WILD TOMORROW FUND

Proposed Construction of a Donor House & Associated Infrastructure, Greater Ukuwela Nature Reserve, Hluhluwe

Draft Environmental Management Programme

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Client:	Wild Tomorrow Fund

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PROPOSED CONSTRUCTION OF A DONOR HOUSE AND ASSOCIATED INFRASTRUCTURE AT THE GREATER UKUWELA NATURE RESERVE, HLUHLUWE

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

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LIST OF TERMS USED

Construction Phase:
The activities pertaining to the preparation for and the physical construction of the proposed development.

Contractor (C):
Persons/organisations contracted by the Developer to carry out parts of the work for the planned development. This includes the main contractor engaged and any additional sub-contractors appointed for the project.

Developer (DEV):
The Developer is Wild Tomorrow Fund

Engineer (E):
Person/organisation appointed by the Client to oversee the work of all consultants, sub-developers, contractors, residents and visitors.

Environment:
The environment is defined in terms of the National Environmental Management Act, No 107 of 1998, as the surroundings within which humans exist and that are made up of – the land, water and atmosphere of the earth; micro-organisms, plant and animal life; any part or combination of (i) and (ii) and the interrelationships among and between them; and the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Compliance Officer (ECO):
Person/organisation appointed by the Developer who will provide direction to the Engineer concerning the activities within the Construction Zone, and who will be responsible for conducting the environmental audits of the project during the construction phase of the project according to the provisions of the Environmental Management Programme (EMPr).

Environmental Management Programme (EMPr):
The EMPr is a detailed plan for the implementation of the mitigation measures to minimise negative environmental impacts during the life-cycle of a project. The EMPr contributes to the preparation of the contract documentation by developing clauses to which the contractor must adhere for the protection of the environment. The EMPr specifies how the construction of the project is to be carried out and includes the actions required for the Post-Construction Phase to ensure that all the environmental impacts are managed for the duration of the project's life-cycle.

Neighbours:
Considered to be the properties adjoining the proposed site.

Operational Phase (Post Construction):
The period following the Construction Phase, during which the proposed development will be operational.

Pre-Construction Phase:
The period prior to commencement of the Construction Phase, during which various activities associated with the preparation for the Construction Phase will be undertaken.

Site Preparation:
This entails vegetation clearance or disturbance of ground to allow for construction to take place or material required for construction to be stored on site. Site preparation forms part of the construction phase. It excludes continued farming in the interim in an environmentally appropriate manner.

Rehabilitation:
Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re-vegetation of a disturbed area and the insurance of a stable land surface. Re-vegetation must aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

Site Manager:
The person, representing the Contractor, responsible for all the Contractor's activities on the site including supervision of the construction staff and activities associated with the Construction Phase. The Site Manager will liaise with the Principal Agent in order to ensure that the project is conducted in accordance with the EMPr.

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1. INTRODUCTION AND BACKGROUND

Wild Tomorrow Fund are proposing the construction of a donor house and associated infrastructure on the Greater Ukuwela Nature Reserve near Hluhluwe, KwaZulu-Natal Province. The Greater Ukuwela Nature Reserve has been registered as an Ezemvelo KZN Biodiversity Stewardship Site and as such is proclaimed as a Protected Area as defined within the National Environmental Management: Protected Areas Act of 2003 (NEMPAA), as amended.

The proposed development is to include the following components:

- Donor House with associated Decking, Terraces, Landscaping and Walkways;
- Managers House;
- Reserve Office and FreeMe Complex;
- Tented Camp; and
- Various internal access roads.

In terms of infrastructure requirements, the following is proposed:

- Potable water provision will be via a municipal source;
- On site sewer treatment will be required (Septic Tank and Soakaway System); and
- Electrical supply will municipal and via small solar plant.

SiVEST SA (Pty) Ltd has been appointed by the Wild Tomorrow Fund to undertake the Environmental Services for the proposed project, in line with the National Environmental Management Act, 1998 (Act 107 of 1998) and to compile an Environmental Management Programme (EMPr) as part of this process.

This EMPr provides a set of guidelines for the environmental management of all works executed by the Developer, Engineer, Contractor and Sub-contractor/s to have a minimum impact on the environment in accordance with all relevant legislation, policies and standards. In this context, it should be viewed as a dynamic or “living” document which may require updating or revision during the life-cycle of the development to address new circumstances as the need arises. It is essentially, a written plan of how the environment is to be managed in practical and achievable terms. The EMPr shall be deemed to have contractual standing on the developer and contractors onsite.

The effectiveness of the EMPr is limited by the level of adherence to the conditions set forth in this report by the Developer and the Contractor and Sub-contractors. It is further assumed that

compliance with the EMPr will be monitored and audited on a regular basis as set out in the EMPr and contractual clauses.

1.1 Content Requirements for an Environmental Management Programme (EMPr)

The content requirements for an EMPr (as provided in Appendix 4 of the EIA Regulations 2014, as amended), as well as details of which section of the report fulfils these requirements, are shown in **Table 1** below.

Table 1: Content requirements for a EMPr

2014 EIA Regulations, as amended.	Requirements for EMPrs	Location in this EMPr
Appendix 4, Section 1. (1)	An EMPr must comply with section 24N of the Act and include -	Refer to relevant reference sections below
Appendix 4, Section 1 (a)	Details of –	
	(i) The EAP who prepared the EMPr; and	Section 3
	(ii) The expertise of that EAP to prepare an EMPr, including a curriculum vitae.	Section 3
Appendix 1, Section 3 (b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 4
Appendix 4, Section 1 (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;	Section 4.1
Appendix 4, Section 1 (d)	a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including— (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Section 10
Appendix 4, Section 3 (f)	a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to — (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Section 10
Appendix 4, Section 3 (g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 10

2014 EIA Regulations, as amended.	Requirements for EMPrs	Location in this EMPr
Appendix 4, Section 3 (h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 10
Appendix 4, Section 3 (i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 10
Appendix 4, Section 3 (j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 10
Appendix 4, Section 3 (k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 10
Appendix 4, Section 3 (l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 10
Appendix 4, Section 3 (m)	an environmental awareness plan describing the manner in which— (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 12
Appendix 4, Section 3 (n)	any specific information that may be required by the competent authority.	Section 8.3 and 11
Appendix 4 Section 2	Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	Not Applicable

2. DETAILS OF THE APPLICANT

2.1 Name and contact details of the Applicant

Table 2: Name and contact details of the applicant

Business Name of Applicant	Wild Tomorrow Fund South Africa
Physical Address	Ukuwela Nature Reserve The Farm Pineapple 16074 Hluhluwe 3960
Postal Address	PO Box 74085 Lynnwood Ridge
Postal Code	0040
Telephone	+27 083 379 2923
Fax	-
Email	greg@wildtomorrowfund.org

3. DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

3.1 Name and contact details of the Environmental Consultants

Table 3: Name and contact details of the environmental consultants who prepared the report

Business Name of EAP	SiVEST SA (PTY) Ltd
Physical Address	4 Pencarrow Crescent, La Lucia Ridge Office Estate
Postal Address	PO Box 1899, Umhlanga Rocks
Postal Code	4320
Telephone	031 581 1500
Fax	031 566 2371
Email	katherinew@sivest.co.za

3.2 Names and expertise of representatives of the EAP

Table 4: Names and details of the expertise of each representative of the EAP involved in the preparation of this report

Name of representative of the EAP	Educational Qualifications	Professional Affiliations	Experience (years)
Michelle Nevette	MEnvMgt. (Environmental Management) Cert. Sci.Nat[1]. Registration No. 120356	IAIASa[2], EAPASA[3] Registration No. 2019/1560	19
Katherine Wiles	Bachelor of Science Honours (Geography and Environmental Management) Cert. Sci.Nat. Registration No. 300205/15	IAIAsa	11
Siphiwokuhle Buthelezi	Bachelor of Social Science (Honours) (Geography and Environmental Management)	-	1

CV's of SiVEST personnel is attached in **Appendix A.**

3.3 Names and expertise of the specialists

Table 5: Names and expertise of specialists

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
SiVEST SA (Pty) Ltd	Mark Summers	Vegetation Assessment	MSC Ecological Science Pr.Sci.Nat	5

[1] Certificated Natural Scientist with the South African Council for Natural and Scientific Professions (SACNASP)
[2] International Association for Impact Assessment South Africa (IAIASa)
[3] Environmental Assessment Practitioners Association South Africa (EAPASA)

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
Umlando Consulting	Gavin Anderson	Heritage Assessment	Masters of Philosophy in Archaeological/Social Psychology: 1996, UCT	24
Eco-Assist	Wayne Jackson	Agricultural and Soils Assessment	Bachelor of Science (Soil Science & Hydrology)	12
Eco-Assist	Wayne Jackson	Hydro-pedological Assessment	Bachelor of Science (Soil Science & Hydrology)	12
Dacre James Alletson	Dacre James Alletson	Wetland Aquatic Assessment	BSc, BSc (Hons)	50

4. DESCRIPTION OF THE ACTIVITY

4.1 Site Locality

The Greater Ukuwela Nature Reserve is a 1283,1 ha reserve that is situated north of Hluhluwe town in Northern KwaZulu Natal. It falls within the uMkhanyakude District Municipality and the Big Five Hlabisa Local Municipality. The reserve comprises of two disconnected portions: Ukuwela (west), which is 540.8 ha, and Mfuleni (east) which is 742.3 ha (**Figure 1** below).

The following Farms and Portions are affected by the proposed project:

- Remainder of the Farm Cloete No. 13350
- The Farm Pineapple No 16074
- Portion 12 of the Farm Cloete No. 13350RE/23/13180
- Portion 13 of the Farm Cloete No. 13350RE/23/13180
- Portion 14 of the Farm Cloete No. 13350RE/23/13180
- Portion 59 of the Farm Cloete No. 13350RE/23/13180
- Portion 37 (of 15) of Farm Msinene Estate Number 14137
- Portion 38(of 15) of Farm Msinene Estate Number 14137
- Portion 39 (of 15) of Farm Msinene Estate Number 14137

An environmental sensitivity overlay map has been provided in **Figure 2**.

