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SEATON THOMSON & ASSOCIATES



## **ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)**

**PREPARED FOR: Wits Rural Facility**

**WITS RURAL FACILITY REDEVELOPMENT AND  
EXPANSION, INCLUDING THE INSTALLATION OF A  
SEWERAGE PACKAGE PLANT**

**WITS RURAL, HOEDSPRUIT REGION, LIMPOPO  
PROVINCE**

LEDET reference number: **12/1/9/1-M75**  
NEAS Reference Number: **LIM/EIA/0000676/2013**

**Applicant:  
University of the Witwatersrand**

July 2013

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# ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

## WITS RURAL FACILITY REDEVELOPMENT AND EXPANSION, INCLUDING THE INSTALLATION OF A SEWERAGE PACKAGE PLANT

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# WITS RURAL FACILITY REDEVELOPMENT AND EXPANSION, INCLUDING THE INSTALLATION OF A SEWERAGE PACKAGE PLANT

## 1. INTRODUCTION

The Environmental Management Programme (EMPr) Report provides guidelines and directions to ensure that the proposed redevelopment and expansion of the Wits Rural Facility (WRF) is able to pursue its academic and social goals without impairing the long-term sustainability of the biophysical and cultural environment. The EMPr addresses the managerial and operational activities of the proposed redevelopment and expansion during and after construction. Once approved by the authorities – Limpopo Department of Economic Development, Environment and Tourism (LEDET), and the National Department of Environmental Affairs (DEA); compliance is obligatory for the contractors, service providers, WRF staff, WRF management and property owners (Wits University).

## 2. ACTIVITIES COVERED BY THE EMPr

The WRF is situated on the northern side of the Acronhoek- Orpen Road in Limpopo Province. The project entails the expansion and redevelopment of the existing University of Witwatersrand Rural Facility (Wits Rural) main camp. The WRF has been operational since the late 1980's, and is used extensively as a satellite campus for Wits student field trips and research. Originally, the farm and associated infrastructure was bought by Wits from the previous owner, who ran the main camp (and other camps on the bigger farm property) as a bushveld WRF/ resort in the 1970's.

