase	
IMPACT	**MITIGATION MEASURES**
Invasion of Alien Species	• If it is determined that an alien invasive management plan is required, it must include the following: ○ Map of the locations of invasive alien plants in relation to the development areas; ○ A timeframe and strategy for the removal of alien plants. This should include a recommendation on the best months of the year to destabilise and remove the alien plants, based on weather conditions/patterns; ○ A list of potential methods of clearing (i.e. herbicides or cutting) appropriate for each identified species); and ○ A list of possible alien invasive species that occur commonly (with pictures of these species) within the construction sites in an arid ecosystem • The site must be checked regularly for the presence of alien invasive species.
Potential bird collision with overhead powerlines and electrocution	• The structure will not have stay wires. This must be included as a recommendation for inclusion as a condition of authorisation. • Should birds nest on any portions of the infrastructure a condition in the operational EMPr must state that birds and their nests are not to be removed. • Flappers must be placed along the whole 0.75km line (100%) given the proximity of the two known nesting sites of Verreaux's Eagle. It is recommended that the earth wires on the spans be fitted with the best available (at the time of construction) anti bird collision line marking device. This should preferably be a dynamic device, i.e. one that moves as it is believed that these are more effective in reducing collisions. It is important that these devices are installed as soon as the conductors are strung, not only once the line is commissioned, as the conductors and earth wires pose a collision risk as soon as they are strung. The devices should be installed alternating a light and a dark colour to provide contrast against dark and light backgrounds respectively. This will make the overhead cables more visible to birds flying in the area. If dynamic flappers are used (as opposed to static) the operational EMPr must include monitoring and replacing of the any broken ones during project lifespan • In the case of bird electrocution, the powerline must be built on a recognised bird-friendly pole structure which provides ample clearance between phases and phase-earth to allow large birds to perch on them in safety. i.e. 1800-2000mm minimum phase-phase and phase-earth clearance
Increased Stormwater Runoff and Erosion	• Flood attenuation and storm water control measures must be implemented; • Storm-water structures need to be implemented as part of the development and must link up with the current storm-water infrastructure in order to navigate stormwater and minimise soil erosion; • At the first signs of erosion, the correct procedures must be undertaken to manage,

Potential	resolve and prevent it from occurring. • It is recommended that a stormwater management plan is designed prior to construction activities occurring.
Contamination of Water from operation activities	• No machinery must be parked overnight within 50 m of the rivers/wetlands. • All stationary machinery must be equipped with a drip tray to retain any oil leaks. • Chemicals used must be stored safely on bunded surfaces in the site camp. • Cement mixing must take place on a contained and impermeable surface, must it be undertaken on site. • Emergency plans, and spill kits, must be in place in case of accidental spillages on site. • No ablution facilities must be located within 50 m of any river or wetland system. • Chemical toilets must be regularly maintained/ serviced to prevent ground or surface water pollution. • Any hazardous substances/waste must be stored in impermeable bunded areas or secondary containers 110% the volume of the contents within it. • All general waste temporarily stored on site must be done so in windproof/sealable containers before being disposed of at a registered landfill site.
Solid Waste Generation	• Adequate waste disposal (litter) bins must be available on site. Bins located on the outside of the building must be properly secured and covered to prevent scavengers from tipping them; • A responsible person must be appointed to manage the solid waste generated at the proposed development in order to ensure that the waste is properly stored • Waste must regularly be disposed of at the municipal solid waste site. • Where possible, recycling must be instituted and different types of solid waste be kept in separate containers
Sewerage and Wastewater Generation	• Due to the proposed development requiring a conservancy tank for the temporary storage of waste water, the tank must be regularly emptied by a registered waste water carrier to ensure it does not overflow or leak; • Ablution facilities and associated piping must be adequately lined and checked for leaks on a regular basis.; and • Wastewater and effluent management must be implemented on site.
Noise	• Maintenance activities must be limited to hours between sunrise and sunset.
Visual	• Lighting should be minimised and carefully controlled as part of the project's • The use of green energy fittings and concepts should be encouraged, and lighting developed with sensitivity to the rural landscape. • Floodlighting for security purposes should be avoided, and down lighting used instead. • The lighting of the large antennas requires careful consideration

5. ENVIRONMENTAL MANAGEMENT SYSTEM

5.1. REPORTING

5.1.1. Administration

Before the contractor begins construction in sensitive areas (e.g. river crossings and areas of indigenous vegetation), the Contractor must give the ECO and engineer a written method statement setting out the following:

- The type of construction activity;
- Locality where the activity will take place;
- Identification of impacts that might result from the activity;
- Identification of activities or aspects that may cause an impact;
- Methodology and/or specifications for impact prevention for each activity or aspect;
- Methodology and/or specific actions for impact containment for each activity or aspect;
- Emergency/disaster incident and reaction procedures; and
- Treatment and continued maintenance of impacted environment.

The contractor must provide such information in advance of any or all construction activities provided that new submissions will be given to the ECO and/or engineer whenever there is a change or variation to the original. The ECO and/or engineer must provide comment on the methodology and procedures proposed by the Contractor but he must not be responsible for the contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the contractor must demonstrate at inception and at least once during the contract that the approved measures and procedures function properly. An example of a Method Statement is provided in Annexure 1.

5.1.2. Record keeping

The engineer and the ECO will monitor the contractor's adherence to the approved impact prevention procedures and the engineer must issue to the contractor a notice of non-compliance whenever transgressions are observed. The ECO must document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance must be documented and reported to the engineer in the monthly report. These reports must be made available to the authorities when requested.

The Contractor must ensure that an electronic filing system identifying all documentation related to the EMPr is established. A list of reports likely to be generated during all phases of the project is provided below, and all applicable documentation must be included in the environmental filing system catalogue or document retrieval index:

- Environmental Management Programme;
- Final design documents and diagrams issued to and by the Contractor;
- All communications detailing changes of design/scope that may have environmental implications;
- Complaints register;
- Medical reports;
- Incident and accident reports;
- Emergency preparedness and response plans;
- Copies of all relevant environmental legislation;
- All relevant permits; and
- All method statements from the Contractor for all phases of the project.

5.1.3. Document control

The Contractor and resident engineer must be responsible for establishing a procedure for electronic or hard copy document control. The document control procedure must comply with the following requirements:

- Documents must be identifiable by organisation, division, function, activity and contact person;
- Every document must identify the personnel and their positions, who drafted and compiled the document, who reviewed and recommended approval, and who finally approved the document for distribution; and
- All documents must be dated, provided with a revision number and reference number, filed systematically, and retained for a five year period.

The Contractor must ensure that documents are periodically reviewed and revised, where necessary, and that current versions are available at all locations where operations essential to the functioning of the EMPr are performed.

5.2. PLANNING AND DESIGN, PRE-CONSTRUCTION AND CONSTRUCTION PHASE

5.2.1. Clearing of the Site

In all areas where the contractor intends to, or is required to clear the natural vegetation and soil, either within the construction area, or at designated or instructed areas outside the construction area, a method statement must first be submitted to the ECO for his approval. The EMPr must contain a photographic record and change/land reference of the areas to be disturbed. This must be submitted to the engineer and ECO for their records before any disturbance/stockpiling can occur. The record must be comprehensive and clear, allowing for easy identification during subsequent inspections.

The contractor must be responsible for the re-vegetation within the development boundaries for all areas disturbed during construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for, or from, road construction has to be stored temporarily or otherwise within the construction area, or at designated or instructed areas outside the construction area. This responsibility must extend until expiry of the defects notification period.

5.2.2. Excavation, hauling and placement

The contractor must provide the engineer with detailed plans of his intended construction processes prior to starting any cut or fill or layer. The plans must detail the number of personnel and plant to be used and the measures by which the impacts of pollution (noise, dust, litter, fuel, oil and sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. The contractor must demonstrate his “good housekeeping”, particularly with respect to closure at the end of every day so that the site is left in a safe condition from rainfall overnight, or over periods when there is no construction activity.

5.2.3. Construction Activities and Equipment

- Construction will be restricted to daytime working hours;
- All noise-making equipment must be turned off when not in use;
- All equipment must be kept in good working order;
- All equipment must be operated within specifications and capacity (i.e. do not overload machines);
- Compliance with the appropriate legislation with respect to noise is mandatory;
- The Contractor will familiarise himself with, and adhere to, any local bylaws and regulations regarding the generation of noise;

- Construction staff must be given “noise sensitivity” training;
- The Contractor will endeavour to keep noise generating activities associated with construction activities to a minimum;
- Modern low noise emission vehicles and equipment must be favoured on site; and
- A well planned and co-ordinated “fast track” procedure is implemented to complete the total construction process in the area in the shortest possible time.