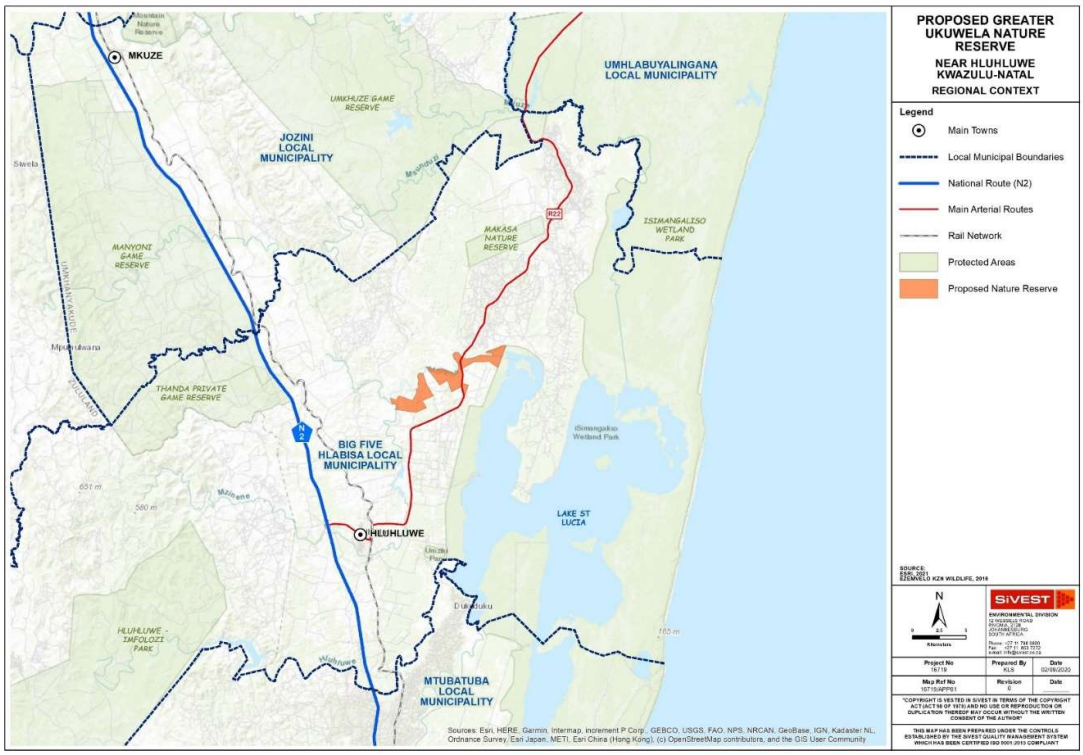

Figure 1: Site locality

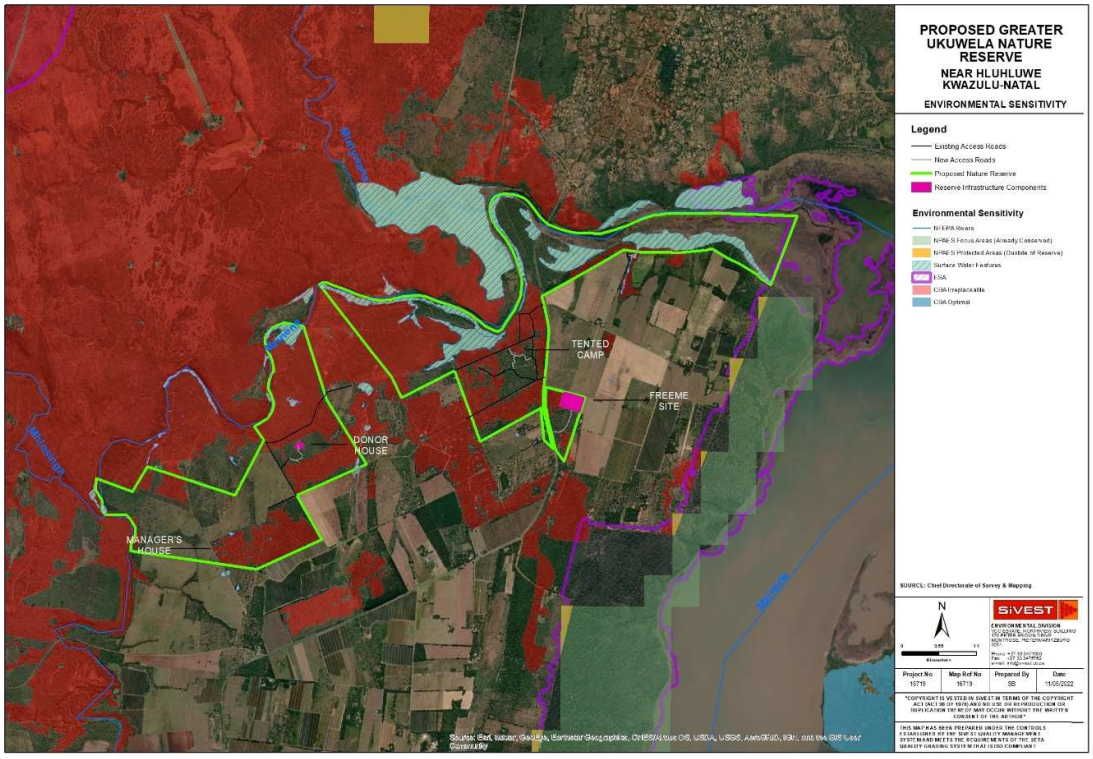

Figure 2: Environmental Sensitivity Overlay

The coordinates for the sites are as follows. A greater area has however been assessed to allow for final design amendments (if required).

Proposed Donor House:

	Latitude /Longitude	Degrees	Minutes	Seconds
Corner Point 1	**South**	27°	54’	0.22”S
	East	32°	19’	34.05”E
Corner Point 2	**South**	27°	53’	56.68”S
	East	32°	19’	37.08”E
Corner Point 3	**South**	27°	54’	0.63”S
	East	32°	19’	40.14”E
Corner Point 4	**South**	27°	54’	2.40”S
	East	32°	19’	37.69”E

Managers House:

	Latitude /Longitude	Degrees	Minutes	Seconds
Corner Point 1	**South**	27°	54’	51.10”S
	East	32°	18’	51.85”E
Corner Point 2	**South**	27°	54’	50.48”S
	East	32°	18’	52.64”E
Corner Point 3	**South**	27°	54’	51.11”S
	East	32°	18’	53.06”E
Corner Point 4	**South**	27°	54’	51.66”S
	East	32°	18’	52.23”E

Reserve Office and FreeMe Complex

	Latitude /Longitude	Degrees	Minutes	Seconds
Corner Point 1	**South**	27°	53’	31.95”S
	East	32°	22’	0.16”E
Corner Point 2	**South**	27°	53’	34.72”S
	East	32°	22’	11.50”E
Corner Point 3	**South**	27°	53’	41.95”S
	East	32°	22’	8.95”E
Corner Point 4	**South**	27°	53’	38.85”S
	East	32°	21’	57.75”E

Tented Camp

	Latitude /Longitude	Degrees	Minutes	Seconds
Building 1 (centre point)	**South**	27°	53’	12.25”S
	East	32°	21’	31.15”E
Building 2 (centre point)	**South**	27°	53’	13.83”S
	East	32°	21’	33.22”E
Tent 1	**South**	27°	53’	16.97”S
	East	32°	21’	33.07”E
Tent 2	**South**	27°	53’	15.57”S
	East	32°	21’	33.14”E
Tent 3	**South**	27°	53’	15.01”S
	East	32°	21’	34.13”E
Tent 4	**South**	27°	53’	15.23”S
	East	32°	21’	35.41”E
Tent 5	**South**	27°	53’	15.14”S
	East	32°	21’	36.66”E

Tent 6	**South**	27°	53’	14.44”S
	East	32°	21’	37.59”E
Tent 7	**South**	27°	53’	14.99”S
	East	32°	21’	38.59”E
Tent 8	**South**	27°	53’	15.99”S
	East	32°	21’	38.97”E

Various internal access roads

	Start	**Middle**	**End**
Donor House Access Road	27°54'5.35"S 32°19'31.59"E	27°54'6.05"S 32°19'36.53"E	27°54'1.42"S 32°19'36.42"E
Free Me Access Road	27°53'51.53"S 32°21'53.67"E	27°53'48.79"S 32°22'1.42"E	27°53'40.71"S 32°22'4.42"E
Tented Camp Access Road 1	27°53'21.30"S 32°21'32.96"E	27°53'14.97"S 32°21'33.30"E	27°53'10.80"S 32°21'29.99"E
Tented Camp Access Road 1	27°53'15.82"S 32°21'42.79"E	27°53'14.97"S 32°21'33.30"E	27°53'10.80"S 32°21'29.99"E

4.2 Activity Information

Portions of the Greater Ukuwela Nature Reserve have previously been commercially farmed since the 1950s; with a combination of both crop and beef production. The Mfuleni portion of the is predominantly primary vegetation (wetland habitat), with small patches that were utilised for farming. The entire area is now currently being used for conservation and ecotourism ventures; therefore, the area is in the process of being rehabilitated.

The existing infrastructure found within the Greater Ukuwela Nature Reserve is therefore primarily related to the continued management of the reserve, the operation of ecotourism ventures and residential purposes and includes the following (not limited to):

- A perimeter fence and access gates. The permitter fence is 1.8m heavy galvanized, electrified Veldspan or Bonnox game fence. The electrics are run off solar power;
- An internal road network (access to the sites and internal management tracks/game viewing tracks);
- Anti-poaching camps; and
- Residential houses.

Wild Tomorrow Fund are proposing the construction of a donor house, management house, tented camp, associated small gravel access roads and in conjunction with FreeMe, a rehabilitation facility.

- The Donor house site is approximately 1.57 hectares in extent (15 709 m^2)
- The FreeMe site is approximately 7.4 hectares in extent (74 000 m^2)
- The Manager’s house is approximately 0.1 hectares (61m^2)
- Tented Camp:
    - Building 1: approximately 114m^2
    - Building 2: approximately: 1200m^2
    - Approximate size of tents: 60 – 80m^2

Note the entire sites mentioned above will not be cleared.

Further details of the proposed bulk infrastructure to support the donor house, tented camp and FreeMe facility is elaborated on below.

4.2.1 Roads

Various internal access roads are proposed to access the various infrastructure proposed. There are existing registered access roads to all the properties within the Greater Ukuwela Nature Reserve and internal game viewing tracks etc.

There are no new additional roads proposed other than the ones provided to access the donor house and the tented camp.

4.2.2 Water

A water pipeline runs through the Ukuwela Nature Reserve (Farm Pineapple 16074) to Mun-Ya-Wana Conservancy; however, this is not a registered servitude.

Potable water will be sourced by connecting the various developments to the main municipal line. These will be small PVC pipelines with a 50m diameter The length of the water pipelines is as follows:

- Donor house: approx. 950 m;
- Management house: approx. 50 m; and
- Tented camp: approx. 140 m.

4.2.3 Sanitation

The developer has proposed to utilise a septic tank system at the Managers house, the donor house and the tented camp. The sewage tank treats wastewater at the location rather than removing it to sewer system.

The size of the septic tanks is as follows:

- Donor house: minimum 6600 litres at minimum surface area of 4 square metres;
- Volunteer tented camp: as above; and
- Management house: minimum 3000 litres at minimum surface area of 2.5 square metres.

4.2.4 Electricity

The developer hopes to use small Solar PV Panels to provide electricity to the various development components. The output will be under the BA thresholds. The small solar plant will have a mechanical room with a battery & generator. The panels will be perched up on a steel structure with the correct orientation to the sun, not higher than the trees.

4.3 NEMA Listed Activities

The amended EIA Regulations promulgated under Section 24(5) of the National Environmental Management Act, Act 107 of 1998 and published in Government Notice No. R. 326 list activities which may not commence without environmental authorization from the Competent Authority. The proposed activity is identified in terms of Government Notice No. R. 327, 324 for activities which must follow a Basic Assessment Process. The project will trigger the following listed activities:

Table 6: Listed activities triggered in terms of NEMA

Listing Notice	Activity	Applicability
GNR 327, April 2017 (Listing Notice 1): Activity 27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	With all the areas to be cleared for the roads, donor house, tented camp and free me complex it is anticipated that more than 1 hectare will be cleared.
GNR 324, April 2017 (Listing Notice 3): Activity 6	The development of resorts, lodges, hotels, tourism or hospitality facilities that sleeps 15 people or more. d. KwaZulu-Natal … i. A protected area identified in terms of the NEMPAA; ii. Outside urban areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; … v. Biodiversity Stewardship Programme Biodiversity Agreement areas; … ix. A protected area identified in terms of NEMPAA, excluding conservancies; … xiii. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;	This listed activity will be triggered where the facilities will be utilised for hospitality or tourism purposes particularly the Tented Camp.
GNR 324, April 2017 (Listing Notice 3): Activity 12	Activity 12 The clearance of an area of 300 square metres or more of indigenous vegetation within… d. KwaZulu-Natal … iii. Biodiversity Stewardship Programme Biodiversity Agreement areas; … vii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; viii. A protected area identified in terms of NEMPAA, excluding conservancies; … xi. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;	This listed activity will be triggered as the reserve is registered as an Ezemvelo KZN Wildlife Stewardship site according to the information provided by the client. As such the transformation of more than 300m^2 of indigenous vegetation on the properties will trigger this listed activity.