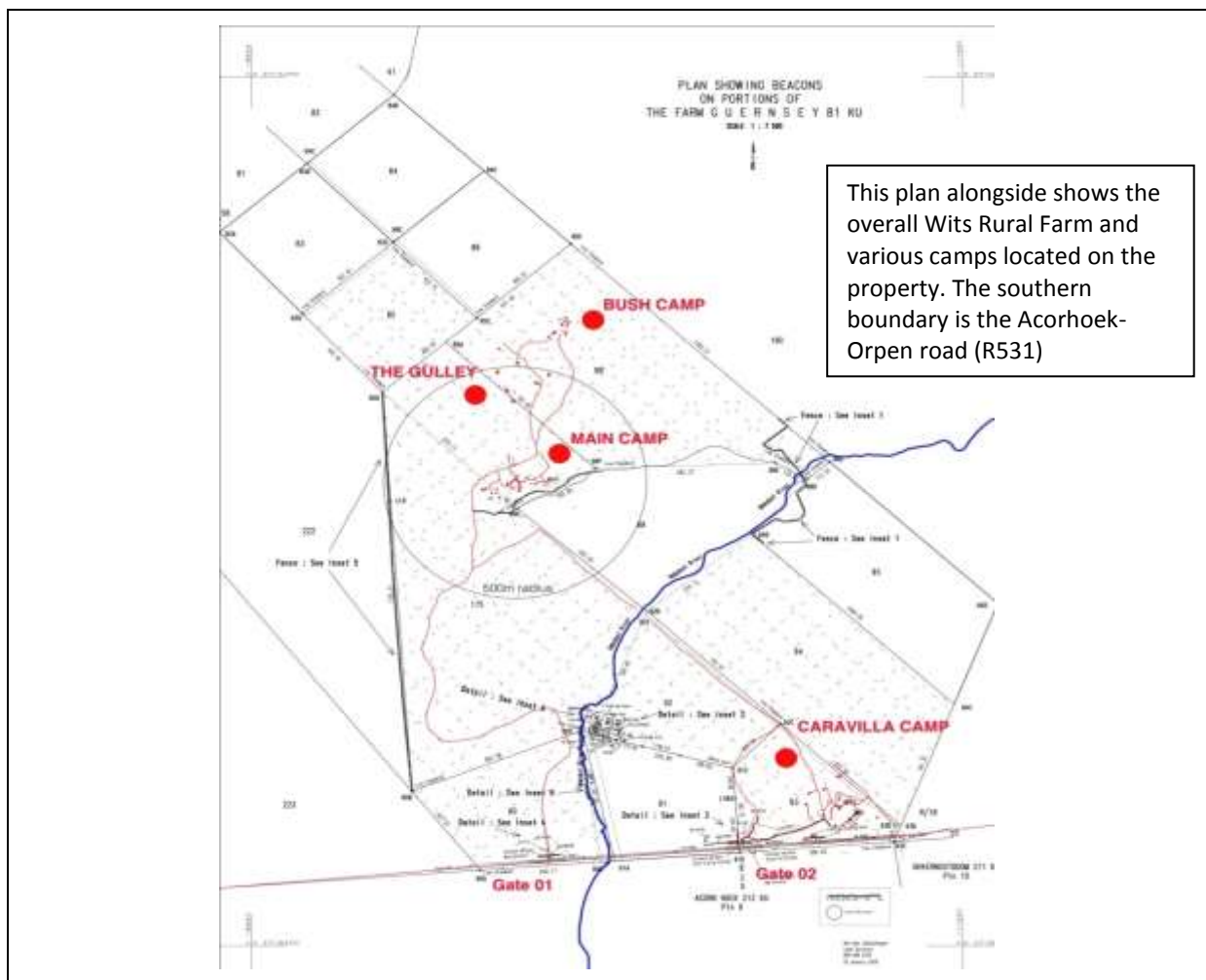


Figure showing the WRF Farm, and various camps on the property. This EMPr deals with the expansions at the Main Camp

The following expansions and additions are proposed at the Wits Rural Facility Main Camp:

1. A new reception, lounge, bar, dining room and kitchen area (Phase 1)
2. A new laboratory for field studies (Phase 1)
3. Four (4) new seminar rooms for lectures (Phase 1)
4. One (1) new conference room (Phase 1)
5. A new club house at the existing swimming pool (existing club-house is to be demolished) (Phase 1)
6. A number of new storerooms, staff kitchen, laundry and workshop is also proposed (Phase 1)
7. New Sewerage Package Plant (Phase 1) – currently the Wits Rural Facility uses septic tanks, which have been in use since the camp was established in the 1970's. The proposed sewerage package plant will replace all the existing septic tanks in use.
8. Fifty-four (54) new accommodation units to be developed in 2 phases. Twelve (12) accommodation units to be established in Phase 1 and the remainder in Phase 2.

### **3. OWNER OF WITS RURAL FACILITY**

**University of the Witwatersrand – Johannesburg**

The property owner is ultimately responsible for:

- Commissioning the preparation, implementation and monitoring of the EMPr.
- Ensuring that the EMPr is submitted for approval with the Environmental Impact Assessment and that approval in the form of a Environmental Authorization is given before development begins.
- Appointing the Environmental Control Officer (ECO).
- Ensuring compliance by all parties and the imposition of penalties for non-compliance through the ECO.
- Appointment of an Internal Environmental Officer (IEO)
- Bearing the costs of development and implementation.
- Implementing corrective action where required
- After the development has been completed and individual buyers take ownership, the above responsibilities devolve to the property owners association or other appropriate organisation.

### **4. ENVIRONMENTAL CONSULTANT**

**SEATON THOMSON AND ASSOCIATES**

The consultant is responsible for:

- Preparing the EMPr.
- Facilitating its submission to the Authority for an Environmental Authorization.
- The consultant is *not* responsible for the implementation or the monitoring of the EMPr unless expressly commissioned to do so.