5.2.4. Good housekeeping

The contractor must undertake “good housekeeping” practices during construction. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leave the area in a safe state and must also include the care for and preservation of the environment within which the site is situated.

5.2.5. Solid waste management

- No on-site burning, burying or dumping of any waste materials, litter or refuse must occur.
- The Contractor must provide vermin and weatherproof bins with lids of sufficient number and capacity to store the solid waste produced on a daily basis. The lids must be kept firmly closed on the bins at all times.
- Bins must not be allowed to become overfull and must be emptied at least once a day.
- The waste from bins must be temporarily stored on site in a central waste area that is weatherproof and scavenger-proof, and which the ECO has approved.
- Recyclable waste must be disposed of into separate skips/bins and removed off-site for recycling.
- All solid waste must be disposed of at the existing waste site on the farm.
- Any hazardous waste will need to be disposed of off-site at an approved registered landfill site. The Contractor must supply the ECO with the appropriate disposal certificates.
- The Contractor must submit a solid waste management plan as part of the Pollution Control Method Statement to the ECO.

5.2.6. Water use

- All sources of water for construction purposes must be sourced from existing, approved water supply points located on the farm. It is recommended that borehole water be made available.
- Where possible all wash water will be recycled for use, as wash water again or for dust suppression where applicable.

5.2.7. Contaminated water

- No machinery must be parked overnight within 50 m of the rivers/wetlands.
- All stationary machinery must be equipped with a drip tray to retain any oil leaks.
- Chemicals used must be stored safely on bunded surfaces in the site camp.
- Cement mixing must take place on a contained and impermeable surface, must it be undertaken on site.
- Emergency plans, and spill kits, must be in place in case of accidental spillages on site.
- No ablution facilities must be located within 50 m of any river or wetland system.
- Chemical toilets must be regularly maintained/ serviced to prevent ground or surface water pollution.
- Any hazardous substances/waste must be stored in impermeable bunded areas or secondary containers 110% the volume of the contents within it.
- All general waste temporarily stored on site must be done so in windproof/sealable containers before being disposed of at a registered landfill site.

- Construction materials and chemicals that could be a potential pollutant of any kind and in any form must be kept, stored, and used in such a manner that any escape can be contained and that the water table and surface water is not endangered. Water containing pollutants such as chemicals, washing detergents, sewerage, fuels, paints, solvents and hydrocarbons must be contained and discharged into an impermeable storage facility for removal from the site or for recycling. This particularly applies to runoff from fuel depots/workshops/truck washing areas.
- Wash down areas must be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. The Contractor must notify the ECO immediately of any pollution incidents on Site.
- As part of the Pollution Control Method Statement, the Contractor must submit a plan to the ECO detailing how the contaminated water will be managed on site.

5.2.8. Hazardous substances

- The transportation and handling of hazardous substances must comply with the provisions of the Hazardous Substances Act (Act No.187 of 1993) and associated regulations as well as SABS 0228 and SABS 0229.
- The Contractor must also comply with all other applicable regional and local legislation and regulations with regard to the transport, use and disposal of hazardous substances. Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction must be stored in secondary containers. The relevant Material Safety Data Sheets (MSDS) must be available on site. Procedures detailed in the MSDSs must be followed in the event of an emergency situation.
- The Contractor must be responsible for the training and education of all personnel who will be handling hazardous materials about their proper use, handling and disposal.
- If potentially hazardous substances are to be stored or used on site, the Contractor must submit a Method Statement to the ECO detailing the substances / materials to be used, together with the transport, storage, handling and disposal procedures for the substances.

5.2.9. Cement and mixing of concrete

- The proposed location of cement mixing areas (including the location of cement stores and sand and aggregate stockpiles) must be indicated on the site layout plan and approved by the ECO.
- All wastewater generated from the operation and cleaning of concrete mixing equipment and other sources of concrete must be passed through a concrete wastewater settlement system. The water from this system must not be allowed to flow into any “no go” area or water course but must permeate through the ground before it reaches any such water course. The accumulated sludge in the settlement system must be regularly cleaned out and appropriately disposed of as solid waste.
- The Contractor must ensure that minimal water is used for washing of concrete and cement mixing equipment.
- Washing and cleaning of equipment must also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion.
- Used cement bags must be disposed of in weatherproof bins on site to prevent the generation of wind-blown cement dust, and the bags from blowing away.
- During construction, the contractor must ensure that concrete is mixed on mortar boards, and that all visible remains of concrete are removed and disposed of as waste, and that all surplus aggregate is removed.
- As part of the Pollution Control Method Statement, a plan detailing all actions to be taken to comply with these requirements must be submitted to the ECO.

5.2.10. Fuel (petrol and diesel) and oil

Fuel Storage

- All fuels and oil must be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination into nearby rivers or drainage lines. These sites must be re-vegetated after construction has been completed.
- The location of the fuel storage area will be approved by the ECO. All necessary approvals with respect to fuel storage and dispensing must be obtained from the appropriate authorities. Symbolic safety signs depicting “No Smoking”, “No Naked Lights” and “Danger” conforming to the requirement of SABS 1186 must be prominently displayed in and around the fuel storage area. There must be adequate fire-fighting equipment at the fuel storage area.
- The Contractor must ensure that all liquid fuels and oils are stored in tanks with lids, which are kept firmly shut and under lock and key at all times. The capacity of the tank must be clearly displayed and the product contained within the tank clearly identified using the emergency information system detailed in SABS 0232 part 1. Fuel storage tanks must have a capacity not exceeding 9 000 litres and must be kept on site only for as long as fuel is needed for construction activities, on completion of which they must be removed.
- Tanks on site must not be linked or joined via any pipe work, but must remain as separate entities. The tanks must be situated on a smooth impermeable base with a bund. The volume inside the bund must be 110% of the total capacity of the largest storage tank. The base must be constructed of concrete, or of plastic sheeting with impermeable joints with a layer of sand over to prevent perishing. The impermeable lining must extend to the crest of the bund. The floor of the bund must be sloped to enable any spilled fuel and/or fuel-contaminated water to be removed. Appropriate material, approved by the ECO that absorbs / breaks-down or encapsulates minor hydrocarbon spillage and which is effective in water must be installed in the sump. Contaminated soil must be taken off site to a disposal site approved by the ECO, and the material that absorbs / breaks-down or encapsulates minor hydrocarbon spillage must be replenished.
- Only empty and externally clean tanks can be stored on the bare ground. Empty and externally dirty tanks must be sealed and stored in an area where the ground has been protected.
- Adequate precautions must be provided to prevent spillage during the filling of any tank and during the dispensing of the contents. The dispensing mechanism for the fuel storage tanks must be stored in a waterproof container when not in use.
- As part of the required site layout for the construction camp, a plan must be submitted to the ECO detailing the design, location and construction of the fuel storage area as well as for the filling and dispensing from storage tanks; and for the type of absorbing / breaking-down or encapsulating material to be used.

Refuelling

- Where reasonably practical, the plant must be refuelled at a designated re-fuelling area/depot or at a workshop as applicable. If this is not reasonably practical then the surface under the refuelling area must be protected and appropriately bunded against pollution to the reasonable satisfaction of the ECO prior to any refuelling activities.
- Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any drainage line or waterbody.
- If fuel is dispensed from 200 litre drums, the proper dispensing equipment must be used, and the drum must not be tipped in order to dispense fuel. The Contractor must ensure that the appropriate fire-fighting equipment is present during refuelling operations.
  The Contractor must ensure that there is always a supply of absorbent material readily available to absorb/breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials must be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill.

Used oil and hydrocarbon contaminated materials

- Used oil must be stored at a central location on site prior to removal off site for disposal at an approved disposal or recycling site.

- Old oil filters and oil, petrol and diesel-soaked material must be treated as hazardous waste. The Contractor must remove all oil, petrol, and diesel-soaked sand immediately and must dispose of it as hazardous waste or treat it on site with material that breaks-down or encapsulates such spillages, as approved by the ECO.

5.2.11. Ablution facilities

- Washing, whether of the person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided. The Contractor must provide the necessary ablution facilities for all his personnel prior to the commencement of work and must ensure that his personnel make use of the facilities.
- Toilet facilities must be supplied by the Contractor for the workers at a ratio of at least 1 toilet per 20 workers in areas approved by the ECO. Every 1-man urinal will be taken as supplying the equivalent of 5 men in addition to the 20 men per toilet on site. No toilets will be erected within 20 m of any “no go” areas. Toilets must be situated within 200m of any area where work is taking place in numbers sufficient to meet the ratio depicted above for the workers in the area.
- The facilities must be maintained in a hygienic state and serviced regularly. Toilet paper must be provided. Temporary / portable toilets must be secured to the ground to prevent them toppling due to wind or any other cause, to the satisfaction of the ECO.
- Discharge into the environment and burial of waste is strictly prohibited. The Contractor must ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from the site. Toilets must be emptied before the Contractors’ holidays or any other temporary site closure.