5. SITE MASTER LAYOUT PLAN

The Master Layout Plan is displayed in **Appendix B.**

6. SUMMARY OF SPECIALIST FINDINGS AND RECOMMENDATIONS

Table 7: Summary of specialist findings and recommendations

Specialist Study	Findings	Recommendations
Soils, Land Capability and Land Use Specialist Assessment	The sensitivity analysis identified the project area to have a Medium to High sensitivity and as such an Agro-Ecosystem Assessment was required. The results show that none of the development sites are within any crop boundaries. The remaining area ranges from Medium to High sensitivity. The Managers house and the Free Me site are within a High sensitivity area. The Donor house and the Tented camp site are within a Medium sensitivity area. The High sensitivity ratings of the managers house and the Free Me sites were verified as High. The Medium sensitivity areas (Tented camp and Donor house) have been verified as medium, based on the slope of these sites. The sandy nature of the soil at the tented camp is also a limiting factor. The impact assessment has determined that the activities are rated as a Low impact on agricultural resources. This is largely due to the following aspects; • The sites are not located on any existing or previously utilised agricultural land; • The sites are not fragmenting agricultural resources; • The development will be sparsely utilised as and secondary impacts are unlikely; • The size of the development sites are small in nature and do not pose a significant impact on the overall agricultural importance of the region; and • The sites are located within a protected nature reserve and it is not proposed to change the current land use to agriculture.	The following recommendations are made; • Green engineering methods be implemented to retain some soil structure in the development area; and • The proposed mitigation measures are to be followed to prevent unnecessary loss to soil resources.
Hydropedological Impact Assessment	The Ukuwela development will have a Low impact on the flow drivers and wetlands within the project area. The impacts to the flow drivers include the increased runoff from the development upslope within the recharge zone and interflow zones. These stem from the increased impervious surfaces which promote runoff from the impervious surfaces. It is the opinion of the Specialist that the proposed development may proceed, this is based on the proposed recommendations.	The following recommendations have been made to minimise threats to sensitive receptors (sub-surface flow paths) and wetland functioning; • Green engineering structures should be considered to improve infiltration into the vadose zones;

Specialist Study	Findings	Recommendations
		• It is recommended that an alien invasive management programme is implemented; and • Buffer zones are to be kept intact.
Heritage Impact Assessment	A HIA was undertaken for the proposed four developments at Ukuwela Game Reserve. There will be four built structures with access tracks located at different parts on the Game Reserve. Two of the structures have no heritage sites. The tented camp has isolated artefacts that originate further up the hill. The Donor's House has artefacts in a secondary context, while part of the track passes areas of high artefact concentration. It is not necessary to divert the track at this stage, however monitoring of the area is recommended during site clearing. The proposed developments at Ukuwela will only affect part of one archaeological site. DH01. The impact will be low and only affect the upper 10cm of topsoil. A desktop PIA was undertaken and found that the palaeontology of the area is of high significance. The desktop study suggested that fieldwork would be required to fully assess the proposed developments on the fossil record prior to construction. A Paleontological Chance Finds Protocol has therefore been included in the EMPr too.	The area will need to be monitored by a suitably qualified archaeologist after vegetation clearance and during any topsoil removal. A collection permit should be obtained so that any significant artefacts can be sampled. If needs be, the track can be altered if any features are noted. A PIA field survey will be required to determine the full extent of the fossil record.
Aquatic Impact Assessment	The watercourses and wetlands within the Greater Ukuwela Nature Reserve have been visited and assessed in relation to the proposed development of four sites within the reserve. s. . The construction phase will have very low potential for any impacts on the watercourses or wetlands and they will be short term impacts largely restricted to that phase. Careful management of the construction sites and process will reduce these impacts further. In the operational phase the impacts arising from the operation and maintenance of the facilities will obviously persist through a longer time. Impacts from routine road and site maintenance are very limited and can easily be reduced through monitoring of the areas and then addressing any problems as they arise. Seepage from the tented camp septic tanks is a longer term issue but it too can be reduced through proper design and construction.	It is the opinion of the specialist that the construction of the new facilities will have no fatal flaws but will contribute to sustainable job creation and biodiversity conservation in the region, and may therefore be authorised but only subject to certain conditions. These conditions are as follows: • The mitigatory measures put forward must be adhered to. • The appointed ECO must have authority to motivate for further measures if unforeseen impacts arise. • The proposed monitoring measures must be put in place and be rigorously implemented

Specialist Study	Findings	Recommendations
Ecological Impact Assessment	From a faunal perspective, the study area has a medium to high conservation value. This is based on the potential for this site to harbour some species of conservation importance, which are present on site and within the surrounding reserves, which may use GUNR as a viable home range or as transient species utilising an ecological corridor. Habitat for foraging abundant throughout the whole reserve, and so faunal species can move to adjacent areas during construction. This is unlikely to affect the status of species of conservation concern. It is not anticipated that the proposed construction will have a long term negative effect on the fauna of the area. The fauna of the site is directly dependent on the vegetation of the site, and the careful management of the vegetation (and soil) will benefit the fauna of the area It is important to mention that additional species may have been overlooked during the field survey because of the plant life history characteristics exhibited by certain plant species during this time of the season. Some species, especially the plants which have underground bulbs, may not have emerged due variations in their life strategies. However, it is the Specialist's opinion that the vegetation that was recorded from the site assessment provides enough information in order for inferences and extrapolations as to the quality, and the likely impacts associated with a development of this nature, to be made. When development does take place and indigenous plants will need to be removed or relocated, permits for their removal will need to be obtained from DAFF and Ezemvelo KZN Wildlife. The removal should occur during their dormant growth period months and with due care informed by a Translocation Plan, preferably complied by a qualified botanist or similarly qualified individual. The plants should be relocated into areas with the same aspect, soil conditions and elevation to ensure that the relocations are successful. In addition, the plants should be placed into good-sized holes that are at least twice the size of underground organs. It is very important for survival for underground organs not to be damaged and for plants to be watered for a period of time. Bulbs, however, are able to withstand a relatively high level of disturbance, given their survival strategy of storing the required reserve resources in the bulb. These species will likely re- generate following their excavation and replacement. Any applicable approvals/permits/consents/licenses relating to the environment should be in place prior to any site clearing and development. Good housekeeping and management of the construction impacts will see no or very limited impact on the environment.	Should any development take place the following is recommended but not limited to: ✓ Permits for the removal and relocation of plants (DAFF for *Sclerocary birrea* and EKZNW for *Asparagus spp.*) must be in place before any construction can commence; ✓ Translocation plan should inform the relocation of indigenous plants; including storing protected plants within an onsite plant storage area or for rehabilitation purposes. To be decided upon by the DAFF / EKZNW permit requirements. ✓ The appointed ECO should do a site walk through prior to construction commencing to search for breeding and nesting fauna. Should these be identified, a search and rescue operation by a suitably qualified person, must be undertaken before construction commences; ✓ Rehabilitation must occur once construction is complete in the relevant area; ✓ Community outreach regarding poaching of fauna should be undertaken; ✓ Rehabilitation of vegetation communities would improve faunal diversity across the site;

Specialist Study	Findings	Recommendations
	The overall area is transformed but is recovering from many years of farming activities and therefore currently has a medium conservation value. Although species identified in the DFFE Screening Tool may be present on site (including species as per the POC table), the type of construction limits the overall loss in habitat for these species, especially if mitigation measures are implemented. Further to this, species identified in the TSCP Minset dataset mirror that of the DFFE Screening Tool. Ecological corridoors, CBA: Irreplaceable areas and threatened ecosystems will ultimately benefit from the increase in revenue generated from the four facilities proposed for GUNR. Even though there may be site specific impacts, these can largely be mitigated against and the overall objective of conserving the fauna, flora and ecosystems is achieved. The ecologist has no objection to the development provided all mitigation measures can be agreed and achieved are implemented.	✓ An Alien Invasive Control Programme must be implemented. ✓ Erosion control measures must be implemented; ✓ Construction must occur in a phased approach and ✓ Care must be taken that veld fires are not started. ✓ No biodiversity offset plan is recommended.

7. ENVIRONMENTAL MANAGEMENT PROGRAMME

7.1 Introduction

The Environmental Management Programme has been prepared in order to comply with the requirements as stipulated in the National Environmental Management Act (No. 107 of 1998).

This EMPr includes:

- Details of the EAP who prepared the EMPr;
- The expertise of the EAP who prepared the EMPr, including curriculum vitae
- Project Description
- Facility Master Layout Plans (**Appendix B**)
- Mitigation measures as contained in the Basic Assessment Report
- Recommendations and conclusions emanating from the specialist studies
- Impact Management Objectives and Actions
- A copy of the EA (**if granted**)

7.2 Aim and Objectives of the EMPr

The aim of the EMPr is to:

- Identify those construction activities identified for the proposed development that may have a negative impact on the environment;
- Outline the mitigation measures that will need to be taken and the steps necessary for their implementation;
- Describe the reporting system to be undertaken during construction.

The objectives of the EMP are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential adverse impacts to minimal or insignificant levels.
- Provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site.
- Provide management structures that address the concerns and complaints of I&APs pertaining to the development.
- Ensure that the environmental specifications are identified, effective and contractually binding so as to enable compliance on site.

7.3 Layout of the EMPr

The EMPr identifies the five phases of development as:

- Site specific specialist requirements (10.1)
- Preconstruction Planning Phase Activities (Section 10.2)
- Site Establishment and Setup Phase Activities (Section 10.3)
- Construction Phase Activities (Section 10.4)
- Operation Phase Activities (Section 10.5)
- Decommissioning Phase Activities (Section 10.6)

The generic and specific provisions are included together under each phase for each environmental consideration. The generic provisions are the general environmental issues,

procedures and controls that can be applied to the project and site as a whole. The specific provisions are those environmental issues, procedures and controls that are relevant to a particular section of the site. It should be understood that the EMP is considered an evolving document and may be amended at any time by the relevant authorities (Department of Economic Development, Tourism and Environmental Affairs).

8. LEGAL AND OTHER REQUIREMENTS

8.1 Compliance with Applicable Laws

The supreme law of the land is "The Constitution of the Republic of South Africa", which states: "*Every person shall have the right to an environment which is not detrimental to his or her health or wellbeing*". Laws applicable to the protection of the environment in terms of Environmental Management (and relating to construction activities) include but are not restricted to:

- Animals Protection Act, Act No. 71 of 1962
- Conservation of Agricultural Resources Act, Act No. 43 of 1983
- Environment Conservation Act, Act No. 73 of 1989
- Environmental Planning Act, Act No. 88 of 1967
- Hazardous Substances Act, Act No. 15 of 1973
- Land Survey Act, Act No. 9 of 1921
- Minerals Act, Act No. 50 of 1991
- National Environmental Management: Air Quality Act, Act No. 39 of 2004);
- National Environmental Management: Biodiversity Act, Act No. 10 of 2004, as amended)
- National Environmental Management Act, Act No.107 of 1998
- NEMA EIA Regulations, 2014 (as amended)
- National Environmental Management: Protected Areas Act (NEM: PAA) (Act No. 57 of 2003, as amended)
- National Environmental Management: Waste Act, Act No. 59 of 2008
- National Forests Act (NFA) (Act No. 84 of 1998)
- The National Heritage Resources Act, Act No. 25 of 1999
- National Water Act, Act No. 36 of 1998
- Occupational Health and Safety Act, Act No. 85 of 1993
- Provincial and Local Government Ordinances and Bylaws
- Soil Conservation Act, Act No. 76 of 1969
- Water Services Act, Act No. 108 of 1997

Several regulations will be applicable to the construction phase of the project. These guidelines are mentioned in the EMPr tables. The EMPr forms part of the Contract Documentation and is thus is a legally binding document.

8.2 Compliance with the Environmental Management Programme

A copy of the EMPr must be kept on site during the construction period at all times. The EMPr will be made binding on all contractors operating on the site and will be included within the Contractual Clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance with the Environmental Authorisation (EA) issued by EDTEA.

It should be noted that in terms of Section 28 of the National Environmental Management Act (NEMA) Act No. 107 of 1998, those responsible for Environmental Damage must pay the repair costs both to the environment and human health and the preventative measures to reduce or prevent further pollution and/or environmental damage. (The polluter pays principle).

In terms of the EA, non-compliance of the EA may result in invalidation of the EA, criminal prosecution or other actions provided for in the NEMA (as amended) and associated regulations. Any non-compliance must result in an immediate stop to works being issued. The contractor and developer will be held liable for any damage and consequent rehabilitation to environmentally sensitive areas outside the site boundary. In the event of any dispute concerning the significance of a particular impact, the opinion of EDTEA in respect of its significance will prevail.