Seaton Thomson and Associates have ±30 years experience in town, regional and environmental planning. This includes environmental impact assessment and environmental management. The Company has undertaken numerous EIA and BA applications for authorisation under both the Environment Conservation Act (Act 73 of 1989) and the National Environmental Management Act (NEMA)(as amended) (Act 107 of 1998) in all Provinces in South Africa, including diverse land use development applications, various types of bulk and service infrastructure, filling stations and game WRFs in conservation areas.

## **5. AUTHORITIES**

**LIMPOPO DEPARTMENT OF ECONOMIC DEVELOPMENT, ENVIRONMENT AND TOURISM (LEDET) and NATIONAL DEPARTMENT OF ENVIRONMENTAL AFFAIRS (DEA)**

The Authority is responsible for:

- Appraising the EMPr in the light of the Basic Assessment Report findings and other relevant information.
- Calling for modifications, extensions or further information if required.
- Issuing an Environmental Authorization on the Basic Assessment Report, which includes approval (or otherwise) of the EMPr.

## **6. ENVIRONMENTAL CONTROL OFFICER (ECO)**

### **TO BE APPOINTED**

The ECO is appointed by the developer and is responsible for:

- Implementing all aspects of the EMPr.
- Monitoring and verifying compliance with the EMPr by contractors, sub-contractors, agents, property owners and any other parties concerned with the development.
- Being fully familiar with relevant legislation and regulations.
- Providing guidance and assistance to all participants in implementing and complying with the EMPr.
- Keeping a permanent, written and photographic record of activities, instances of non-compliance.
- Implementing corrective action with regard to the EMPr and imposing appropriate penalties for non-compliance as authorised by the owner/developer.

## **7. CONTRACTORS AND SERVICE PROVIDERS**

All contractors, sub-contractors and service providers are responsible for:

- Incorporating the EMPr into their contracts and signing agreements to comply with its conditions.
- Submitting an obligatory Methods Statement for approval by the ECO before any work is undertaken.
- Adhering to any instructions issued by the ECO.

## **8. INTERNAL ENVIRONMENTAL OFFICER (IEO)**

WRF must appoint an Internal Environmental Officer (IEO), a employee of WRF, who will be responsible for monitoring, reviewing and verifying compliance with the EMPr on a day-to-day basis while construction is underway, and while the WRF is in operation. This role may be fulfilled by any suitably qualified and responsible representative involved with daily on-site operations.

## **9. LEGISLATION**

Management of the development during both the construction and the operational stages is subject to a suite of environmental law. Compliance with this legislation is an integral aspect of the EMPr. Examples of the some of the relevant legislation:

National Environmental Management Act 107 of 1998 (as amended)  
National Heritage Resources Act (Act No. 25 Of 1999)  
National Parks Act (Act 57 of 1976)  
National Environmental Management: Biodiversity Act (Act 10 of 2004)  
National Environmental Management: Protected Areas Act (Act 57 of 2003)  
Conservation of Agricultural Resources Act (Act 43 of 1983)  
National Water Act 36 of 1998  
Atmospheric Pollution Prevention Act 45 of 1965  
Local Government Municipal Structures Act 117 of 1998  
Hazardous Substances Act 85 of 1993  
Fire Services Act 99 of 1956  
Occupational Health and Safety Act 85 of 1993  
Environmental Planning Act (Act No. 88 of 1967)  
Forest and Veld Conservation Act (Act No. 13 of 1941)  
Land Survey Act (Act No. 9 of 1921)  
Minerals and Petroleum Resources Development Act (Act No. 28 Of 2002)  
Soil Conservation Act (Act No. 76 of 1969)  
Water Services Act (Act 108 of 1997)  
Relevant building codes (e.g. SABS 089)  
Provincial and Local Government Ordinances and Bylaws  
Regional Development Frameworks  
Land Use Planning Policies.