5.2.12. Eating areas

- The Contractor must designate eating area(s), subject to the approval of the ECO. No cooking is allowed outside of the Contractor’s camp area on site.
- At meal times all workers must eat in designated eating areas. These areas must have shade for the workers. The eating areas must be in existing structures or in temporary / transportable structures that must be well constructed using wood or metal for the frame and screened on the top and sides with shade cloth/canvas or other material to the satisfaction of the ECO. These areas must be well demarcated and in locations approved by the ECO, and must not be within 20 m of any “no go” areas, on or adjacent to the site.
- Sufficient bins must be present in these areas. All disposable food packaging must be disposed of in the bins after every meal.
- The area must be cleaned after every meal.
- The feeding or leaving of food for animals is strictly prohibited.

5.2.13. Site structures

- All site establishment components (as well as equipment) must be positioned to limit visual intrusion on neighbours and the size of the land area disturbed. The type and colour of roofing and cladding materials to the Contractor's temporary structures must be selected to reduce reflection.
- The Contractor must supply and maintain adequate and suitable sheds for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather must be weatherproof, adequately ventilated and provided with raised floors.

5.2.14. Lights

- The Contractor must ensure that any lighting installed on the site for his activities does not cause a reasonably avoidable disturbance to the naturally occurring fauna.

5.2.15. Noise

- The Contractor must take precautions to minimise noise generated on site (e.g. install and maintain silencers on machinery).
- The Contractor must comply with the Noise Induced Hearing Loss Regulations published under the Occupational Health and Safety Act.
- Appropriate directional and intensity settings are to be maintained on all hooters and sirens.
- Work will be limited to daylight hours
- No amplified music must be allowed on site. The Contractor must not use sound amplification equipment on Site unless in emergency situations.

5.2.16. Dust Control

- Dust generated during the construction phases must comply with the National Dust Control Regulations (GN No. R. 827 of 1 November 2013), promulgated in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004). These regulations prohibit a person from conducting any activity in such a way as to give rise to dust in such quantities and concentrations that the dust, or dust fall, has a detrimental effect on the environment, including health.
- The Contractor will be responsible for the continued control of dust arising from his operations. The Contractor must take all reasonable measures to minimize the generation of dust as a result of construction activities to the satisfaction of the ECO.
- Given that the site is located within a water scarce region, commercial dust binders (such as Hydropam or Dustex), planting of cleared space, rotovating straw bales, and scheduling of dust-generating activities must be the preferred mitigation measures for alleviating dust. The use of water for spraying and dampening must be used as a last resort. Potable water must not be used.
- Damping of all gravel haul and access roads (if constructed) with water or binding with a commercial dust binder must be ongoing. Should dust still be a problem on any specific road, the allowable speed will be reduced to 20km/h. If dust is still a problem the road must be treated with a commercial dust binder, as required, to form a cohesive layer that will control the dust on the road.
- Where recycled water is to be used, this must be of a suitable quality so as not to cause any severe/repeated pollution to soil or surface water resources.
- Areas that are to have the topsoil stripped for construction purposes must be limited, and only stripped when work is about to take place.
- Other activities and situations that could result in a dust nuisance include: site clearance and other earth moving operations, open cleared space, stockpiles of topsoil or sand and activities associated with concrete mixing.
- The appropriate health and safety equipment (e.g. dust masks) must be worn by workers during the phases of dust-producing construction activity.
- During periods of strong winds, construction work which tends to produce large amounts of dust must be paused until such a time that the wind subsides.

5.2.17. Environmental awareness training

- An environmental awareness induction training course must be run for all personnel on site (See Annexure 2 for a proposed Basic Environmental Education Course). The course must be run in the morning during normal working hours at a suitable venue provided by the Contractor. All attendees must remain for the duration of the course and sign an attendance register on completion that clearly indicates participant's names, a copy of which must be handed to the ECO.
- The environmental awareness training course for site staff and labour must be presented by the Contractor's SHE Officer from material provided by the ECO unless otherwise required by the Project Specification. The course will be approximately one-hour long.

- Notwithstanding the specific provisions of this clause it is incumbent upon the Contractor to convey the sentiments of the EMPr to all personnel and Subcontractors involved with the Works.

Construction personnel information posters

- The Contractor must erect and maintain information posters for the information of his employees depicting actions to be taken to ensure compliance with the Environmental EMPr. Construction personnel information posters must be laminated and erected in all eating areas, workshops and site offices. The Contractor must ensure that the construction personnel information posters are not damaged in any way, and must replace them if any part becomes illegible.
- Examples of these posters will be supplied to the Contractor by the ECO in electronic format.

5.2.18. Fire control

- The Contractor must take all the necessary precautions to ensure that fires are not started as a result of his activities on site.
- No open fires must be permitted on the site.
- Smoking must not be permitted in those areas where there is a fire hazard. Such areas must include the workshop and fuel storage areas and any areas where the vegetation or other material could support the rapid spreading of an initial flame.
- The Contractor must appoint a Fire Officer who must be responsible for ensuring immediate and appropriate actions in the event of a fire and must ensure that employees are aware of the procedures to be followed. The Contractor must forward the name of the Fire Officer to the ECO for his approval within 7 days of being on site.
- The Contractor must ensure that there is basic fire-fighting equipment available on site at all times. This must include at least rubber beaters when working in natural areas, at least one fire extinguisher of the appropriate type in the mess and cooking area, and at least one fire extinguisher of the appropriate type when welding or other “hot” activities are undertaken.
- The Contractor must be liable for any expenses incurred by any organisations called to assist with fighting fires that were started as a result of his activities or personnel, and for any cost relating to the rehabilitation of burnt areas, or consequential damages.

5.2.19. Emergency Procedures

- Emergency procedures, including the names and contact details of responsible personnel and emergency services must be made available to all staff and must be clearly displayed at relevant locations at the site. The Contractor must advise the ECO of any emergencies on site, together with a record of action taken, within 24 hours of the emergency occurring.
- Telephone numbers of emergency services must also be posted conspicuously in the Contractor’s office near the telephone.
- The Contractor must submit a Method Statement covering the procedures for the following emergencies:

Fire

- The Contractor must advise the relevant authority of a fire as soon as one starts and must not wait until he can no longer control it.
- The Contractor must ensure that his employees are aware of the procedures to be followed in the event of a fire.

Accidental leaks and spillages

- The Contractor must ensure that his employees are aware of the procedures to be followed for dealing with spills and leaks, which must include notifying the ECO and the relevant authorities. The Contractor must ensure that all the necessary materials and equipment for dealing with spills and leaks are available on site at all times. Treatment and remediation of the spill areas must be undertaken to the reasonable satisfaction of the ECO.

- In the event of a hydrocarbon spill, the source of the spillage must be isolated and the spillage contained. The area must be cordoned off and secured. The Contractor must ensure that there is always a supply of absorbent material readily available to absorb/ breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials must be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill.
- Any spills must be cleared and the contaminated soil/sludge disposed of in an appropriate manner, approved by the ECO, or at a licensed hazardous waste disposal site.
- in accordance with section 30 of the NEMA, 1998, in the event of a significant spill or leak of hazardous substances (e.g. petrol, diesel, etc.) used during the proposed activities, such an incident(s) must be reported to the relevant authorities, including the Directorate of Pollution and Chemicals Management,

5.2.20. Protection of natural features

- The Contractor must not deface, paint, damage or mark any natural features (e.g. rock formations) situated in or around the site for survey or other purposes unless agreed beforehand with the ECO. Any features affected by the Contractor in contravention of this clause must be restored / rehabilitated to the satisfaction of the ECO.
- The Contractor must not permit his employees to make use of any natural water sources for the purposes of swimming, personal washing and the washing of machinery or clothes.