National government, provincial government, local authorities or committees appointed in terms of the conditions of the EA or any other public authority shall not be held responsible for any damages or losses suffered by the authorisation holder or successor in title in any instance where construction or operation subsequent to construction is temporarily or permanently stopped for reasons of non-compliance by the authorisation holder with the conditions of authorisation as set out in this document or any subsequent document emanating from these conditions of authorisation.

8.3 Specific Conditions Pertaining to Authorisations

Should the Provincial Department of Economic Development, Tourism and Enviroinmental Affairs (EDTEA) issue an Environmental Authorisation (EA), this EMPr will be updated to include any additional pre-construction, construction, operation and decommissioning conditions stipulated in the EA not already included below.

A water use license will be applied for and may become applicable to the proposed project at a later stage.

Specific conditions pertaining to regulatory processes, or Licensee / Holder of the Authorisation requirements, have not been included within the EMPr and will only be included on finalization of the EMPr (pending decision). These conditions are to be undertaken by the Licensee / Holder of the Authorisation prior to the commencement of construction.

9. PROJECT RESPONSIBILITIES

9.1 Responsible Parties and associated roles

As described below, **Table 8** below provides a summary of the responsible parties and the auditing process to be carried out.

Table 8: Responsible Parties and Auditing Process

TITLE	PARTY	ROLE DURING CONSTRUCTION	ROLE DURING OPERATION
Project Developer (Proponent)	Wild Tomorrow Fund	Assume ultimate responsibility	Assume ultimate responsibility
Project Manager	To be appointed by proponent	Project management	N/A
Contractor's Project Manager	Balance of Plant Contractor	Construction management	N/A
Main Contractor/s	There will be multiple contracts placed for the construction phase. These will cover civil earthworks and concrete, structural mechanical and electrical / instrumentation. There could also be the construction camp management contract. These may be managed by the Contractor's Project Manager (or other).	Main Contractor will undertake day to day construction activities covering aspects such as civil earthworks and concrete, structural mechanical and electrical / instrumentation.	N/A
Environmental Officer	To be appointed by Main Contractors	Day to day environmental responsibility, point of contact for ECO	N/A
Environmental Control Officer	To be appointed by Project developer	Monthly audits	Annual audits
Competent Authority	Provincial Department of Economic Development, Tourism and Enviroinmental Affairs (EDTEA)	Conduct site visits when necessary.	Conduct site visits when necessary

The above may be updated based on the outcome of the Environmental process should additional responsibilities be identified.

10. IMPACT MANAGEMENT ACTIONS AND OUTCOMES

10.1 Site-specific specialist requirements

Table 9: Site specific specialist requirements

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Heritage	• The track and Donor House should be monitored during vegetation clearance and especially while the track is being set out. A sampling permit should be obtained in case any artefacts are exposed. • Archaeological site DH01 at the Donor House must be monitored by a suitably qualified archaeologist after vegetation clearance and during any topsoil removal. A collection permit should be obtained so that any significant artefacts can be sampled. If needs be, the track can be altered if any features are noted • A suitably qualified palaeontologist must visit the site to assess for the presence of fossils in the proposed development area prior to construction.	At all times pre and during construction.	Developer/ Service Providers, Contractors, Engineers.	Impacts avoided or managed as per specialist recommendations.
Agriculture	• Green Engineering structures should be considered to improve infiltration into soil profiles and minimise runoff volumes.	At all times during construction.	Developer/ Service Providers, Contractors, Engineers.	Impacts avoided or managed as per specialist recommendations.
Vegetation and Fauna	• Permits for the removal and relocation of plants (DAFF for *Sclerocary birrea* and EKZNW for *Asparagus spp.*) must be in place before any construction can commence; • Translocation plan should inform the relocation of indigenous plants; including storing protected plants within an onsite plant storage area or for rehabilitation	At all times pre and during construction.	Developer/ Service Providers, Contractors, Engineers.	Establishment and spread of alien invasive plant species due disturbance vectors Ensure the EMPr is understood and adhered to .

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	purposes. To be decided upon by the DAFF / EKZNW permit requirements. • The appointed ECO should do a site walk through prior to construction commencing to search for breeding and nesting fauna. Should these be identified, a search and rescue operation by a suitably qualified person, must be undertaken before construction commences; • Rehabilitation must occur once construction is complete in the relevant area; • Community outreach regarding poaching of fauna should be undertaken; • Rehabilitation of vegetation communities would improve faunal diversity across the site; • An Alien Invasive Control Programme must be implemented. • Erosion control measures must be implemented; • Construction must occur in a phased approach and • Care must be taken that veld fires are not started. • No biodiversity offset plan is recommended.			Any applicable approvals/permits/consents/licenses relating to the environment should be in place prior to any site clearing and development.
Hydropedology	• Green engineering structures should be considered to improve infiltration into the vadose zones; • It is recommended that an alien invasive management programme is implemented during the initial phase of construction and that monitoring be done throughout the construction phase. The alien invasive management programme must continue post construction for a period of 1 year; and • Buffer zones are to be kept intact.	At all times during construction.	Developer/ Service Providers, Contractors, Engineers.	Impacts avoided or managed as per specialist recommendations.

10.2 Pre-construction planning phase activities and associated environmental management requirements

Pre-Construction Planning EMPr activities are those relating to obtaining the necessary permits or approvals and management plans prior to the start of the Construction Phase.

Table 10: Pre-construction planning phase activities

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Permits / Licenses / Approvals	• The EMPr must be approved by EDTEA prior to commencement of construction. • A written notice must be given to EDTEA fourteen (14) days prior to the commencement of construction. The notice must include site preparation activities as well as a date on which it is anticipated that the activity will commence. The notice must cite the reference number. • A copy of the environmental authorisation (EA) (**if granted**) must be kept by the authorisation holder and on site by the contractor. The EA made available to any official of the Department on request. • The development layout must comply with the Layout Plan, as approved in the Environmental Authorisation. Should the layout have changed, the updated layout must be submitted to EDTEA and approved prior to construction. • Impacting on water resources will require a Water Use Licence from the Department of Water and Sanitation (DWS) before construction commences; • The appointed ECO should do a site walk through prior to construction commencing to search for breeding and nesting fauna. Should these be identified, a search and rescue operation by a suitably qualified person, must be undertaken before construction commences;	Prior to commencement of construction	Applicant/ECO	Avoid construction delays. Ensure the EMPr is understood and adhered to. Any applicable approvals / permits / consents/licenses relating to the environment should be in place prior to any site clearing and development. Prevent impacts to heritage resources.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	• Where indigenous plants will need to be removed or relocated, permits for their removal will need to be obtained from DAFF and Ezemvelo KZN Wildlife (DAFF for *Sclerocary birrea* and EKZNW for *Asparagus spp.*). The removal should occur during their dormant growth period months and with due care informed by a Translocation Plan, preferably complied by a qualified botanist or similarly qualified individual. • The plants should be relocated into areas with the same aspect, soil conditions and elevation to ensure that the relocations are successful. In addition, the plants should be placed into good-sized holes that are at least twice the size of underground organs. It is very important for survival for underground organs not to be damaged and for plants to be watered for a period of time. Bulbs, however, are able to withstand a relatively high level of disturbance, given their survival strategy of storing the required reserve resources in the bulb. These species will likely re- generate following their excavation and replacement. • Good housekeeping and management of the construction impacts will see no or very limited impact on the environment. • Before construction starts, all staff need to know what possible archaeological or historical objects of value may resemble and to notify the Project Engineer should such an item be unearthed. AMAFA Akwazulu-Natali must be contacted if any heritage resources, objects or features and sites be identified during construction. All construction activities must cease until further notice from Amafa. The chance find protocol is attached in **Appendix D**.			

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Method Statements / Management Plans	The following method statements and/or management plans shall be submitted by the Contractor to the Engineer, Environmental Control Officer, and Wild Tomorrow Fund for approval prior to any construction commencing on site: • Plant Translocation Plan • Alien invasive control programme • A rehabilitation plan • An appropriate construction storm water management plan formulated by a suitably qualified professional; • Management plan and method statements for work in close proximity to wetlands and watercourses; • Spill Contingency Plan; • Emergency Response Procedures.	Prior to commencement of construction	Contractor	Ensure method statements are compiled and included in site file.
Environmental file	• An environmental management file shall be opened and maintained on site. The file must always be up-to-date with the following documentation: - Copy of Environmental Authorisation - Copy of EMPr - Copy of Approved Layout - Environmental method statements/management plans - Monthly Environmental Audits Reports - Personnel Register - Incident Register - Complaints Register - Correspondence with ECO - Correspondence with I&APs / stakeholders / surrounding areas - Proof of Waste Disposal (general / hazardous)	At all times during construction.	Contractor	All relevant documentation will be up to date and available for inspection by Key Stakeholders and the Public. Ensure effective communication with the community and Key Stakeholders. All environmental incidents and community complaints are adequately dealt with and recorded.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	- Proof of chemical toilet cleaning - Proof of raw material sourcing - Proof of environmental training (including cultural)			
Source of materials	• Contractors must prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners, water etc), and submit these to the Engineer for approval prior to commencement of any work. • A signed document from the supplier of natural materials must be obtained confirming that they have been obtained in a sustainable manner and in compliance with relevant legislation. • Where materials are borrowed (mined), proof must be provided of authorisation to utilise these materials from the landowner / material rights owner and the Department of Minerals and Energy.	Prior to commencement of construction	Contractor	Ensure that no illegal mining occurs.

10.3 Site Establishment and setup activities

Table 11: Site establishment and setup activities

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Demarcation of construction footprint	• The construction footprint of each phase must be fenced off with wooden boarding or shade cloth and wooden poles. • The working areas must be clearly demarcated and all construction work must be kept within the demarcated area. • The working area must be cordoned off to the public to prevent injury.	Prior to commencement of construction / During Construction	Contractor	Prevent unauthorized disturbance to the environment. Prevent unauthorised access to construction site.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	• Water resources/wetlands within the development footrpint must be well fenced and sign-posted, to keep machinery, people, and livestock away from the water body as well as vegetated areas to reduce the soil disturbance, soil compaction and vegetation destruction, which thus reduces the amount of erosion and habitat loss.			

Establishment of site/construction camp	• The Project Engineer shall in conjunction with the Contractor and Environmental Control Officer, identify the most suitable location for the construction camp(s).
	  ○ The construction camp(s) must be located in a disturbed area and must be screened off during the entire construction phase.
	  ○ The construction camps must not impact on any adjacent properties and must be located 50m away from any watercourse areas or stormwater drains, however must still be easily accessible.
	  ○ When locating the construction camp and equipment yard, watercourses and areas susceptible to soil erosion and/or water contamination must be avoided.
	  ○ The camp should be established on level ground.
	  ○ If the contractor chooses to locate the camp site on private land, he must get prior permission from both the engineer and the landowner.
	• Further considerations for the construction of the camp include the avoidance of cut and fill wherever possible during the setup of the construction camp. The size of the camp should be kept to a minimum.
		During site establishment	Developer/ Service Providers, Contractors, Engineers	Minimise disturbance to the environment.