## **10. EMP UPDATE**

This EMPr must be updated upon:

- receipt of an Environmental Authorization (EA), and/or
- issues of any relevant environmental permit, licence, or authorisation with respect to the project

## 11. PLANNING, DESIGN AND PRE-CONSTRUCTION PHASE

Aspect/ activity	Impacts	Management and mitigation	Responsibility	Frequency
All planning and design aspects of the WRF expansion	None	<p>Planning and design of all elements of the application to be in accordance with acceptable and approved standards as required by the relevant authorities.</p> <p>Planning and design to take cognisance of localised conditions and circumstances, particularly in terms of control of building operations, appropriate approved and registered contractors, access to the site, source of labour and transportation.</p>	Project planning team	Throughput planning phases, before construction commences
Contractual Issues	None	<p>The appointed contractors will be contractually bound to these conditions as well as the provisions of the proposed EMPr.</p> <p>The appointed contractors will undertake an induction process with all staff and workers on site and issue a written schedule of rules and work conditions specific to the site</p>	Project planning team and contractor	As required
Site Establishment and site infrastructure	Disturbance and possible degradation of bushveld areas and wildlife	<p>The contractor and/ or WRF must provide for the following:</p> <ol style="list-style-type: none"> <li>1. An area to set up a temporary construction camp and laydown area at least 100m from any riparian habitat or river frontage. The site camp is to be fenced off to ensure that encroachment into the surrounding natural area is avoided. The contractor and sub-contractors will utilise this designated area which is to include ablution facilities, location of waste containers, fuel storage areas, laydown areas etc</li> <li>2. Adequate ablution facilities for all construction personal at least 100m from any riparian habitat or river frontage. Abluting anywhere other than in the toilets provided is strictly forbidden.</li> <li>3. Provide clean drinking water to all construction staff</li> <li>4. Provide refuse bins in the construction camp as well as on the construction site</li> <li>5. All roads and accesses to the various construction sites must be maintained. Vehicles may not leave the designated roads, tracks and/or turnaround points at any time</li> </ol>	Project planning team and developer	Before actual construction commences on the site
Demarcation of the various work sites	Disturbance and possible degradation	<ul style="list-style-type: none"> <li>• The Contractors shall demarcate the boundaries of entire work site with a temporary fence and shade cloth; in order to</li> </ul>	Contractor and developer	Before commencement

## 11. PLANNING, DESIGN AND PRE-CONSTRUCTION PHASE

Aspect/ activity	Impacts	Management and mitigation	Responsibility	Frequency
within the larger WRF Main camp boundary	of bushveld areas and wildlife	<p>restrict their construction activities to within the site.</p> <ul style="list-style-type: none"> <li>The demarcation must be in the form of green, brown and/or camouflage hessian or shade cloth to limit visual disturbance to wildlife</li> <li>Maintain site demarcations in position until the completion of all construction works.</li> </ul>		of construction
Sensitive Areas	Disturbance and possible degradation of bushveld areas and wildlife	All areas which are not part of the direct working sites are considered to be sensitive, as the area is a Reserve/ game farm. All areas except those demarcated as work areas as above are strictly out of bounds.	All	Fore entire construction period
Topsoil conservation	Loss of topsoil	Any topsoil which is to be stripped must be stockpiled for use during rehabilitation and landscaping.	Contractor	Before construction
Erosion Control	Loss of soils into non-perennial watercourse	The Contractors shall take all reasonable measures to ensure that erosion does not occur as a result of any construction related activities.	Contractors	As required
Record of environmental incidents	Possible non-compliance	<ul style="list-style-type: none"> <li>All incidents should be thoroughly investigated and recorded</li> <li>document all environmental incidents in the required manner</li> <li>recorded environmental incidents are to be reported to the project site agent immediately, and within 24 hours to independent environmental control officer</li> </ul>	Contractors and ECO	As required
Legal compliance	Non-compliance	All relevant legislation must be adhered to before construction commences. The environmental authorisation as well as any licences or permits must be in place before construction commences, and any recommendations contained in these permits, licences and/or authorizations must be incorporated into the project design	Project Manager and contractor	As required
Identification & marking of trees to protect	Potential impact on significant or protected trees within the development	<ul style="list-style-type: none"> <li>The landscape architect and ECO are to clearly mark the trees that are to be protected and retained.</li> <li>These are to be pointed out to the ECO and the contractor</li> </ul>	Landscape Architect, ECO, contractor	Once off before any onsite works commence