5.2.21. Protection of flora and fauna

In addition to the mitigation measures listed under section 4.2, the following is applicable:

- All clearing activities must deploy search and rescue teams in-front of clearing machinery to assist in relocating slower moving faunal species e.g. tortoises.
- Protected plant species must be removed from the designated construction footprint and relocated to adjacent areas of similar habitat that will not be affected by construction and used in landscaping once construction is complete. The required permits must be obtained prior to moving any species.
- Except to the extent necessary for the carrying out of the works, flora must not be removed, damaged or disturbed nor must any vegetation be planted.
- The removal and stockpiling of topsoil must also be carried out in accordance with the EMPr.
- Trapping, poisoning and/or shooting of animals is strictly forbidden by employees and contractors.
- The use of chemicals of all forms must be carefully controlled and monitored to avoid contamination of areas.
- The environmental education programme must explain to staff why species of concern are of ecological significance.

5.2.22. Protection of heritage features

In addition to the mitigation measures listed under section 4.2, the following is applicable:

- Construction managers/foremen must be informed before construction starts regarding the possible types of heritage sites and cultural material they may encounter, and the procedures to follow when they find sites.
- If concentrations of palaeontological/archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Heritage Western Cape (021 483 5959) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/ excavation can be undertaken.
- Any person who causes intentional damage to archaeological or historical sites and/or artefacts could be penalised or legally prosecuted in terms of the National Heritage Resources Act 25 of 1999.

5.2.23. **Vegetation Clearance**

In addition to the mitigation measures listed under section 4.2, the following is applicable:

- Vegetation clearing and trampling must be avoided in areas demarcated as no-go areas.
- Temporary infrastructure such as the site camp, lay down areas and storage areas must be placed outside the 32m buffer from the river.
- Vegetation clearing must occur in parallel with the construction progress to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the river.
- The Contractor must work according to a plan, which demarcates areas to be cleared. The plan must be part of the Project Layout Plan developed in the Site Design Phase.
- The minimum amount of vegetation clearance must take place.
- All plants not interfering with construction must be left undisturbed.
- Collection or wilful damage to any plants outside of the areas demarcated for clearing is not allowed.

5.2.24. **Alien Vegetation Clearance**

In addition to the mitigation measures listed under section 4.2, the following is applicable:

- The construction phase must employ eradication programmes to remove any new invasive species, especially those categorized as 1, 2 and 3 on the NEMBA list. This must be undertaken in accordance with the site-specific Alien Plant Management Plan
- Long-term operational eradication programs to eradicate invasive species must be implemented if possible.

5.2.25. **Revegetation**

In addition to the mitigation measures listed under section 4.2, the following is applicable:

- All areas disturbed during construction must be reinstated to a state that approximates or betters the state that they were in before construction.
- Cut and fill areas must be restored and reshaped.
- Areas compacted by vehicles during construction must be scarified to allow penetration of plant roots and the regrowth of natural vegetation.
- The revegetation programme must take cognisance of the climatic and seasonal conditions with the most favourable period being in spring and early summer.
- The rehabilitated areas will be weeded by the nominated rehabilitation contractor for a period of 1 year.
- Species indigenous and or endemic to the area, and suitable for rehabilitation, must be identified and used in preference to exotic species.
- Where possible, indigenous species cleared for construction, must be used to revegetate disturbed areas.
- It is also advised that the Environmental Control Officer, to be appointed during the construction phase, must have a good understanding of the local flora. The ECO must be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas, using species selected by an appropriate botanist. All alien plant re-growth must be monitored and should it occur these plants must be eradicated.

5.2.26. **Topsoil stripping and stockpiling**

- Topsoil can only be stripped from the areas as indicated below:
    - Any area which is to be used for temporary storage of materials
    - Areas which could be polluted by any aspect of the construction activity and;
    - Areas designated for the dumping of soil.
- Stripping of topsoil will be undertaken in such a manner as to minimise erosion by wind or runoff.

- Outside of the development footprint, topsoil will be stripped to a depth not exceeding 150mm from the original ground level.
- Areas from which the topsoil is to be removed will be cleared of any foreign material including bricks, rubble, any waste material, litter, excess vegetation and any other material which could reduce the quality of the topsoil.
- The Contractor must ensure that subsoil and topsoil are not mixed during stripping, excavation, reinstatement and rehabilitation. If mixed with clay sub-soil the usefulness of the topsoil for rehabilitation of the site will be lost.
- Soils must be exposed for the minimum time possible once cleared.
- Topsoil will be temporarily stockpiled, separately from (clay) subsoil and rocky materials.
- Topsoil will be stockpiled in areas designated by the ECO.
- Soil must not be stockpiled near the river without prior consent from the ECO.
- Stockpiles will either be vegetated with indigenous grasses or covered by a suitable fabric to prevent erosion and invasion of weeds.
- Stockpiled topsoil will not be compacted

5.2.27. **Stormwater Management**

- A storm water management plan must be designed and approved by the Environmental Auditor prior to construction commencing.
- Mitigation measures must be aimed at reducing contact between stormwater and hazardous chemicals. This needs to be considered during the planning of the stormwater drainage system for the project facilities.
- In terms of minimising discharge of pollutants and run-off quantity requiring treatment, all stormwater run-off must be properly segregated and clean water run-off diverted to prevent it mixing with water containing a high solids content.
- All run-off from wash areas must pass through an oil trap and must be treated as hazardous due to the presence of hydrocarbons. All other run-off water must pass through a sediment trap to remove the majority of suspended solids prior to discharge to the environment. All settled material must be disposed of at an assigned landfill.
- Natural run-off must be diverted to stormwater drains where these are available. The Contractor must take appropriate measures to prevent sand, silt and silt-laden waters from entering the river.

5.2.28. **Erosion and sedimentation control**

- The Contractor must take all reasonable measures to limit erosion and sedimentation due to construction activities.
- Re-vegetate areas that have been disturbed as soon as possible.
- Where erosion and/or sedimentation, whether on or off the site, occurs despite the Contractor complying with the foregoing, rectification must be carried out in accordance with details specified by the ECO. Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification must be carried out to the reasonable requirements of the ECO and at the expense of the Contractor.
- No removal of vegetation is to take place within 50m of any river, artificial or natural wetland, except for the control of alien vegetation.
- Construction vehicles and machinery must not encroach into identified ‘no-go’ areas or areas outside the project footprint.
- Activities within 32m of a watercourse must obtain the necessary Water Use License prior to the commencement of such activities.

5.2.29. Aesthetics

- The Contractor must take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.

5.2.30. Community relations

- If so required by the Project Specification, the Contractor must erect and maintain information boards in the positions, quantities, designs and dimensions specified. Such boards must include contact details for complaints by members of the public in accordance with details provided by the ECO.
- The Contractor must keep a "Complaints Register" on site. The Register must contain all contact details of the person who made the complaint, and information regarding the complaint itself and note the date and time that the complaint was resolved.
- The ECO must be responsible for responding to queries and/or complaints and may request assistance from the Contractor's Management Staff.
- Construction materials and other purchases relating to the project must be done, where possible, within the nearby community and at local shops.

5.3. OPERATION PHASE

5.3.1. Emergency procedures

- Emergency procedures, including the names and contact details of responsible personnel and emergency services must be made available to all staff and must be clearly displayed at relevant locations at the site.
- Telephone numbers of emergency services must also be posted conspicuously in the office(s) near the telephone.
- The applicant must undergo these procedures for the following emergencies:

Fire

- The applicant must advise the relevant authority of a fire as soon as one starts and must not wait until he can no longer control it. The applicant must ensure that his employees are aware of the procedures to be followed in the event of a fire.

5.3.2. Aesthetics

- The applicant must take reasonable measures to ensure that operational activities do not have an unreasonable impact on the aesthetics of the area.

5.3.3. Noise

- All four generators will be housed in the generator room. Generators with lower sound power levels must be selected and vendors/contractors must be required to guarantee optimised equipment design noise levels. As far as is practically possible, the generators must be enclosed. The extent of enclosure will depend on the nature of the machine and ventilation requirements. It must be noted that the effectiveness of partial enclosures and screens can be reduced if used incorrectly, e.g. noise must be directed into a partial enclosure and not out of it, and there must not be any reflecting surfaces such as parked vehicles opposite the open end of a noise enclosure.