Ablutions	• The Contractor shall make adequate provision for temporary chemical toilets for the use of their employees during the Construction Phase - at least one toilet for	During site establishment	Contractor	Prevent ground pollution and disturbance to the environment.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	every 15 workers.. Such facilities, which shall comply with local authority regulations, shall be maintained in a clean and hygienic condition. Their use shall be strictly enforced. They shall be positioned in an appropriate place. • There must be no on-site sanitation in the form of pit latrines, septic tanks or similar for the construction phase. • The location of the toilet facilities shall be agreed to prior to the commencement of construction and shall be agreed in conjunction with the ECO, Engineer and contractor. • Chemical ablution facilities must not be placed closer than 50m from the edge of a water course, wetland or similar. Toilets must be situated out of the 1:100 year flood line of any watercourse. The location and use of the toilets must be such that it causes no pollution of water nor poses health hazards. • The ablution facilities must be cleaned regularly and any waste must be disposed of at a registered waste site. Proof of chemical toilet cleaning and waste disposal must be kept in the environmental file. • Chemical toilets must be removed from the site when the construction phase is completed. • Contractors must ensure that no spillage occurs when chemical toilets are cleaned and that the contents are properly stored and removed off-site. • The permanent toilets should ideally be of a type which has low water usage so as to minimise percolation of waste water into the ground water system. Where possible, such as in the tented camp, multiple tanks spread over a wide area should be installed so as to spread the area over which percolation will			

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	occur. The spread may be further increased through widely dispersed soakaway facilities.			
Stormwater, Erosion and Soil Management	• The Contractor must ensure that wind screening and stormwater management controls are undertaken to prevent soil loss during site establishment. • Clearing activities should only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected clearing activities should be put on hold. • The contractor must attend to drainage of the camp site to avoid standing water (ponding) and/or rill erosion. • The time that stripped areas are exposed must be minimized wherever possible. Care must be taken to ensure that lead times are not excessive. • Procedures that are in place to conserve topsoil during the construction phase are to be applied during the site establishment phase. i.e. topsoil is to be conserved while providing access to the site and setting up the camp. • The Contractor must strip and stockpile all soil within the works area for possible subsequent use. Stockpiled soil must not be in excess of 2m in height, and must be protected from wind and rain with the use of tarpaulins where necessary. The area stripped of soil is to be surfaced, and it is unlikely that the stripped soil will be required for rehabilitation purposes. • Excavated topsoil and subsoil must be stored in piles out of wetland areas and drainage lines and their associated buffer zones and must be at least 50m away from any watercourse. • Stabilization practices (e.g., revegetation) must occur as soon as possible after grading. In colder climates, a mulch	During site establishment	Contractor	Manage stormwater, erosion and soil efficiently

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	cover is needed to stabilize the soil during the winter months when grass does not grow or grows poorly. • The following measures must be used to stabilize soils for site preparation and construction: hydro mulch, straw (placed evenly on slope), crimping (rolling the placed straw with a sheep-foot roller), seeding, fertiliser, transplanting and net (jute netting pinned onto the slope).			
Establishment of equipment lay-down and storage areas	• Choice of location for equipment lay-down and storage areas must take into account prevailing winds, distances to adjacent land uses, general onsite topography and water erosion potential of the soil (e.g. no closer than 50m to a water course or wetland, preferably an already transformed area, demarcated areas, the use of bunds, and the use of berms for erosion control). • Storage areas should be secure so as to minimize the risk of crime. They should also be safe from access by children and animals. • Fire prevention facilities must be present at all storage facilities. • Hazardous storage and refuelling areas must be bunded prior to their use on site during the construction period. The bund wall must be high enough to contain at least 150% of any stored volume. • These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources. • Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible the	During site establishment	Contractor	Prevent unauthorized disturbance to the environment. Prevent ground and water pollution.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes. • Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures. The contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training. • Drip trays should be utilised at all dispensing areas or a biddum and stone-chip hazardous materials filling and handling area should be established adjacent to the bund.			
Environmental awareness	• The project core team must be provided with environmental awareness training, occupational safety, and/or legal information training on the approved EMPr, environmental authorization, method statements and management plans. The contractor will be required to communicate this to their staff. The training shall ensure that the construction team and all sub-contractor/s are familiar with the EMPr requirements and the training must take into account language and literacy requirements as well as measures to determine the effectiveness of training. Proof of this training must be included in the environmental file. • The contractor must ensure that formal environmental induction of the appointed construction personnel will take place through a presentation to staff on environmental awareness.	At all times during construction.	ECO/Contractor	All staff members are aware of the EMPr requirements relevant to them and activities that may impact upon the environment.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	• The contractor must ensure that environmental site procedures relevant to the project must be communicated to staff on a weekly basis – method statements can be used as part of awareness training material. • The contractor must ensure that environmental matters will be discussed during toolbox talks. • The Contractor must ensure that the construction team and all sub-contractor/s are familiar with the EMPr requirements and have a basic level of environmental awareness training. • The need for a 'clean site' policy must be explained to the construction workers. • Community outreach regarding poaching of fauna should be undertaken.			

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Workers conduct	• A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: - No alcohol / drugs to be present on site. - Prevent excessive noise. - Construction staff are to make use of the facilities provided for them, as opposed to ad-hoc alternatives (e.g. fires for cooking). - No fires to be permitted on site. - Trespassing on private / commercial properties adjoining the site is forbidden. - No poaching or harming of wildlife - Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks. - No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Management.	At all times during construction.	Contractor	Ensure general well-being of the site staff, affected and surrounding environment.
Security, fencing and lighting	• During site establishment the site camp must be secured if necessary to minimize the opportunity for criminal activity. The site camp sites must be fenced and manned on a 24 hour basis. • Water resources within the development footprint (where relevant) must be well fenced and sign-posted, to keep machinery, people, and animals away from the water body as well as vegetated areas to reduce the soil disturbance, soil compaction and vegetation destruction, which thus reduces the amount of erosion and habitat loss.	At all times during construction.	Contractor	Ensure safety of the public and prevent loss/ damage to equipment. Prevent unauthorized disturbance to the environment.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Site Establishment	• Invasive species are highly likely to colonise disturbed areas, even after rehabilitation and follow-up clearing must be done until healthy vegetation returns to the site. • Areas (away from surface water bodies and outside of the riparian zone) must be designated for the storage of materials and mixing of materials (such as concrete or chemicals). This reduces contamination of water resources from these materials/ activities. • Within a construction site, vehicle access must be strictly controlled (i.e., there must be set parking, turning areas, set routes and no access to undisturbed areas.) This minimises soil disturbance and compaction and pollution from fluids leaking onto the ground as well as the disturbance of aquatic organisms.	Prior to commencement of construction	Contractor	Ensure method statements are compiled and included in site file.
Wetland - Impacts associated with clearance and edge effects to the wetland habitat	**Design & routing:** • Unavoidable services crossings should be located within already disturbed areas like existing road crossings and located across the narrowest portions of the wetland. • The services must be routed so that the wetland is crossed at right angles to the direction of flow. **Site setup:** • Disturbance to the wetland soils along the services crossings should be restricted to an established construction right-of-way (ROW) corridor. The ROW corridor within the wetlands should be as narrow as practically possible and should be demarcated and fenced off during the site setup phase to the satisfaction of the ECO.	At all times during construction.	Developer/ Service Providers, Contractors, Engineers.	Impacts avoided or managed as per specialist recommendations.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	• The construction ROW should comprise the trench footprint, a narrow one-way running track and soil stockpile zones. • Excavations within the wetland should be undertaken by hand. • All wetland areas outside of the demarcated ROW must be considered no-go areas. • Ideally, excavations within the onsite wetlands should be undertaken between the months of April and September.			

10.4 Construction phase activities and associated environmental management requirements

Construction EMPr activities are those relating to the Construction Phase as defined. The contractor is responsible for the implementation of activities within this phase.

Table 12: Construction activities

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Maintenance of access and haulage roads	• Contractors should ensure that access roads are maintained in good condition by attending to potholes, corrugations and stormwater damages as soon as these develop. • Unnecessary compaction of soils by heavy vehicles must be avoided. Construction vehicles must be restricted to demarcated access, haulage routes and turning areas. • Machine / vehicle operators should receive clear instructions to remain within demarcated access routes. Movement of heavy-duty vehicles and vehicles not connected with work in progress must be restricted to the construction zone in order to control related impacts such as compaction of soil, damage to vegetation and noise pollution.	At all times during construction.	Contractor	Prevent unauthorized access to site. Ensure that construction plant and vehicles do not impact negatively upon the environment. Ensure that access and haulage roads are maintained in a satisfactory manner.
Access Control	• Water resources within the development footprint must be well fenced and sign-posted, to keep machinery and people, away from the water body as well as vegetated areas to reduce the soil disturbance, soil compaction and vegetation destruction, which thus reduces the amount of erosion and habitat loss.	At all times during construction.	Contractor	Prevent unauthorized disturbance to the environment.
Soil Stabilisation	• Stabilization practices (e.g., revegetation) must occur as soon as possible after grading. In colder climates, a mulch	At all times during construction.	Contractor	Manage stormwater, erosion and soil efficiently

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome

	cover is needed to stabilize the soil during the winter months when grass does not grow or grows poorly.
	• The following measures can be used to stabilize soils for site preparation and construction:
	  ○ hydro mulch, straw (placed evenly on slope),
	  ○ crimping (rolling the placed straw with a sheep-foot roller),
	  ○ seeding,
	  ○ fertiliser,
	  ○ transplanting and net (jute netting pinned onto the slope).			

Stockpile management	• Unprotected stockpiles are very prone to erosion and therefore must be protected. Small stockpiles can be covered with a tarp to prevent erosion. Large stockpiles must be stabilized by erosion blankets, seeding, and/or mulching. • Stockpiling of soil or any other materials used during the construction phase must not be allowed on or near slopes, near a watercourse or water body. This is to prevent pollution or the impediment of surface runoff. • Dust emissions from soil stockpiles can occur during the loading of piles, when wind disturbs the stockpile surface, and during reclamation. • The applicant must establish additional suitable mitigation measures to prevent the erosion of stockpiles. • Unprotected stockpiles are very prone to erosion and therefore must be protected. Small stockpiles can be covered with a tarp/hessian sheet to prevent erosion. Large stockpiles must be stabilized by erosion blankets, seeding, and/or mulching. • Stockpiles must not exceed 2 m in height.	At all times during construction.	Contractor	Prevent pollution and erosion.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
General Pollution Control Prevention of spills eliminates or minimizes the discharge of pollutants to water bodies.	• If soil contamination occurs (i.e. due to a spill) the soil must be removed from the site and disposed of appropriately. • Handle hazardous and non-hazardous materials, such as concrete, solvents, asphalt, sealants, and fuels, as infrequently as possible and observe all national and local regulations when using, handling, or disposing of these materials. • An effective response plan must be in place and personnel must be ready to mobilise in the event of a spillage to reduce the environmental effects of an oil or chemical spill. • Spill control devices such as absorbent snakes and mats must be placed around chemical storage areas, and they can be used in an emergency to contain a spill. • Implement preventative maintenance system to ensure that work vehicles are maintained in an acceptable condition. This would involve routinely checking vehicles for leaks before construction begins; and not allowing vehicles with significant leaks to operate or be repaired within the construction site. Ideally, vehicle maintenance and washing occurs in garages and wash facilities, not on active construction sites. • Before an operation occurs near a waterbody, vehicles must be checked for leaks, to reduce soil and water contamination from vehicle fluids. • Old engine oil must NOT be thrown on the ground or down a stormwater drain but rather collected in containers and recycled. • Ensure that appropriate solid waste disposal facilities are provided, and adequate signage is provided for all solid, liquid, and hazardous waste types. These must contain waste products in a weatherproof manner and to prevent	At all times during construction.	Contractor	Prevent pollution and ground contamination