## 12. CONSTRUCTION PHASE

Aspect/ activity	Impacts	Management and mitigation	Responsibility	Frequency
Monitoring and reporting	Compliance with the EMPr and Environmental Authorisation.	<ul style="list-style-type: none"> <li>Monitor site activities and compliance with EMPr.</li> <li>Identify, propose, monitor and sign off on the implementation of rectification measures</li> </ul>	ECO or IEO	Monitor daily. Full report back monthly.
Environmental Incidents	Environmental incident during the construction phase	The IEO and ECO must immediately be informed should any serious incident occur which is likely to have detrimental effects on the environment. A record of these incidents must be kept.	Contractor, IEO and ECO	As required
Demolition of existing buildings	Waste generation Dumping of demolition materials	<ul style="list-style-type: none"> <li>Appropriate, clean building material can be used for fill material if agreed with the engineers. Typical fill items include inside of the gabions, the septic tanks, crushed for use under the building platforms.</li> <li>No contaminated materials are to be used as fill or dumped on site in any areas.</li> <li>ECO is to undertake inspections of all fill areas as and when filling occurs to ensure compliance.</li> <li>Pavers can be re-used for the new pathways and are therefore to be stockpiled in the appropriate manner and in a location agreed with the ECO.</li> </ul>	Engineers, ECO & contractor	AS required and at all times during any demolition works
Traffic	Degradation to roads within WRF Farm	<ul style="list-style-type: none"> <li>Damping down of un-surfaced roads used regularly by construction vehicles near staff housing and other camps within WRF farm.</li> <li>Construction traffic vehicles and worker-related traffic shall be routed to minimise disturbances to WRF staff and wildlife</li> </ul>	Contractor	Daily
Maintenance of vehicles and equipment	Oil, diesel, petrol leaks	<ul style="list-style-type: none"> <li>Regularly check vehicles, machinery and equipment operating on site to ensure that none have leaks or cause spills of oil, diesel, grease or hydraulic fluid.</li> <li>No vehicles, machinery or equipment with leaks or causing spills may be allowed to operate on the construction site. These must be sent to the maintenance yard or workshop for repair, or must be removed from site</li> </ul>	Contractor	Daily
Fuel storage and dispensing	Potential ground water contamination	<ul style="list-style-type: none"> <li>The volume of fuel that is to be stored is to be as minimal as possible.</li> <li>All legal compliance in terms of fuel storage and handling are to be met. All fire safety regulations are to be adhered to.</li> </ul>	Contractor, ECO	Check daily

## 12. CONSTRUCTION PHASE

Aspect/ activity	Impacts	Management and mitigation	Responsibility	Frequency
		<ul style="list-style-type: none"> <li>Fuel storage should be surrounded by adequate bund walls (110% capacity of fuel stored) and provided with an impervious surface to contain the full volume of fuel stored in the tank.</li> <li>The area outside the containment should either be concrete or crusher so that spills can be easily and appropriately cleaned up.</li> <li>Ensure that there is a spill plan and trained staff to deal with spillages if a substantial amount of fuel is spilled.</li> <li>All vehicles should be in good working order and leaks such as oil and fuel should be repaired immediately.</li> </ul>		
Cultural, Historical and Archaeological Features	Loss of any potential Cultural, Historic and Archaeological Features	<ul style="list-style-type: none"> <li>Any archaeological sites exposed during construction must not be disturbed during or after the construction period prior to authorisation from SAHRA. The removal, exhuming, destruction, altering or any other disturbance of heritage sites must be authorised by SAHRA in terms of the National Heritage Resources Act (No 25 of 1999)</li> <li>Should any unusual features, artefacts, graves etc be discovered on the site during excavation and construction, this must be brought to the immediate attention of the Contractor / Project Manager/ IEO and ECO</li> </ul>	Contractor and project Manager	As required
Noise	Nuisance from excessive noise associated with construction	<ul style="list-style-type: none"> <li>Keep any WRF guests informed of unusually noisy activities.</li> <li>Noise suppression measures can be applied to all equipment. Equipment must be kept in good working order, and where appropriate fitted with silencers which are to be kept in good working order.</li> </ul>	Contractor and WRF management	As required
Soils	Changes to Soil Structure as a Result of Disturbance Loss of topsoil due to erosion	<ul style="list-style-type: none"> <li>No soil stripping shall take place on areas within the sites that the contractors do not require for services or structures</li> <li>All good topsoil exposed will be stockpiled for use in rehabilitation and landscaping. Stockpiles must be on already disturbed areas (i.e. NOT in natural veld areas)</li> <li>All cement or mortar mixing shall be done in already impacted areas, and on trays or sealed areas, to prevent soil contamination</li> </ul>	Contractor	Check daily