5.3.4. Fuel Storage

- All fuels and oil required for the generators must be stored in demarcated areas that are contained within permanent berms/bunds that are appropriately sealed. Washing and cleaning of equipment must also be done in berms or bunds, in order to trap any hydrocarbons and prevent excessive soil erosion;
- All necessary approvals with respect to fuel storage and dispensing must be obtained from the appropriate authorities. Symbolic safety signs depicting “No Smoking” and “Danger”, conforming to the requirement of SABS 1186, must be prominently displayed in and around the fuel storage area. There must be adequate fire-fighting equipment at the fuel storage area;
- The applicant must ensure that all liquid fuels and oils are stored in tanks with lids, which are kept firmly shut and under lock and key at all times. The capacity of the tank must be clearly displayed, and the product contained within the tank clearly identified using the emergency information system detailed in SABS 0232 part 1. Fuel storage tanks capacity must not exceed 9 000 litres.
- Tanks onsite must not be linked or joined via any pipe work but must remain as separate entities. The tanks must be situated on a smooth impermeable base with a bund. The volume inside the bund must be 110% of the total capacity of the largest storage tank. The base must be constructed of concrete. The impermeable lining must extend to the crest of the bund. The floor of the bund must be sloped to enable any spilled fuel and/or fuel-contaminated water to be removed. Appropriate material, approved by the ECO that absorbs / breaks-down or encapsulates minor hydrocarbon spillage and which is effective in water must be installed in the sump;
- The tanks and bunded areas must be covered by a roofed structure,
- Spills and materials used to clean up the spill must be taken offsite to a disposal site approved by the Environmental Auditor, and the material that absorbs / breaks-down or encapsulates minor hydrocarbon spillage must be replenished;
- Adequate precautions must be provided to prevent spillage during the filling of any tank and during the dispensing of the contents. The dispensing mechanism for the fuel storage tanks must be stored in a waterproof container when not in use; and
- As part of the required site layout, a plan must be submitted to the authorities detailing the design, location and construction of the fuel storage area as well as for the filling and dispensing from storage tanks and for the type of absorbing / breaking-down or encapsulating material to be used.

5.3.5. Refuelling

- The surface under the refuelling area must be protected and appropriately bunded against pollution to the reasonable satisfaction of the ECO prior to any refuelling activities;
- If fuel is dispensed from 200 litre drums, the proper dispensing equipment must be used, and the drum must not be tipped in order to dispense fuel. The applicant must ensure that the appropriate fire-fighting equipment is present during refuelling operations; and
- The Applicant must ensure that there is always a supply of absorbent material readily available to absorb / breakdown or where possible, be designed to encapsulate minor hydrocarbon spillages. The quantities of such materials must be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill. Prior to any refuelling or maintenance activities, the Environmental Auditor must approve this material.
- Used oil must be stored at a central location onsite prior to removal offsite for disposal at an approved disposal or recycling site; and

- Old oil filters and oil, petrol and diesel-soaked material must be treated as hazardous waste. The Applicant must remove all oil, petrol, and diesel-soaked sand immediately and must dispose of it as hazardous waste or treat it onsite with material that breaks-down or encapsulates such spillages as approved by the ECO.

5.3.6. Contaminated water

- Potential pollutants of any kind and in any form must be kept, stored, and used in such a manner that any escape can be contained and that the water table and surface water is not endangered. Water containing such pollutants as chemicals, washing detergents, sewerage, fuels, paints and solvents and hydrocarbons must be contained and discharged into an impermeable storage facility for removal from the site or for recycling.
- Care must be taken with the installation of the conservancy tank as any crack may lead to leakages over time.
- Proper and regular servicing of the conservancy tank must be scheduled to prevent possible groundwater contamination.

5.3.7. Solid waste management

- No on-site burning, burying or dumping of any waste materials, litter or refuse must occur.
- The applicant must provide vermin and weatherproof bins with lids of sufficient number and capacity to store the solid waste produced on a daily basis. The lids must be kept firmly on the bins at all times.
- Bins must not be allowed to become overfull and must be emptied regularly.
- The waste from bins may be temporarily stored on site in a central waste area that is weatherproof and scavenger proof.
- Recyclable waste must be disposed of into separate skips/bins and removed off-site for recycling by an appointed contractor.
- All solid waste must be disposed of off-site at an approved registered landfill site or collected by the municipal collection services.
- Organic waste must be separated and either composted on site or taken to an approved green waste management facility.

5.3.8. Water use

- All sources of water for operational purposes must be approved by the relevant authority in writing before any such sources can be used to obtain water.
- Water efficient systems, such as dual-flush toilets and water-efficient taps must be used in order to save water.
- Given the site occurs within a water scarce area, a grey water system must be installed.

5.3.9. Ablution facilities

- Washing, whether of the person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the facilities provided.
- The facilities must be maintained in a hygienic state and serviced regularly. Toilet paper must be provided.
- Discharge into the environment and burial of waste is strictly prohibited.

5.3.10. Lights

- The applicant must ensure that any lighting installed on the site for his activities does not cause a reasonably avoidable disturbance to the naturally-occurring fauna.
- Security lighting must be as dim as possible and low lighting i.e. place near to the ground and point downwards.

5.3.11. Protection of natural features

- The applicant must not deface, paint, damage or mark any natural features (e.g. rock formations or the adjacent riverbed) situated in or around the site for survey or other purposes unless agreed beforehand with the ECO. Any features affected by the applicant in contravention of this clause must be restored / rehabilitated to the satisfaction of the ECO.
-

5.3.12. Protection of Fauna

- birds and their nests are not to be removed.

- No stay wires may be used

5.3.13. Storm water management

- An increase in hard surfaces (parking area, buildings, antennae themselves) will result in an increase in stormwater which could lead to erosion. An operational stormwater management plan must be designed and implemented prior to construction.
- Mitigation measures must be aimed at reducing contact between stormwater and hazardous chemicals. This needs to be considered during the planning of the stormwater drainage system for the project facilities.
- In terms of minimising discharge of pollutants and run-off quantity requiring treatment, all stormwater run-off must be properly segregated and clean water run-off diverted to prevent it mixing with water containing a high solids content.
- All run-off from wash areas must pass through an oil trap and must be treated as hazardous due to the presence of hydrocarbons. All other run-off water must pass through a sediment trap to remove the majority of suspended solids prior to discharge to the environment. All settled material must be disposed of at an assigned landfill.
- The quality of all liquid waste streams discharged from the site, including stormwater, must be monitored regularly to ensure compliance with the requirements of relevant legislation and standards.

5.4. DECOMISSIONING PHASE

If SANSA decommission any structures, all the management measures listed in the construction phase will apply to the decommissioning phase. These mitigation and management measures must be implemented in addition to the following:

5.4.1. Rehabilitation

- A percentage of operational earnings should be set aside for the Decommissioning Phase, which must include costs for landscaping and re-vegetation of the whole development footprint.

- A Decommissioning Rehabilitation Plan must be developed and include primary objectives of rehabilitation and the latest acceptable methods for implementation.
- Only species indigenous to the site must be used for rehabilitation. No new species must be introduced.
- Laydown areas must be located in already disturbed areas.
- Where vegetation has been cleared, site rehabilitation in terms of soil stabilisation and re-vegetation must be undertaken as soon as possible.

6. ENVIRONMENTAL MANAGEMENT PROTOCOL

6.1. ROLES AND RESPONSIBILITIES

6.1.1. Applicant/Developer

The applicant is the responsible entity for monitoring the implementation of the EMPr and compliance with the authorisation. However, if the applicant appoints a contractor to implement the project and hence implement the proposed mitigation measures documented in this EMPr on their behalf, then the successful contractor's responsibilities are outlined as per the section that follows.

6.1.2. Contractor

The successful contractor must:

- Be responsible for the finalisation of the EMPr in terms of methodologies which are required to be implemented to achieve the environmental specifications contained herein, and the relevant requirements contained in the Environmental Authorisation (EA);
- Be responsible for the overall implementation of the EMPr in accordance with the requirements of the developer and the EA;
- Ensure that all third parties who carry out all or part of the contractor's obligations under the contract comply with the requirements of this EMPr; and
- Ensure that the appointments of the ECO are subject to the approval of the developer.

6.1.3. Environmental Control Officer

For the purposes of implementing the conditions contained herein, the contractor must appoint an ECO for the contract. The ECO will be the responsible person for ensuring that the provisions of the EMPr as well as the EA are complied with during the construction period. The ECO will be responsible for issuing instructions to the contractor and where environmental considerations call for action to be taken. The ECO will submit monthly written environmental monitoring reports to the applicant and the environmental authority during the construction phase.