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	any airborne litter, access to scavengers or loss of food residues that may be washed into surface or ground waters. Collected waste needs to be disposed of at a registered landfill site/hazardous waste facility (where applicable). • Re-fuelling areas for vehicles must be bunded and located away from water resources and sensitive environments to prevent any accidental spillage contaminating soil or seeping into groundwater aquifers. All servicing area run-off must be directed towards a fully contained collection sump for recovery and appropriate disposal. • There must be no standing water at a stockpile site, to reduce erosion as well as the contamination of the water by nutrients/ toxics.			
Air/dust pollution	• Vehicles travelling back and forth from the construction site must adhere to speed limits so as to avoid generating excessive dust. A speed limit of 30 km/hour must be adhered to on site on all un-surfaced roads. • The dampening down of access surfaces must be practiced especially in dry and windy conditions to prevent excessive dust formation. • Vehicles and machinery are to be kept in good working order and should excessive emissions be noted; the Contractor is to have equipment serviced as soon as possible. No fires are to be permitted on site except for the burning of firebreaks.	At all times during construction	Contractor	Compliance to all legislative requirements. Prevent air and dust pollution
Noise pollution	• 'Noisy' activities must take place during normal working hours. The adjacent land owners must be notified prior to any planned activities that will be unusually noisy.	At all times during construction	Contractor	Compliance to all legislative requirements.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	• Should complaints regarding noise levels be received, as a result of construction activities on the site, these must be recorded by the ECO.			Prevent noise pollution
Wetland - Impacts associated with clearance and edge effects to the wetland habitat	**Construction phase:** • Disturbance to the wetland soils along the services crossings should be restricted to an established construction right-of-way (ROW) corridor. • Excavations within the wetland should be undertaken by hand. • All wetland areas outside of the demarcated ROW must be considered no-go areas. • Ideally, excavations within the onsite wetlands should be undertaken between the months of April and September. • Any spillages, if they occur, in these areas must be contained and cleared up immediately. Contaminated soil must be stored in appropriate containers and then be removed to an approved disposal facility. • An emergency clean-up kit of suitable capacity and sealable soil storage drums must be on site at all times. • No plant or equipment will be stored/parked within 40m of the bank of any watercourse or wetland areas when not in operation. Plant and equipment will be parked at designated parking areas. • All plant and equipment must be checked on a daily basis for leaks, any plant that is found to be leaking will be removed off site for maintenance.	At all times during construction.	Developer/ Service Providers, Contractors, Engineers.	Impacts avoided or managed as per specialist recommendations.
Wetland - Impacts to the Geomorphology of the Wetlands	**Preventing Temporary Increased Run-off, Sedimentation and Erosion Impacting the Wetlands** • Importantly, the storm water management plan must account for increased run-off and sedimentation. As such,	At all times during construction.	Developer/ Service Providers, Contractors, Engineers.	Impacts avoided or managed as per specialist recommendations.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	attenuation facilities are to be implemented if and where required. • Additionally, appropriate drainage structures at the storm water outlet points are to be implemented with energy dissipating structures as well as sediment trapping devices to prevent sedimentation exiting the site during construction. This can be in the form of silt nets. • Green Engineering structures should be considered to improve infiltration into soil profiles and minimise runoff volumes. • Runoff from disturbed areas (such as landing/depot areas, extraction routes, gravel pits, temporary and unpaved roads) must be directed to silt traps (silt fences, sandbags, etc) to remove sediment and reduce the sedimentation of the water bodies. • No road drains may discharge into an area within 20m of a watercourse or wetland. See sections above and below for site setup, construction phase, rehabilitation and monitoring mitigation measures.			
Wetland - Impacts associated with accelerated run-off and associated increased flood peaks to the watercourses.	**Preventing Increased Run-off and associated Erosion Impacting on the Wetland** • Adequate structures must be put into place (temporary or permanent where necessary in extreme cases) to deal with increased/accelerated run-off and potential erosion. • The use of silt fencing and potentially sandbags or hessian "sausage" nets along the boundaries of the construction areas can be used to slow run-off entering the wetlands and the associated buffer zones, thereby also decreasing	At all times during construction.	Developer/ Service Providers, Contractors, Engineers.	Impacts avoided or managed as per specialist recommendations.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	the likelihood of increased flood peaks and consequent potential erosion and sedimentation impacts. An Environmental Control Officer (ECO) must be appointed during the construction phase to oversee construction activities undertaken by contractors. The ECO must also monitor increased run-off and associated erosion impacts. Where additional mitigation measures are stipulated by the ECO in order to control increased run-off and erosion, this is to be undertaken accordingly.			
Wetland - Potential impacts associated with the leakage / spillage of oils, fuels and other potentially hazardous substances from construction vehicles / machinery and workers; as well as sedimentation via run-off polluting the wetlands.	**Storage of Oils, Fuels and Hazardous Substances / Liquids** • All oils, fuels and hazardous substances or liquids must not be stored within 100m from the full extent of the wetlands and the associated buffer zones. • Where these items are stored within the proposed development area, a designated storage area will be required and the storage area must be adequately bunded to contain any spillage from containers. • Emergency spill kits must be available to clean up and remove accidental spills. **Preventing Soil and Surface Water Contamination** • All vehicles and machinery operating on the site are to be checked for oil, fuel or any other fluid leaks before entering the nearby construction area. • All vehicles and machinery must be regularly serviced and maintained before being allowed to enter the construction area.	At all times during construction.	Developer/ Service Providers, Contractors, Engineers.	Impacts avoided or managed as per specialist recommendations.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	• No fuelling, re-fuelling, vehicle and machinery servicing or maintenance is to take place within 20m of the wetlands, watercourses and the associated buffer zones. • The construction site is to contain sufficient safety measures throughout the construction process. Safety measures include (but are not limited) oil spill kits and the availability of fire extinguishers. • Additionally, fuel, oil or hazardous substances storage areas must be bunded to 110% capacity to prevent oil or fuel contamination of the ground and / or nearby wetlands and the associated buffer zones. • No cement mixing is to take place in the wetlands and the associated buffer zones. • In general, any cement mixing in the construction area is to take place over a bin lined (impermeable) surface or alternatively in the load bin of a vehicle to prevent the mixing of cement with the ground. Cement / concrete can also be trucked in by readymix cement vehicles. • Importantly, no mixing of cement or concrete is allowed directly within the wetland and associated buffer zone. • No “long drop” toilets are allowed on the study site. • Suitable temporary chemical sanitation facilities are to be provided. **Refer to mitigation measures above regarding the Prevention of increased run-off and associated erosion impacting on the wetland.** An Environmental Control Officer (ECO) must be appointed during the construction phase to oversee construction activities undertaken by contractors. The ECO must also monitor sedimentation impacts. Where additional mitigation			

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	measures are stipulated by the ECO in order to control sedimentation, this is to be undertaken accordingly.			
Indigenous Vegetation	• Footprint of the activity needs to be strictly adhered to. • A site specific Environmental Management Programme needs to be developed for the construction and operation phases. • An Alien Invasive Control Programme must be implemented. • An Environmental Control Officer (ECO) needs to be appointed for the duration of construction. • Permits for plants collection/removal need to be obtained prior to search and rescue operations. • Vegetation clearance in the construction phase is to be removed in a phased approach, as and when it becomes necessary as vegetation harbours fauna. • Sensitive areas need to be demarcated clearly before construction commences. • Areas outside of the construction zone are to be designated as “no-go areas.	At all times during construction.	Developer/ Service Providers, Contractors, Engineers.	Impacts avoided or managed as per specialist recommendations.
Vegetation - Transformation of habitat for Flora	• Servitude widths need to be a strictly adhered to. • Where possible, indigenous vegetation needs to be retained. • Clearance for construction should be done in a phased approach, and rehabilitation should be done as soon as work has ceased along the section of routing. • Where possible, construction should occur in the dry season to prevent soil loss through stormwater. • Where possible, manual clearance of the vegetation should be done so as to prevent the unnecessary movement of machinery in no-go areas.	At all times during construction.	Developer/ Service Providers, Contractors, Engineers.	Impacts avoided or managed as per specialist recommendations.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	• The contractor must implement an alien invasive control programme, particularly in areas where soil disturbance occurs. • Strictly no littering. The contractor should highlight this at daily toolbox talks and site clean-ups should occur on a daily occasion. • An environmental education programme should be conducted within the beneficiary community to educate and inform the beneficiaries of the value and correct use of vegetation and conservation areas. • A mix of indigenous grass species should be used for rehabilitation. • Soil stockpiles need to be grassed with an indigenous mix or covered with shadecloth to prevent soil loss through wind and water erosion. • Rehabilitation should take place as soon as construction of the section of line is complete. • Care must be taken that veld fires are not started.			

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Habitat transformation and fragmentation for fauna	• Construction footprint needs to be a strictly adhered to. • Clearance of land and vegetation is not allowed, unless clearance occurs within the authorised project area. • Areas outside of the construction zone must be demarcated as “no-go” areas. • Where possible, indigenous vegetation needs to be retained. • Manual clearance of alien and invasive vegetation should be done so as to prevent the unnecessary movement of machinery in no-go areas. • An alien and invasive control programme must be implemented, particularly in areas where soil disturbance has occurred. • Soil stockpiles need to be returned to the excavations, with the subsoil being placed first, followed by the topsoil. • Strictly no trapping or hunting of fauna is allowed. • All open excavations need to be checked on a daily basis and any fauna that may be stranded will have to be caught and released by a qualified person. • Monthly ECO auditing should occur during rehabilitation of the site. Once rehabilitation is complete, one three month, and one six month follow up audit should be conducted to assess the state of rehabilitation.	At all times during construction.	Developer/ Service Providers, Contractors, Engineers.	Impacts avoided or managed as per specialist recommendations.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Erosion	• All sites must be checked for any signs of soil erosion on at least a quarterly basis. • An approved Stormwater Management Plan should be implemented before construction occurs. • Where possible, indigenous vegetation needs to be retained. • Vegetation should be cleared only when construction occurs in that section of the development. • Soil stockpiles need to be grassed with an indigenous mix or covered with shadecloth to prevent soil loss through wind and water erosion. • Rehabilitation should take place as soon as construction is complete. • In areas of higher gradient, access roads should have erosion berms to prevent soil loss. • Construction activities should be limited to the winter months to prevent loss of soil to water runoff. • Spraying of the soil surface should occur when working in dusty conditions. • Any erosion found must be addressed immediately and be rehabilitated as is appropriate to the site. • Stabilization practices (e.g., revegetation) must occur as soon as possible after grading. In colder climates, a mulch cover is needed to stabilize the soil during the winter months when grass does not grow or grows poorly. • The following measures can be used to stabilize soils for site preparation and construction: hydro mulch, straw (placed evenly on slope), crimping (rolling the placed straw with a sheep-foot roller), seeding, fertiliser, transplanting and net (jute netting pinned onto the slope).	At all times during construction.	Contractor	Ensure that erosion related impacts avoided or managed efficiently.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Stormwater Control	• Good site drainage, including provision of stormwater control facilities such as retention structures, interceptors, subsoil drainage and similar such measures, is strongly advised to reduce concentrated overland flows. • Discharge of any attenuated runoff must not be concentrated. • Drainage must be controlled to ensure that runoff from the development will not culminate in off-site pollution or cause water damage to properties further down from the site. • Any damage caused by runoff must be appropriately repaired and/or rehabilitated at the cost of the authorisation holder. • Clearing activities should only be undertaken during agreed working times and permitted weather conditions. If heavy rains and/or strong winds are expected clearing activities should be put on hold. • Roughen the surface of all exposed slopes to retain water, increases infiltration and facilitate re-vegetation. • After every rainfall event, the contractor must check the site for erosion damage and rehabilitate this damage immediately. Erosion rills and gulley's must be filled-in with appropriate material and silt fences or fascine work must be established along the gulley for additional protection until grass has re-colonised the rehabilitated area. • Stormwater management must be implemented/undertaken prior to the commencement of major earthworks which also includes site preparation activities.	At all times during construction.	Contractor	Ensure that stormwater related impacts are avoided or managed efficiently.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	• A wetland specialist must be consulted with regard to any discharge/drainage of stormwater into watercourse areas. • In order to reduce erosion, and maintain the value of wetlands on site, stormwater runoff must be attenuated before being discharged into the stormwater drains and the root/immediate cause of erosion must be dealt with immediately. • The stormwater from developed areas must not cause soil saturation, erosion and sloughing of areas • After construction, the site must be contoured to ensure free flow of run-off and to prevent ponding of water. • Roads must be routed so as to avoid passing through wetlands. Watercourses may only be approached at crossing points. Elsewhere a buffer strip of at least 25m in width must be adhered to. • The material which has been moved must be stockpiled or spoiled at a site which is at least 30 m away from the edge of the river macro-channel.			
General and Hazardous Substances and Materials	• Handling, storage and disposal of excess or containers of potentially hazardous materials shall be in accordance with the requirements of current Regulations and Acts in force. Storage areas that contain hazardous substances must be bunded with an approved impermeable liner. Spills in bunded areas must be cleaned up, removed and disposed of safely from the bunded area as soon after detection as possible to minimize pollution risk and reduced bunding capacity. • Contaminated water storage facilities shall not be allowed to overflow and appropriate protection from rain and flooding shall be implemented. • Every precaution must be taken to ensure that any chemicals or hazardous substances do not contaminate	At all times during construction.	Contractor	Ensure that soil and groundwater pollution is avoided or efficiently managed.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	the soil or groundwater on site. For this purpose, the Contractor must: - Ensure that potentially harmful materials are properly stored in a dry, secure environment, with concrete or sealed flooring. - The Contractor must ensure that materials storage facilities are cleaned/maintained on a regular basis, and that leaking containers are disposed of in a manner that allows no spillage onto the bare soil or surface water. The management of such storage facilities and means of securing them shall be agreed. - Control the use and storage of fuels and chemicals that could potentially leach into the ground. Adequate spillage containment measures shall be implemented, such as cut off drains, etc - Spills in bunded areas must be cleaned up, removed and disposed of safely from the bunded area as soon after detection as possible to minimize pollution risk and reduced bunding capacity. - Fuel and oil storage tanks and drums, including internal installations and waste oil tanks, must be situated on an impermeable base within an oil-tight bund. - Any oils, fuels and spilled substance must be removed weekly and recycled or disposed of at a licensed waste disposal facility able to accommodate such waste. Proof of waste disposal must be kept in the environmental file; and - Ensure that the mixing /decanting of all chemicals and hazardous materials should take place on a tray or impermeable surface.			