## 12. CONSTRUCTION PHASE

Aspect/ activity	Impacts	Management and mitigation	Responsibility	Frequency
Ground water pollution	Potential for decrease in groundwater quality and quantity	<ul style="list-style-type: none"> <li>All cement or mortar mixing shall be done in already impacted areas, and on trays or sealed areas, to prevent any water pollution. All excess cement must be disposed of outside of the WRF Farm, at a registered land fill site that accepts discard cement.</li> <li>Any hazardous substances (i.e. diesel or oil) that are spilled must be contained and removed immediately.</li> <li>All hazardous storage vessels must be designed and managed in order to prevent pollution. All vessels to be bunded.</li> <li>The main contractor will be responsible for ensuring that used oils/lubricants are not disposed of on/near the site or in the WRF Farm, and that contractors purchasing these materials understand the liability under which they must operate</li> </ul>	ECO and Contractor	Daily
Surface water pollution	Potential for decrease in surface water quality and/ or quantity	<ul style="list-style-type: none"> <li>No construction activities or construction personnel will be allowed in the dry river bed bordering the main camp.</li> <li>A temporary fence (at least 2 meters high) must be constructed along the riparian edge to prevent any movement into the dry river bed or in to the riparian vegetation</li> <li>The entire work site must be managed in order to prevent pollution of nearby drainage systems, due to suspended solids, silt or chemical pollutants.</li> <li>All cement or mortar mixing shall be done in already impacted areas, and on trays or sealed areas, to prevent any water pollution. All excess cement must be disposed of outside of the WRF Farm, at a registered land fill site that accepts discard cement.</li> </ul>	Contractor and ECO	Daily
Air pollution due to dust and odours	Air pollution due to dust, odours or fire	<ul style="list-style-type: none"> <li>The Contractors will dampen exposed soil surfaces with a water bowser or sprinklers, as necessary to minimise dust problems.</li> <li>The Contractors will commence rehabilitation of exposed soil surfaces as soon as practical after completion of construction</li> <li>Cooking will only be permitted at a designated area and the establishment of open fires will strictly prohibited</li> </ul>	Contractor	Daily
Security and protection to site visitors	Crime; as well as other security risks	<ul style="list-style-type: none"> <li>The entire work site must be demarcated by means of a temporary fence, covered in green, brown and/or camouflage</li> </ul>	Contractor and developer	Daily

## 12. CONSTRUCTION PHASE

Aspect/ activity	Impacts	Management and mitigation	Responsibility	Frequency
	relating to wildlife.  Injury to visitors to the site	hessian or shade cloth material to limit any security issues that may arise from wildlife encounters <ul style="list-style-type: none"> <li>• No construction personnel will be allowed outside of the construction camp or work site under any circumstances</li> <li>• All contractor' staff as well of that of the sub-contractors are to be clearly identifiable by means of hard hats and reflective jackets</li> <li>• All visitors are to report to the site office on arrival and undertake a short induction.</li> </ul>		
Waste management	Littering, contaminated water runoff, hazardous spills	<ul style="list-style-type: none"> <li>• All waste streams (general, solid, liquid, hazardous etc...) must be disposed of adequately by the contractor. This disposal must be at a registered landfill site not inside the WRF Farm.</li> <li>• Provide general waste bins at all work sites and enforce the use of these by all construction personnel. Litter bins must be equipped with a closing mechanism to prevent their contents from blowing out or being overturned by wildlife</li> <li>• Immediately clean any accidental oil or fuel spills or leakages, and clean up and dispose of all general or non-hazardous construction related waste immediately.</li> <li>• All waste is to be transported in trucks covered by tarpaulins to ensure no loss of rubbish during transportation.</li> </ul>	Contractor – ECO to inspect	Daily
Visual	Negative visual impact of construction activities to guests and wildlife	<ul style="list-style-type: none"> <li>• All work sites must be demarcated in the form of a temporary fence, covered in green, brown and/or camouflage hessian or shade cloth material to limit any visual disturbance to WRF guests or wildlife</li> <li>• Any litter or other waste must be cleared on an on-going basis and placed in bins provided at each work site</li> </ul>	Contractor	Daily
Fire	Destruction of bushveld and existing WRF structures	<ul style="list-style-type: none"> <li>• The Contractors shall take all the necessary precautions to ensure that fires are not started as a result of activities on site</li> <li>• No open fires for heating or cooking shall be permitted on any of the work sites. Closed fires or stoves shall only be permitted at agreed designated safe sites in the construction camp.</li> <li>• The necessary fire fighting equipment shall be maintained on site to deal with any fire incidents</li> </ul>	Contractor	Daily