The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the EMPr and conditions of the environmental authorisation by the contractor. The ECO's duties in this regard will include, *inter alia*, the following:

- Confirming that all the environmental authorisations and permits required in terms of the applicable legislation have been obtained prior to construction commencing;
- Monitoring and verifying that the EMPr, EA and contract are adhered to at all times, and taking action if specifications are not followed;
- Monitoring and verifying that environmental impacts are kept to a minimum;
- Reviewing and approving construction method statements with input from the engineer, where necessary, in order to ensure that the environmental specifications contained within this EMPr and EA are adhered to;
- Inspecting the site and surrounding areas on a regular basis regarding compliance with the EMPr, EA and contract;

- Monitoring the undertaking by the contractor of environmental awareness training for all new personnel on site;
- Ensuring that activities on site comply with all relevant environmental legislation;
- Ordering the removal of, or issuing spot fines for person/s and/or equipment not complying with the specifications of the EMPr and/or environmental authorisation;
- Undertaking a continual internal review of the EMPr and submitting any changes for applicant and authority review and approval as applicable;
- Checking the register of complaints kept on site and ensuring that the correct actions are/were taken in response to these complaints;
- Checking that the required actions are/were undertaken to mitigate the impacts resulting from non-compliance;
- Reporting all incidences of non-compliance;
- Conducting monthly environmental performance audits in respect of the activities undertaken relating to the project. The ECO must also submit compliance audit reports to the competent authority, in accordance with the requirements of the environmental authorisation. Such reports must be reviewed by the applicant, prior to submission;
- Keeping a photographic record of progress on site from an environmental perspective;
- Recommending additional environmental protection measures, should this be necessary; and
- Providing report back on any environmental issues at site meetings.

Given the relatively small scope of the construction activities, a full time ECO will not be required. It is anticipated that upfront activities would include defining laydown and no-go areas, assisting with the development of method statements, presenting the environmental awareness and training programmes and revising this EMPr if details on the construction programme necessitate such changes. Thereafter monthly site audits will likely be sufficient to ensure compliance with this EMPr, provided the developer's Resident Engineer has been capacitated to identify any non-compliances.

6.1.4. **Environmental Auditor**

Regulation 34 of the NEMA EIA Regulations, 2014 (as amended) requires that an environmental audit report is prepared and submitted to the authorities at regular intervals. The auditor must be an independent person with relevant environmental auditing expertise and cannot be the ECO or the EAP who undertook the EIA. The environmental auditor will be required to undertake the following:

- Ensure that the development is compliant with the EA and EMPr.
- Provide verifiable findings to the competent authority in a structured report
- Where it is found that there are insufficient mitigation of environmental impact or insufficient levels of compliance with the EA and EMPr, recommendations to amend the EMPr to rectify the shortcomings must be submitted to the competent authority.
- Such recommendations must have been submitted to a public participation process, including organs of state.

It is important to note that within seven days of the date of submission of the environmental audit report to the competent authority, the holder of the EA must notify all potential and registered interested and affected parties of the submission of that report and ensure that the report is readily available to anyone who requests it as well as publicly accessible on the SANSA website.

During the construction phase it is recommended that an environmental audit is undertaken every six months with a final audit being undertaken 6 months after the conclusion of construction activities. During the Operational Phase, it is recommended than annual environmental audits are undertaken. The contents of the environmental audit report must comply with Appendix 7 of the NEMA EIA Regulations, 2014 (as amended).

6.2. COMPLIANCE MONITORING AND CORRECTIVE ACTION

The EMPr reporting and documentation requirements must be based on best practice principles, e.g. ISO 14001, which must take the following requirements into account:

- Documents associated with the EMPr must be reviewed regularly and updated by all environmental management parties;
- Audits of the environmental performance of the construction phase of the project will be undertaken every six months by an accredited auditor in fulfilment of likely conditions of EA in this regard;
- The findings of external, internal and informal environmental reviews will be recorded and items requiring action will be identified from the recommendations made. Corrective actions must be taken within 30 days of receiving the monitoring report and/or auditors report; and
- The construction contractors will be contractually obliged to fulfil any reasonable recommendations, and implementation of these actions will be assessed in the above audit.

Meetings, where required, should take place onsite. Internal auditing and reporting must be subject to external review by the auditor during the compliance audits, undertaken during the construction phase.

Non-compliance with the conditions of the EMPr must be viewed as a breach of appointment Contract for which the construction contractors will be held liable. The latter is deemed NOT to have complied with the EMPr if:

- There is evidence of contravention of the EMPr, its environmental specifications or the Method Statements developed by the Contractor within the boundaries of the construction site or areas of contractor responsibility;
- Construction related activities take place outside the defined boundaries of the site;
- Environmental damage ensues due to negligence;
- The Contractor fails to comply with corrective or other instructions issued by the ECO within a specific time; or
- The Contractor fails to respond adequately to complaints from the public or authorities.

The Applicant and the construction contractors are liable for any construction rehabilitation costs associated with their non-compliance with this EMPr. This rehabilitation will be undertaken to the satisfaction of the Environmental Auditor. The construction contractors will have the right to appeal any punitive action undertaken by the Environmental Auditor or the Applicant.

6.3. ADDITIONAL MITIGATION MEASURES

As part of the implementation and monitoring requirements, the employees involved in the proposed development must be trained in implementing and monitoring compliance with the EMPr and EA and to undertake the necessary monitoring and implementation of the prescribed mitigation measures detailed here.

6.3.1. <u>Pre-Construction</u>

- Notice must be given to surrounding landowners and businesses informing them of the intended date of commencement of construction.

- The necessary management plans need to be compiled. These include Traffic, Waste, Alien Vegetation and Archaeological Site Management Plans.

6.3.2. Construction Phase

- An ECO must be appointed to ensure that the construction activities remain within the designated area and that no unauthorised activities occur;
- The ECO must submit site monitoring reports detailing the applicant's compliance with the EMPr;
- An independent auditor must be appointed to undertake site audits that are in compliance with Regulation 34 of the NEMA EIA Regulations, 2014 (as amended)
- An efficient stormwater management system must be implemented during construction; and
- Workers must be educated on environmental management aspects.

6.3.3. Operational Phase

- Eradication of the already established alien invasive species onsite within the demarcated construction footprint; and
- An ECO must be present during maintenance work.

6.4. MONITORING

Construction activities have the potential to impact on a range of biophysical habitats as well as neighbouring communities. The monitoring programme which requires development by the Applicant, ECO and Contractor must, inter alia, allow for analysis of:

1) Air quality (such as dust);
2) Hydrocarbon pollution;
3) Success of local labour employment;
4) Success of local procurement policies;
5) Ambient and workplace noise;
6) Health and safety incidents;
7) Success of traffic management measures; and
8) Contamination and soil erosion.

Monitoring must continue into the operational phase and will require development with the applicant and an external environmental auditor. This monitoring must allow for the analysis of:

1) Hydrocarbon pollution;
2) Ambient and workplace noise;
3) Health and safety incidents;
4) Success of traffic management measures; and
5) Contamination and soil erosion.

7. ENVIRONMENTAL AWARENESS

Contractors must ensure that its employees and any third party who carries out all or part of the Contractor's obligations are adequately trained with regard to the implementation of the EMPr, as well as regarding environmental legal requirements and obligations. Training must be conducted by an independent person where necessary. Environment and health awareness training programmes must be targeted at two distinct levels of employment, i.e. management and labour. Environmental awareness training programmes must contain the following information:

- The names, positions and responsibilities of personnel to be trained;
- The framework for appropriate training plans;
- The summarised content of each training course; and
- A schedule for the presentation of the training courses.

The person conducting training must ensure that records of all training interventions are kept in accordance with the record keeping and documentation control requirements as set out in this EMPr. The training records must verify each of the targeted personnel's training experience.

The Developer must ensure that adequate environmental training takes place. All employees must have been given an induction presentation on environmental awareness and the content of the EMPr. The presentation needs to be conducted in the language of the employees to ensure it is understood. The environmental training must, as a minimum, include the following:

- The importance of conformance with all environmental policies;
- The environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities;
- Environmental legal requirements and obligations;
- Details regarding floral/faunal species of special concern and protected species, and the procedures to be followed should these be encountered during the construction of the bridge, main access roads, approach roads or construction camps;
- The importance of not littering;
- The importance of using supplied toilet facilities;
- The need to use water sparingly;
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible; and
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.

The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed. If necessary, a translator must be called to the site to further explain aspects of environmental or social behaviour that are unclear. An environmental training and awareness course has been provided in Annexure 2.

8. CONCLUSION

Although all foreseeable actions and potential mitigations or management actions are contained in this document, the EMPr must be seen as a day-to-day management document. The EMPr thus sets out the environmental standards that are required to minimise the negative impacts and maximise the positive benefits of the proposed construction of radio antennae and associated infrastructure, as detailed in the Basic Assessment Report (BAR). The EMPr is a “live document”, and if continuously reviewed and managed correctly can result in successful construction and operation of the proposed development.

All attempts must be made to have this EMPr available, as part of any tender documentation, so that the contractors are made aware of the potential cost and timing implications needed to fulfil the implementation of the EMPr, thus adequately costing for these. Further guidance must also be taken on any conditions contained in the EA, if the project is granted approval, and that these conditions must be incorporated into the final EMPr.