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	- Chemical/hazardous waste generated during mixing/decanting should then be disposed of at a registered landfill site. - Municipal water or another source approved by the Engineer should be used for all activities such as washing or equipment or disposal of any type of waste, dust suppression, concrete mixing and compacting. • In the event of a spillage/incident that cannot be contained and which poses a potential threat to the local environment, the following Departments must be informed of the incident within 48 hours and in accordance with Section 30 of the National Environmental Management Act, Act 107 of 1998: - The Local Authority, Hlabisa Municipality; - Department of Water and Sanitation (DWS) - Department of Economic Development, Tourism and Environmental Affairs (Pollution and Waste Component) - The local Fire Department; and - Any other mandated authority. • Should there be any soil and groundwater contamination, the Control Environmental Officer: Pollution and Waste Component as per contact details specified above must be informed within five (05) working days. • Soil must be removed from the site and disposed of appropriately. • In the event of this occurring, the necessary clean up measures must be undertaken immediately. - Any soil/groundwater contaminated during construction must be removed, stored in sealed			

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	container and disposed thereof at a licensed facility. Proof of safe disposal must be kept in the environmental file. - Appoint appropriate contractors to remove any residue from spillages from site. - Ensure that used oils/lubricants are not disposed of on/near the site, but at a permitted landfill and that contractors purchasing these materials understand the liability under which they must operate. The Environmental Control Officer will be responsible for reporting the storage/use of any other potentially harmful materials to the relevant authority. • Should any sewer infrastructure be routed through existing stormwater culverts the following must be adhered to: - Mitigation measures must be put in place to ensure quick detection and repair of leakages or breakages in the pipe system. - Leakages must be contained in the immediate vicinity of the pipeline and must not be allowed to enter the stormwater system.			
Waste management	• For the purposes of this EMPr, waste includes all construction rubble, debris and refuse (e.g. food waste, garbage, rubbish, etc.), including hazardous waste (e.g. oils). • Bins and/or skips need to be supplied on site for disposal of waste within the construction camp. The bins must have liner bags for easy control and safe disposal of waste. • The Contractor must ensure that all litter is collected from the work and camp areas daily.	At all times during construction.	Contractor	Ensure efficient waste management during construction. Avoid pollution. Encourage recycling.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	• Bins and/or skips must be emptied regularly and waste must be disposed of at a registered landfill site. Waybills for all such disposals are to be kept by the Contractor for review by the Engineer/ECO. This is required for all waste disposed of. • The excavation and use of rubbish pits on site is forbidden. • The burning of waste is forbidden. • The area demarcated for the sorting and disposal of waste needs to be fenced off. The provision of separate skips for different waste types (i.e. "household" type refuse; building rubble) needs to be provided. • Hazardous waste such as fuel, oils and chemicals must be disposed of at a licensed hazardous waste disposal site with proof of disposal kept in the environmental file.			
Fire control	• All fire requirements must be carried out as contained in the National Building Regulations SABS 0400 and the safety code of the N.F.P.A. and aligned to the Ukuwela Fire Management Plan (where applicable). • The Contractor must take all reasonable and active steps to avoid increasing the risk of fire through their activities on site. The Contractor must ensure that the basic fire-fighting equipment is to the satisfaction of the Local Fire Services. The Contractor must ensure that all the correct fire-fighting equipment is available on site and within easy access. • No fires for heating or cooking must be permitted. • The disposal of any matter by burning is prohibited.	At all times during construction.	Contractor	Prevent fires on site during construction.
Rehabilitation of sensitive areas	• Rehabilitation must commence at the earliest time as prescribed by the ECO.	At all times during construction.	Contractor	Ensure that sensitive areas are rehabilitated should they be disturbed or

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	• The contractor must undertake any maintenance that may be required as a result of erosion control measures not functioning correctly, and where vegetation has not taken to reseed these areas to prevent further environmental degradation.			damaged during construction.
Geotechnical It should be noted that it is possible that localised, potentially unstable areas can become exposed during development, i.e. during earthworks.	• It is important to allow for onsite inspections and evaluations by an experienced engineering geologist/geotechnical engineer so that stability problems can be timeously identified and remedied.	At all times during construction.	Contractor	Impacts avoided or managed as per specialist recommendations.

10.5 Operation phase activities and associated environmental management requirements

This relates to the activities that occur once the construction is completed and the site is operational.

Table 13: Operation activities

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Erosion	• All sites must be checked for any signs of soil erosion on at least a quarterly basis. • All stormwater outflows must be protected with reno-mattresses and gabion baskets to reduce the effect of erosion on the access road. • Where possible, indigenous vegetation needs to be returned as soon as construction ceases. • Soil stockpiles need to be grassed with an indigenous mix and rehabilitated to prevent soil loss through wind and water erosion before operation phase begins. • Rehabilitation should take place as soon as construction is complete. • Operation phase should only begin once the ECO has deemed rehabilitation successful and mitigation measures have been implemented. • A six month check of the area should take place for the emergence erosion gulley's, and if gulley's emerge, will need to be rehabilitated immediately. • Any erosion found must be addressed immediately and be rehabilitated as is appropriate to the site. • Once the site has been repaired and revegetation done, an ongoing check must be undertaken for invasion by alien plant species. If any are found they are to be eradicated immediately.	Following completion of construction	Contractor	Ensure that disturbed areas are returned to its natural state post-construction

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Biodiversity loss due to operation phase	• A post construction monitoring programme to ensure that rehabilitation efforts are successful and that edge effects are reduced. • Monthly monitoring of these sensitive areas should take place during the first year after construction to ensure that rehabilitation is successful. • Six monthly checks of the area should take place for the emergence of invader species.			
Vegetation	• Compile and implement Alien Invasive Management Plan. • Rehabilitate disturbed areas.			

10.6 Decommissioning phase activities and associated environmental management requirements

This relates to the activities that occur once should the project be decomissioned. It is important that a meeting is held on site between the Engineer, ECO, the Contractor, and if necessary the EDTEA to approve all the remediation measures and to ensure that the site has been restored to a condition that is approved by the ECO and Engineer.

Table 14: Decommissioning activities

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Removal of the construction camp	• All structures comprising the construction camp are to be removed from site. • The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc, and these should be cleaned up.	Following completion of construction	Contractor	Ensure that disturbed areas are returned to its natural state post-construction

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	• All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top-soiled and re-vegetated if appropriate. • The Contractor must arrange the cancellation of all temporary services.			
Waste Disposal	• The developer and contractor must ensure that no construction material foreign to the site, including construction debris, is left unattended after construction activities have ceased/completed • All construction materials including rubble, cement bags, chemicals, fuels and oils must be safely stored in appropriate containers and disposed of at a license waste facility in accordance with the approved EMPr. • No remaining rubble is to be buried on site. • The site is to be free of litter and surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the Project Engineer.	Following completion of construction	Contractor	Ensure that no waste remains on site following the completion of construction. Ensure effective waste management. Prevent pollution.
Stormwater and erosion control measures	• Where possible, indigenous vegetation and rescued plants needs to be returned as soon as construction ceases. • Site to be reshaped and grassed with an indigenous mix and rehabilitated to prevent soil loss through wind and water erosion before operation phase begins. • Rehabilitation should take place as soon as construction is complete. • Six monthly checks of the area should take place for the emergence of erosion gulley's, and if gulley's emerge, will need to be rehabilitated immediately.	Following completion of construction	Contractor	Ensure effective stormwater management and erosion control measures post-construction.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
Biodiversity loss and alien invasive plant establishment due to operation phase	• A post construction monitoring programme to ensure that rehabilitation efforts are successful and that edge effects are reduced, should be implemented. • Monthly monitoring of these sensitive areas should take place during the first year after construction to ensure that rehabilitation is successful. • Monitoring and control of alien and invasive species as per an alien invasive control programme.	Following completion of construction	Contractor	Ensure that disturbed areas are rehabilitated post-construction.
Rehabilitation	• The applicant is responsible for compliance with the provision for Duty of Care and Remediation of Damage in accordance with Section 28 of the NEMA. Determination of damage vests with EDTEA. • All damaged areas shall be rehabilitated upon completion of the contract • Rehabilitation must take place in a phased approach as soon as possible and once construction is complete. • Re-vegetation of the disturbed areas is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction. • Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding. • Planting of indigenous tree species and or fruit bearing trees in areas not to be built upon must be encouraged. • Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. • The site must be checked for erosion damage and rehabilitation must be undertaken immediately. Erosion rills and gulley's must be filled-in with appropriate material and silt fences or fascine work must be established along	Following completion of construction	Contractor	Ensure that disturbed areas are rehabilitated post-construction.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	the gulley for additional protection until grass has re-colonised the rehabilitated area. • Effort must be made to ensure that the stormwater system including pipes, drains, headwalls and Reno-mattresses are not silted up during the construction phase and post construction phases. • The contractor must undertake any maintenance that may be required as a result of erosion control measures not functioning correctly, and where vegetation has not taken to reseed these areas to prevent further environmental degradation • A meeting is to be held on site between the Engineer, ECO and the Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the Engineer. A representative of EDTEA must be present at the final meeting or when the site is handed over on completion of construction.			
Wetland - Impacts associated with clearance and edge effects to the wetland habitat	**Rehabilitation and monitoring:** • The disturbed areas within the wetland and/or buffers must be rehabilitated after the water pipes are established. Compacted areas must be ripped and seeded immediately. An indigenous grass seed mix should be used as recommended by a wetland specialist. • Adhere to the requirements of the wetland rehabilitation plan if prepared. • The environmental control officer must be present during the establishment of the construction ROW, the excavation of the trench and the rehabilitation of the wetland to guide these processes.	At all times during construction.	Developer/ Service Providers, Contractors, Engineers.	Impacts avoided or managed as per specialist recommendations.

Aspect / Impact	Impact Management Action	Frequency / Timing	Responsibility	Impact Management Objective and Outcome
	• The disturbed area should be monitored for erosion once a month during the first wet season after construction. • The re-instated wetland areas must be monitored post-construction by the municipality to manage and control alien vegetation in the wetland.			

11. AMENDMENTS TO THE EMPR

The Environmental Control Officer (ECO) has the right to request (in writing) a method statement to be compiled by the contractor in cases where the Construction EMPr may not adequately address the issue or nature of the activity/site warrants the need thereof. The method statement must be approved in writing by the ECO prior to carrying out the activity.

Any major issues not covered in the EMPr as submitted as well as any layout changes, will be addressed as an addendum to the EMPr and must be submitted for approval prior to implementation.

Authorised officials of the Department reserve the right to review the approved EMPr during the construction and operational phases of the above-mentioned activity and amend/add any condition as it is deemed necessary. Authorised officials also reserve the right to inspect the project during both construction and operational phase of development.

12. ENVIRONMENTAL AWARENESS PLAN

Appendix 4 of GN R326 EIA Regulations 2014 (as amended) requires that and Environmental Awareness Plan describes the manner in which "*the applicant intends to inform his or her employees of any environmental risk which may result from their work; and risks must be dealt with in order to avoid pollution or the degradation of the environment*". In recognition of the need to protect our environment, environmental management should not only be seen as a legal obligation but also as a moral obligation.