## 12. CONSTRUCTION PHASE

Aspect/ activity	Impacts	Management and mitigation	Responsibility	Frequency
		<ul style="list-style-type: none"> <li>Ensure that workers on site know the proper procedure in the incidence of fire on site.</li> <li>Smoking on site is not permissible outside of the construction camp</li> </ul>		
Septic tanks	Spillage while emptying	<ul style="list-style-type: none"> <li>All septic tanks are to be emptied (liquid and solid waste) by a suitably qualified and experienced operator (Honey sucker or similar)</li> <li>Full all septic tanks in with appropriate demolition material.</li> <li>Emptying and filling of septic tanks is to be photographed and recorded by ECO</li> </ul>	Contractor/ ECO	Once off, when scheduled
Vegetation (flora)	Reduction of biodiversity/ loss of flora as a result of the WRF expansion	<ul style="list-style-type: none"> <li>All identified and marked trees are to remain in place and not be cut down</li> <li>Only those few trees and bushes identified to be cut down can be cut down</li> <li>No protected trees are to be removed, defaced or impacted upon what-so-ever.</li> <li>No clearing or removal of vegetation shall occur beyond the existing development footprint</li> <li>Any indigenous vegetation damaged or removed <i>unnecessarily</i> during the construction phase must be replaced with the same species in the same position</li> <li>No plant material may be collected for any reason including firewood, fruit or crops.</li> <li>No plant collecting for medicinal or other purposes to occur on the site</li> </ul>	Contractor and ECO	Monitor continuously
Wildlife (fauna)	Disturbance to natural wildlife and/or loss of natural wildlife	<ul style="list-style-type: none"> <li>Construction workers may under no circumstances interfere with the fauna for the purposes of obtaining food or otherwise</li> <li>Ensure that the Work Site is kept clean, tidy and free of rubbish that would attract animals</li> <li>No birds or animals may be hunted by any means including snares or traps.</li> <li>Trenches or any other open excavations must be inspected each morning to ensure that no fauna is trapped.</li> </ul>	Contractor and ECO	Monitor continuously
Alien invasive plants	Emergence of	<ul style="list-style-type: none"> <li>All invasive weeds and exotic plants on the various work sites</li> </ul>	Contractor, ECO	Daily

## 12. CONSTRUCTION PHASE

Aspect/ activity	Impacts	Management and mitigation	Responsibility	Frequency
and weeds	Invasive Weeds to the Detriment of Indigenous Plants	are to identified and removed during the construction phase of the project	and flora specialist	
Socio-economic (positive)	Positive economic upliftment of local communities surrounding WRF Farm	<ul style="list-style-type: none"> <li>• The labour force should largely be recruited from the local communities, where ever possible, including skilled and semi-skilled positions</li> <li>• In order to facilitate training and education, it is recommended that the contractors, where possible, recruits its Employees from previously disadvantaged groups and from adjoining low income areas, and not only will they fill certain posts, but for those posts that they are inexperienced in, a mentorship process should be initiated.</li> </ul>	Contractor and developer	Continuous