ANNEXURE 1: METHOD STATEMENTS

Method statements need to be compiled by the Contractor for approval by the ECO. For the purposes of the environmental specification, a method statement is defined as a written submission by the Contractor to the ECO setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, in such detail that the ECO is enabled to assess whether the Contractor's proposal is in accordance with the EMPr and / or will produce results in accordance with the EMPr.

The method statement must cover applicable details with regard to:

Construction procedures,
Materials and equipment to be used,
Transporting the equipment to and from site,
How the equipment/ material will be moved while on site,
How and where material will be stored,
The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur,
Timing and location of activities,
Compliance/ non-compliance with the Specifications, and
Any other information deemed necessary by the Engineer.

The Contractor must abide by these approved method statements, and any activity covered by a method statement must not commence until the ECO has approved the method statement. The method statement must be submitted to the ECO not less than 20 days prior to the intended date of commencement of the activity, or as directed by the ECO.

METHOD STATEMENT

CONTRACT:……..... **DATE**:……

PROPOSED ACTIVITY (give title of method statement):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

Start Date:	End Date:

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated sketches and plans where possible):

* Note: please attach extra pages if more space is required

DECLARATIONS

1) ENVIRONMENTAL CONTROL OFFICER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

_____ _____

(Signed) (Print name)

Dated:._____

2) PERSON UNDERTAKING THE WORKS

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

ANNEXURE 2: BASIC ENVIRONMENTAL EDUCATION COURSE OUTLINE

Reasons why should we look after the environment

- We have a right to a clean environment
- A clean environment is essential to healthy living
- All our basic needs come from the environment
- A contract has been signed – development vs the environment
- Penalties / fines could be issued

How to look after the environment

- Report issues
- Teamwork
- Follow the set rules and guidelines (EA, EMPr, Method statements etc.)
- Conserve, reuse and recycle

Tips and Guidelines

- Workers and equipment should not be allowed outside demarcated areas
- No swimming or polluting of water bodies allowed
- No damage / disturbance to vegetation or water bodies without consent / permits
- No disturbance allowed in no-go areas
- No hunting of animals
- Report all fires
- No burning or burying of waste
- No smoking near hazardous materials
- Training on fire fighting equipment
- Hazardous materials to be stored in designated and bunded areas
- Spill kits and drip trays a must
- Report all spills
- Control dust and Noise
- Maintain construction vehicles
- Availability and maintenance of sanitation facilities

CAUTION
Spill Hazard
SLOW DOWN
NO DUST

30
km/h
ZONE
STOP
WEAR YOUR
PERSONAL PROTECTIVE EQUIPMENT
EMERGENCY NUMBERS
POLICE:
FIRE DEPT:
AMBULANCE:
PHYSICIAN:

ANNEXURE 3: DETAILS AND CV OF THE EAP

Please refer to the Basic Assessment Report for details and CVs of the project team.

ANNEXURE 4: SITE SENSITIVITY MAP:

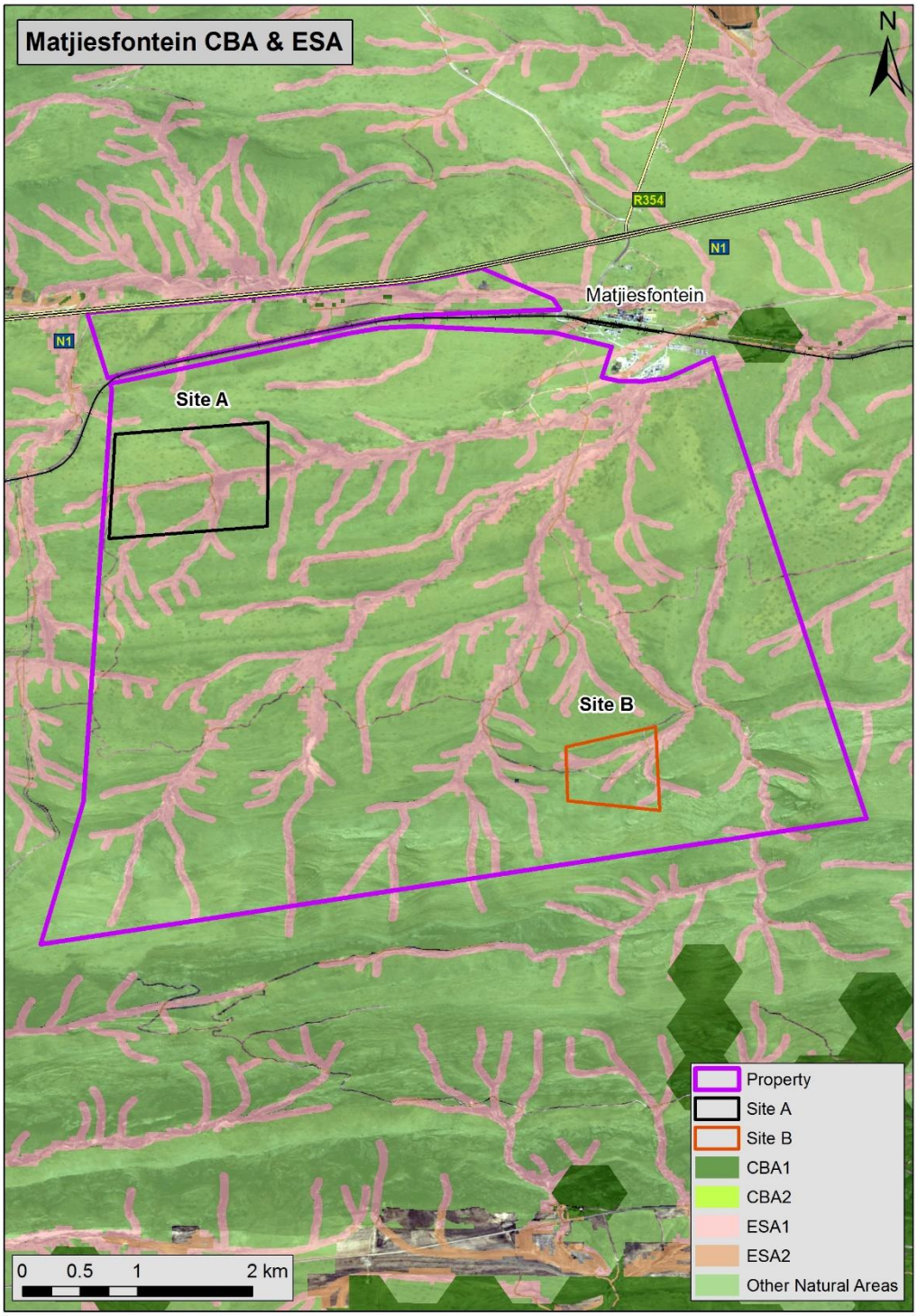


Figure A4-1: Ecological Support Areas present withing site boundaries

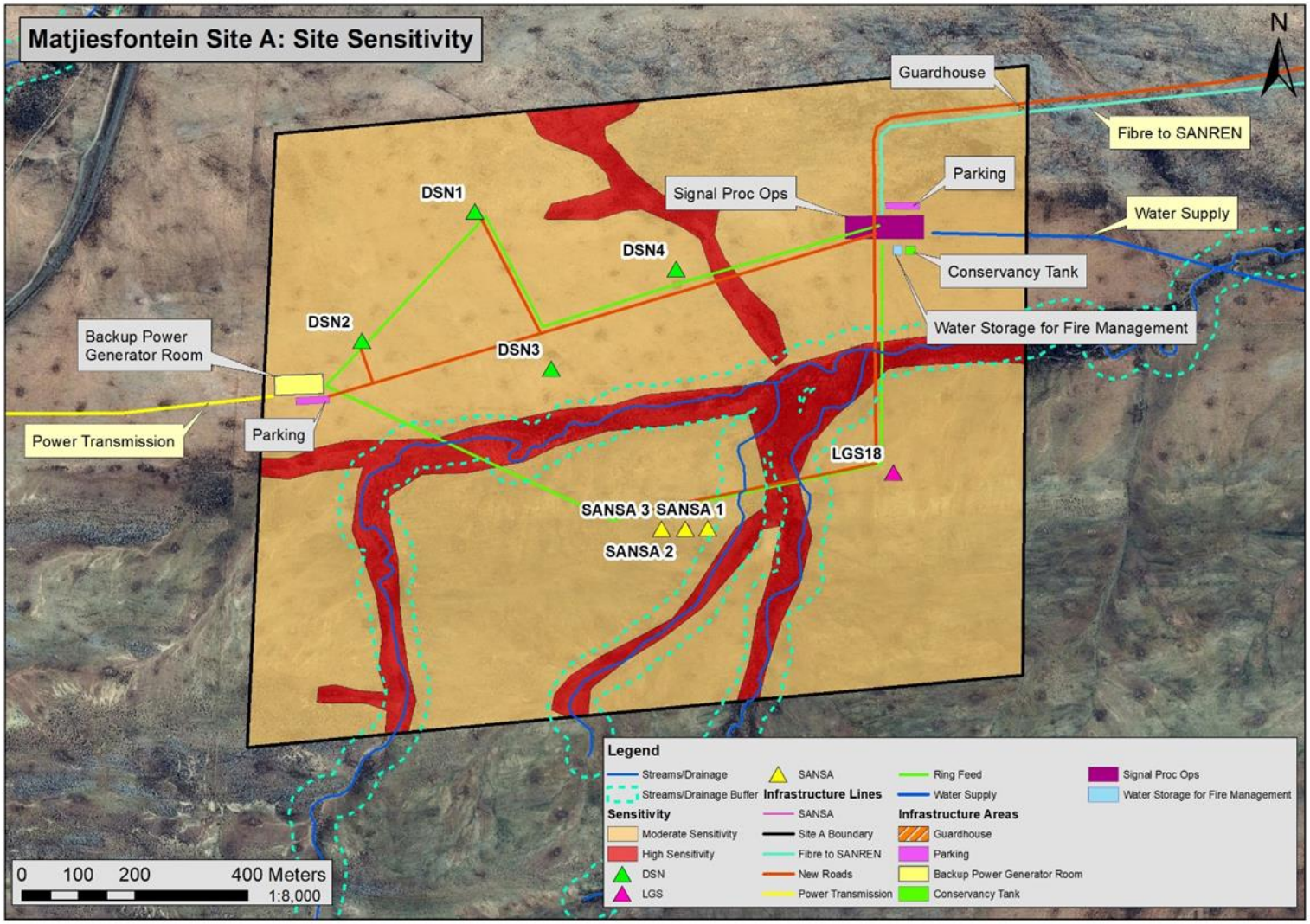
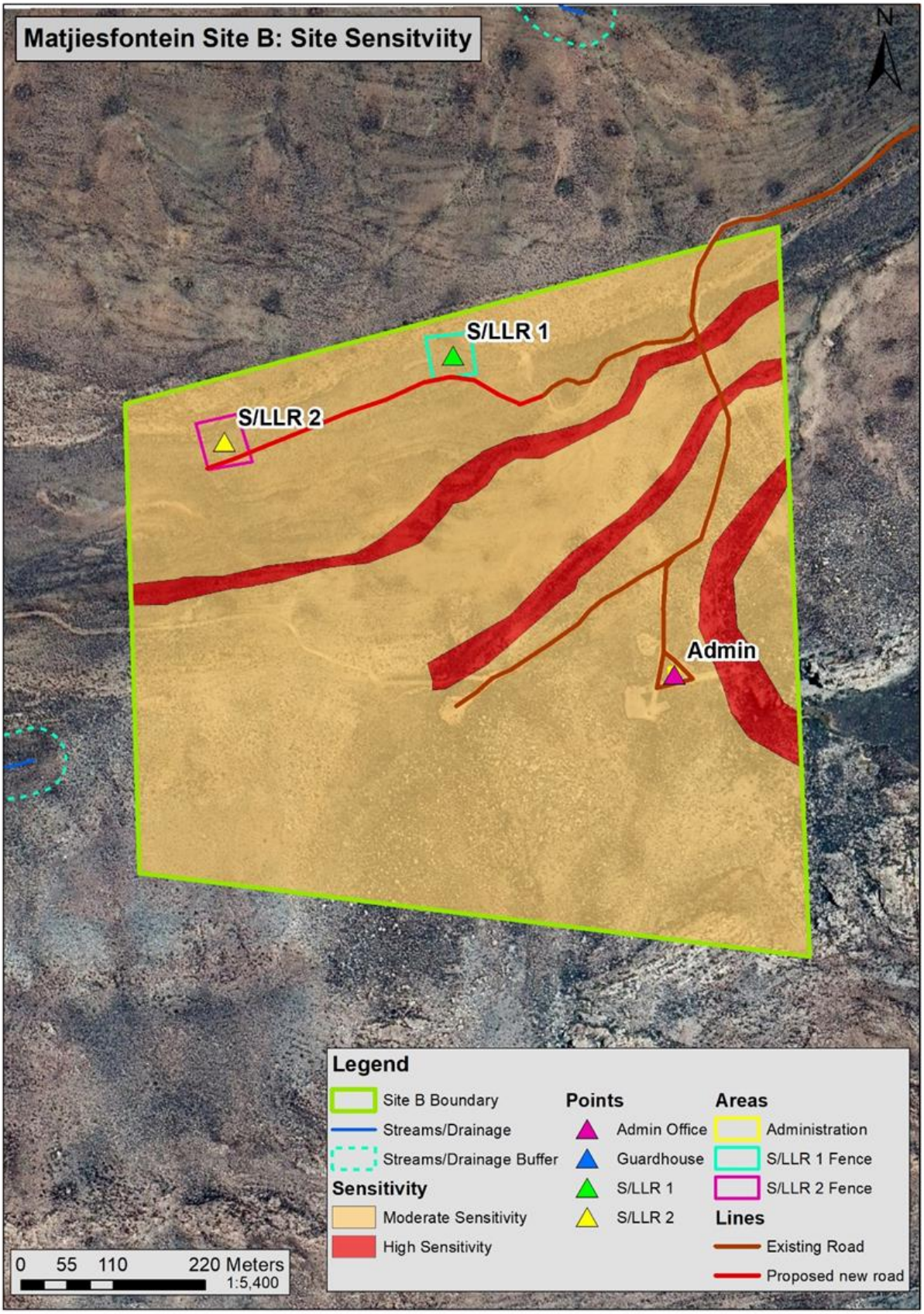


Figure A4-2: Site A Infrastructure placed outside of areas of high sensitivity



FigureA4-3: Site B Infrastructure and sensitivities

ANNEXURE 5: ANTENNA INFRASTRUCTURE IMAGES

Plate 3-1: Deep Space Navigation (DSN) Antennae, up to 45m.

Plate 3-2: Ka Antennae, 18m wide dish, 30m height.

Plate 3-3: This is a typical 6m antenna with a height of up to 12m.

Plate 3-4: SANSA(1,2,3)Typical 2,4m to 3,3 m antenna with a concrete base

Plate 3-5: Short/Long Laser Ranger (S/LLR).

ANNEXURE 6: ADDITIONAL INFORMATION AND GUIDANCE

The Contractor must ensure that all South African legislation concerning the natural environment, pollution and the built environment is strictly enforced. Such legislation must include :**Occupational Health and Safety Act 85 of 1993**

Health and Safety	• All relevant Health and Safety legislation as required in South Africa must be strictly adhered to, including but not limited to the Occupational Health and Safety Act, 1993 (No. 85 of 1993); • Smoking must only be permitted in a designated smoking area and must not be permitted near flammable substances Any welding or other sources of heating of materials must be done in a controlled environment and under appropriate supervision; • Ensure availability of fire extinguishers; • All employees must be aware of emergency/ contingency plans to ensure an understanding of the hazards and procedures required during an emergency situation; • An emergency preparedness and response protocol must be development by the appointed contractor to be implemented for the duration of construction; • Records of environmental and/or health and safety related incidents must be maintained and communicated to the relevant persons; • The Contractor must ensure that signage, which must be pictorial and, in the vernacular, is erected to warn against entering the construction area; • Traffic calming and speed control measures for access to construction sites must be instigated in consultation with the local authorities.

Additional recommendations for implementation are as follows:

Construction Phase	
Creation of temporary jobs	• Where feasible, priority for unskilled labour must be given to people living in Matjiesfontein • It is recommended that, where possible, the labour force required during construction must be sourced from the local communities; the construction of buildings, antennae and associated infrastructure will increase employment opportunities at the local level providing much needed income for families living in Matjiesfontein. • Skills development in the form of training must be implemented where possible.
Purchasing of Materials from Local Businesses	• Where feasible, building materials, hardware, sand, concrete and so forth must be sourced from the immediate community at Laingsburg.
Operational Phase	
Employment Creation	• Ensure that bursaries are offered to South African students to continue South African' exploration and involvement in international space projects; • Where feasible, upskill South African students and researchers interested in this field of science.