This Environmental Awareness Plan is intended to create the required awareness and culture with personnel and contractor's / service providers on environmental safety and health issues associated with the development activities.

12.1 Policy on Environmental Awareness

This Environmental Awareness Plan must serve as the basis for the induction of all new employees (as well as contractors depending on the nature of their work on site) on matters as described herein and read in conjunction with the EMPr. The Plan will also be used to hone awareness of all employees on a continuous basis.

Specific environmental awareness performance criteria will also form part of the job descriptions of employees, to ensure diligence and full responsibility at all levels of the organisational work force.

12.2 Implementation of Environmental Awareness

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout the project's duration. This will ensure that environmental accidents are minimised and environmental compliance maximised.

Environmental awareness will be fostered in the following manner:

- Induction course for all workers on site, before commencing work on site;
- Refresher courses as and when required;

- Daily toolbox talks with all workers on the site at the start of each day, where workers can be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working; and
- Displaying of information posters and other environmental awareness material at the general assembly points.

12.3 Training and awareness

The main contractor is to take responsibility for the management of their staff and subcontractors on the project site during the construction phase and supervise them closely at all times. The onus is on the contractor to make sure that all their staff and subcontractors fully comprehend the contents of the EMPr. The contractor must organise environmental awareness training programmes, which should be targeted at the two levels of employee: management and labour.

12.4 Training of construction workers

All construction staff must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must be informed of how to recognise historical / archaeological artefacts that may be uncovered. They must also be apprised of the EMPr's requirements. Environmental awareness training programmes need to be formulated for these employee levels and must comprise:

- A record of all names, positions and duties of staff to be trained;
- A framework for the training programmes;
- A summarised version of the training course(s); and
- An agenda for the delivery of the training courses.

Such programmes will set out the training requirements, which need to be conducted prior to any construction works occurring and will include:

- Acceptable behaviour with regard to flora and fauna;
- Management and minimising of waste, including waste separation;
- Maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants, cement, mortar and other chemicals;
- Responsible handling of chemicals and spills;
- Environmental emergency procedures and incident reporting; and
- General code of conduct towards I&APs.

13. CONCLUSION

The environmental and social impacts of the project were identified through the main project phases (pre-construction and site establishment, construction, operation and decommissioning). The following section briefly describes some of the major impacts and proposed mitigation measures within each of the project phases.

13.1 Pre-Construction Phase and Site Establishment

The first site activities before mobilization of equipment will be a survey, required for final design. There will be negative impacts on land associated with the construction of camps (temporary loss) and storage of construction materials, and foundations for the buildings (permanent loss). Expectations of improvement in livelihood among locals should be addressed through public participation. Construction contracts will include environmental monitoring and management procedures and requirements. These must be in place prior to the commencement of any construction activities.

13.2 Construction Phase

This phase of the activity will have both positive and negative impacts. The positive impacts are employment opportunities offered to the construction workers and any other labourer who will be hired to provide their services during the construction phase as well as providing further opportunity for tourism. The negative impacts would include wastes generated, accidents, air, dust and noise pollution, vegetation clearance, soil erosion, socio-environmental issues, loss of vegetation, and compaction of soil. Most of the negative impacts are minor and temporary and the significance of the impacts can be greatly reduced by the implementation of mitigation measures, which are outlined in this EMPr. The contractor shall ensure that all staff have adequate protective clothing and are adequately trained.

13.3 Operational Phase

The proposed project will have minimal negative effects. Most of the negative impacts are minor and the significance of the impacts can be greatly reduced by the implementation of mitigation measures, which are outlined in this EMPr.

13.4 Decommissioning Phase

As with any project, the facilities used in this project will have a lifetime after which they may no longer be cost effective to continue with operation. At that time, the project would be decommissioned, and the existing equipment removed.

Potential environmental impacts caused during decommissioning are those, which will be mitigated as provided by the Environmental Management Programme. These include: noise and emissions to the surrounding environment, removal of hazardous waste and substances, fire, oil spills, wastes and public safety. The disposal of materials from the decommissioned plant is not viewed as high risk. Much of the material would be recyclable or inert (concrete foundations, etc.). These materials would however, need to be disposed of at a formal waste disposal or recycling centre.

Based on the above information, it is unlikely that the Project will have significant adverse social and environmental impacts. Most adverse impacts will be of a temporary nature during the construction phase and can be managed to acceptable levels with implementation of the recommended mitigation measures for the Project such that the overall benefits from the Project will greatly outweigh the few adverse impacts.

All the negative impacts could be easily mitigated and will either be moderate or less in rating. Generally, the proposed project will result in appreciable benefits to the people in the project area of influence and bring opportunities for tourism to the province.

Appendix A:
EAP CVs

Appendix B:
Master Layout Plan

Appendix C:
Environmental Authorisation (if granted)

Appendix D:
Palaeontological Chance Find Protocol

This protocol is based on that of Groenevald (2017). This Protocol will ONLY kick-in if palaeontological material is found. In the case of any unusual structures, the Palaeontologist must be notified immediately by the ECO and/or EAP, and a site visit must be arranged at the earliest possible time with the Palaeontologist.

In the case of the ECO or the Site Manager becoming aware of suspicious looking palaeo-material

- The construction must be halted in that specific area and the Palaeontologist must be given enough time to reach the site and remove the material before excavation continues.

- Mitigation will involve the attempt to capture all rare fossils and systematic collection of all fossils discovered. This will take place in conjunction with descriptive, diagrammatic and photographic recording of exposures, also involving sediment samples and samples of both representative and unusual sedimentary or biogenic features. The fossils and contextual samples will be processed (sorted, sub-sampled, labeled, and boxed) and documentation consolidated, to create an archive collection from the excavated sites for future researchers.

Functional responsibilities of the Developer

1. At full cost to the project, and guided by the appointed Palaeontological Specialist, ensure that a representative archive of palaeontological samples and other records is assembled to characterize the palaeontological occurrences affected by the excavation operation.

2. Provide field aid, if necessary, in the supply of materials, labour and machinery to excavate, load and transport sampled material from the excavation areas to the sorting areas, removal of overburden if necessary, and the return of discarded material to the disposal areas.

3. Facilitate systematic recording of the stratigraphic and palaeo-environmental features in exposures in the fossil-bearing excavations, by described and measured geological sections, and by providing aid in the surveying of positions where significant fossils are found.

4. Provide safe storage for fossil material found routinely during excavation operations by construction personnel. In this context, isolated fossil finds in disturbed material qualify as “normal” fossil finds.

5. Provide covered, dry storage for samples and facilities for a work area for sorting, labeling and boxing/bagging samples.

6. Costs of basic curation and storage in the sample archive at the Museum in Durban (labels, boxes, shelving and, if necessary, specifically-tasked temporary employees) as specified by or agreed with AMAFA. Documentary record of palaeontological occurrences

7. The contractor will in collaboration with the Palaeontologist, make the excavation plan available to the appointed specialist, in which appropriate information regarding plans for excavations and work schedules

must be indicated on the plan of the excavation sites. This must be done in conjunction with the appointed specialist:

8. Initially, all known specific palaeontological information will be indicated on the plan. This will be updated throughout the excavation period

9. Locations of samples and measured sections are to be pegged, and routinely accurately surveyed. Sample locations, measured sections, etc., must be recorded three-dimensionally if any “significant fossils” are recorded during the time of excavation. Functional responsibilities of the appointed palaeontologist

10. Establishment of a representative collection of fossils and a contextual archive of appropriately documented and sampled palaeoenvironmental and sedimentological geodata at the Museum in Durban.

11. Undertake an initial evaluation of potentially affected areas and of available exposures in excavations.

12. On the basis of the above, and evaluation during the early stages of excavation development, in collaboration with the contractor management team, more detailed practical strategies to deal with the fossils encountered routinely during excavation, as well as the strategies for major finds.

13. Informal on-site training in responses applicable to “normal” fossil finds must be provided for the ECO and environmental staff by the appointed specialist.

14. Transport of material from the site to the Museum in Durban.

15. Reporting on the significance of discoveries, as far as can be preliminarily ascertained. This report is in the public domain and copies of the report must be deposited at ESI, AMAFA, and the South African Heritage Resources Authority (SAHRA). It must fulfill the reporting standards and data requirements of these bodies.

16. Reasonable participation in publicity and public involvement associated with palaeontological discoveries. In the event of construction exposing new palaeontological material, not regarded as normative/routine as outlined in the initial investigation, such as a major fossil plant find, the following procedure must be adhered to:

17. The appointed specialist or alternates (AMAFA, SAHRA; University) must be notified by the responsible officer (e.g. the ECO or contractor manager), of major or unusual discoveries during excavation, found by the Contractor Staff.

18. Should a major in situ occurrence be exposed, excavation will immediately cease in that area so that the discovery is not disturbed or altered in any way until the appointed specialist or scientists from the ESI at WITS University, or its designated representatives at AMAFA, have had reasonable opportunity to investigate the find. Such work will be at the expense of the Developer.

Appendix E:
Aquatic Monitoring Programme

1. MONITORING REQUIREMENTS

The construction of the proposed developments must be monitored by an appropriately qualified Environmental Control Officer (ECO) during the construction phase. The purpose of the monitoring will be to check that no watercourse or wetland is being impacted upon in any way including inputs of soil/sediment, liquid wastes of any sort, and solid wastes generated by the building activities.

1.1 Monitoring actions and locations

The monitoring programme provided for below must be conducted by an independent, suitably qualified ecological specialist or specialists.

The monitoring programme will ensure that the stipulated construction and operational conditions which have been included in the EMPr are adhered to, and to monitor the condition of the aquatic systems. All of the building sites are to be monitored as well as the various road upgrades and water pipeline trenches. Apart from direct observations, a photographic record must be compiled and, at all watercourse crossing points, at least one fixed point photographic site should be established. The recorded views of the sites will be such that any sediment inputs or damaging changes to the banks can be noted and recorded.

1.2 Monitoring Actions and Frequency

Table 1 below lists the required monitoring actions and schedules

Table 1: Monitoring actions to be carried out

Actions	Frequency	Rationale
Familiarisation visit to all the various sites prior to the start of any construction. The monitoring sites will be visited and fixed photo points will be selected and documented.	About one month before the start of any construction works.	To meet with the reserve manager and to acquire baseline data, including photographs, which may be used as a benchmark against which the results of future monitoring may be measured.
Visit by the ECO at the start of the construction phase	One visit	The visit at the start of the construction process is called for to ensure that the initial clearing work is done according to the required conditions.

Actions	Frequency	Rationale
Monitoring visits by the ECO to the construction area. To include fixed point photography.	Monthly for the remaining duration of the construction and sign-off phases.	The ECO will check that all the required environmental stipulations in the EMPr are being adhered to and will report on the findings as required by Appendix 7 of the NEMA: Environmental Impact Assessment Regulations of 2014 (as amended).
Ecological monitoring. To include fixed point photography.	Six monthly for the duration of the construction and sign-off phases.	The results of the monitoring will form a long term record of the development process.

Each monitoring event must be reported on and the reports be submitted to the Umkhanyakude District Municipality, EDTEA, The DWS, and the project engineers and/or as required.

1.3 Procedures for the monitoring programme

The focus of the sampling aspects is to investigate any traces of damage to the environment beyond the footprints of the various development sites. Therefore, the ECO will consider the following:

- Movement of loose soil out of the site. A search must be made for any indications that loose soil is being transported from the site. Possible origins of such materials could include building platforms, soil heaps whether stockpiles or spoil heaps, roads, pipeline trenches. Areas of particular concern will be watercourses, wetlands, and their surrounds.
- Damage to watercourses at road or pipeline crossings. At any place where a watercourse or wetland is approached or crossed, the ECO is to ensure that the banks or margins are not permanently damaged. Care must be taken to ensure that the areas are left in a stable condition and that they are revegetated with locally indigenous grasses.
- The areas downslope of any septic tanks should be walked over in the dry season to look for any traces of unnatural groundwater seepage. If any are found, an appropriate specialist must be consulted to determine means of further dispersion of the flows at site.
- All sites must be photographed.

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