## 13. POST-CONSTRUCTION REHABILITATION PHASE

Aspect/ activity	Impacts	Management and mitigation	Responsibility	Frequency
Site clean-up		Clear and completely remove from site all construction plant, equipment, storage containers, temporary fencing, temporary services, fixtures, waste and any other temporary construction works	Contractor and developer	Once off after construction
Rehabilitation		<ul style="list-style-type: none"> <li>• The principle of progressive reinstatement must be followed wherever possible. This includes the reinstatement of disturbed areas on an ongoing basis, immediately after the specified construction activities for that area are concluded</li> <li>• All topsoil removed for any reason during construction must be used for landscaping or to rehabilitate any areas scarred by construction works</li> <li>• Grass and shrubs should be planted in areas which are devoid of vegetation</li> <li>• Focussed watering may be required to encourage regrowth of grasses and shrubs in disturbed areas</li> </ul>	Contractor, developer and ECO	Directly after construction, until such time as the ECO is satisfied with the rehabilitation

## 14. OPERATIONAL PHASE

Aspect/ activity	Impacts	Management and mitigation	Responsibility	Frequency
Legal requirements	Non-compliance	<ul style="list-style-type: none"> <li>The EMPr must be updated on a periodic basis to ensure that environmental legal requirements for the operational phase are adhered to.</li> <li>An on-site safety plan must be available and all staff must be trained in the appropriate emergency procedures.</li> </ul>	Contractor and WRF management	Continuous
Artificial lighting	Impacts to nocturnal animals	<ul style="list-style-type: none"> <li>Artificial lighting must be restricted to areas strictly requiring lighting.</li> <li>Only vertical lighting should be allowed, and not horizontal lighting.</li> <li>Where lighting is required for safety or security reasons, this should be targeted at the areas requiring attention.</li> <li>Low energy bulbs/ energy saving LED lamps should be used as they do not attract as many invertebrates (insects) at night and will not disturb the existing wildlife.</li> </ul>	Developer and WRF management	Continuous
Vegetation management	Loss of vegetation	Continued establishment and management of indigenous vegetation and removal and control of alien vegetation should continue for the entire operational phase.	WRF management	Continuous
Sewerage and waste	Spills or broken pipes	<ul style="list-style-type: none"> <li>All spillages or broken pipes are to be attended to immediately to avoid environmental contamination</li> <li>All pipes and sewerage package plant must be maintained in good working order</li> <li>The Sewerage package plant is to be checked on a daily basis</li> </ul>	WRF management	Continuous
Socio-economic (positive)	Positive economic upliftment of local communities surrounding WRF Farm	<ul style="list-style-type: none"> <li>The staff sourced to work as both skilled and semi-skilled workers should largely be recruited from the local communities, where ever possible</li> <li>In order to facilitate training and education, it is recommended that the WRF , were possible, recruits its Employees from previously disadvantaged groups and from adjoining low income areas to the WRF Farm, and not only will they fill certain posts, but for those posts that they are inexperienced in, a mentorship process should be initiated.</li> </ul>	Developer and WRF management	Continuous
Environmental incidents	Negative impact on all fauna, flora and other wildlife	<ul style="list-style-type: none"> <li>The WRF manager (or similar) must be informed of serious incidents immediately upon occurrence of the incident.</li> <li>WRF will be responsible for rehabilitating any damaged caused to the environment due to any event occurring on site</li> </ul>	Maintenance staff and WRF management	As required

## 15. DECOMMISSIONING PHASE

Aspect/ activity	Impacts	Management and mitigation	Responsibility	Frequency
Permanent closure and decommissioning	N/A	This activity will not be decommissioned. This project has an extended lifespan period, and it is determined that decommissioning of the project will never happen. Due to this, no possible mitigation can at this stage be tabled, due to many environmental changes that will take place over time, which will subsequently render any mitigation discussed, void.	N/A	N/A

## 16. REFERENCES

DEPARTMENT OF WATER AFFAIRS AND FORESTRY, FEBRUARY 2005 Environmental Best Practice Specifications: Construction Integrated Environmental Management Sub-Series No. IEMS 1.6. Third Edition. Pretoria.