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Sept 2023

Final

Environmental Management Program (EMPr)

Proposed Mixed-Use Residential "Agrihood" Development with Associated Infrastructure on Portion 1, Portion 3, Portion 4, Portion 5, Portion 7, and Portion 8 of Erf 2054 Hilton, within the uMngeni Municipality

Ref.: DC22/0017/2023; KZN/EIA/0001913/2023

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Document Control Record

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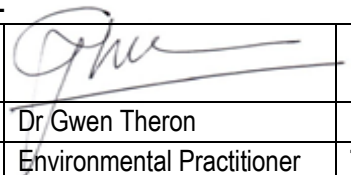
Report Title	Proposed Mixed-Use Residential "Agrihood" Development with Associated Infrastructure on Portion 1, Portion 3, Portion 4, Portion 5, Portion 7, and Portion 8 of Erf 2054 Hilton, within the uMngeni Municipality **Ref.: DC22/0017/2023; KZN/EIA/0001913/2023**					
Document ID	Final EMPr					
File Path	*U:\Main data\PROJECTS\M*Mount *Verde EIA\LEAP Submissions\Draft EIA\Annexure L - Final EMPr GT edit.docx*					
Client	Mount Verde (PTY) LTD		**Client Contact**		Mr Andre Voigts	
Revision	**Date**	**Revision details/Status**	**Prepared by**	**Author**	**Verifier**	**Approved by**
0	September 2023		Dr. G Theron (EAPASA 2019/1421)			
1						
2						
3						
Current Revision						
APPROVAL						
Signature						
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Undertaking by the Developer

I, ……, acting on behalf of ……. (the Developer), for:

Proposed Mixed-Use Residential "Agrihood" Development with Associated Infrastructure on Portion 1, Portion 3, Portion 4, Portion 5, Portion 7, and Portion 8 of Erf 2054 Hilton, within the uMngeni Municipality

Ref.: DC22/0017/2023; KZN/EIA/0001913/2023

hereby confirm that I have read through the Environmental Management Program and understand the measures required to be implemented in terms of the EMPr. I hereby undertake to implement these measures and carry out my duties as specified herein.

Signed on at ……. on ……..……..(date)

Contractor's Environmental Representative Signature …….

Witness……..

Witness…….

Undertaking to Implement the EMPr

Undertaking by the Contractor

I, ……, acting on behalf of …… (the Contractor), for

Proposed Mixed-Use Residential "Agrihood" Development with Associated Infrastructure on Portion 1, Portion 3, Portion 4, Portion 5, Portion 7, and Portion 8 of Erf 2054 Hilton, within the uMngeni Municipality

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hereby confirm that I have read through the Environmental Management Program and understand the measures required to be implemented in terms of the EMPr. I hereby undertake to implement these measures and carry out my duties as specified herein.

Signed on at …… on …… (date)

Contractor's Environmental Representative Signature ……

Witness……

Witness……

Undertaking to Implement the EMPr

Undertaking by the Environmental Control Officer

I, **……**, the Environmental Control Officer appointed by

……, for:

Proposed Mixed-Use Residential "Agrihood" Development with Associated Infrastructure on Portion 1, Portion 3, Portion 4, Portion 5, Portion 7, and Portion 8 of Erf 2054 Hilton, within the uMngeni Municipality

Ref.: DC22/0017/2023; KZN/EIA/0001913/2023

hereby confirm that I have read through the Environmental Management Program, and understand the measures required to be implemented in terms of the EMP and hereby undertake to fulfil my duties as specified herein.

Signed on at **……** on **……** **(**date)

Environmental Control Officer Signature **…….**

Witness**…….**

Witness**…….**

1.0 INTRODUCTION

The purpose of an Environmental Management Program (EMPr) is to guide the planning and design, construction and operational phases of the construction of Proposed Mixed-Use Residential "Agrihood" Development with Associated Infrastructure on Portion 1, Portion 3, Portion 4, Portion 5, Portion 7, and Portion 8 of Erf 2054 Hilton, within the uMngeni Municipality.

The EMPr is developed in parallel with the planning and design phase, which enables environmental guidelines and criteria to be incorporated into the detailed design. This is done to eliminate or mitigate the various possible risks to the environment and its surrounding inhabitants during the planning and pre-construction phase. And it will subsequently ensure that minimal damage will occur to these areas during the construction and operational phases of a project.

2.0 PHASES, ROLES & RESPONSIBILITIES

2.1 Phases of the Project

The approach of any EMPr is to take a pro-active route by addressing and minimising any potentially significant problem before it occurs. This EMPr addresses the following phases:

2.1.1 Planning or Design Phase

It is essential that possible problematic situations be eliminated or mitigated during the planning phase, to ensure that contingency plans are prepared for any possible accidental situation that may arise during the construction phase. By having these contingency plans in order before construction starts it will limit any further potentially detrimental impacts to the environment and its surrounding inhabitants.

2.1.2 Construction Phase

Most possible impacts on a site would occur during the construction phase, and most of them will have immediate effect (e.g. dust pollution, fuel spillage). It is therefore vital that the site is monitored on a continual basis during this phase, as it would be possible to identify and correct these impacts as they occur, thus minimising their possible impact.

2.1.3 Operational Phase

By being pro-active during the design and construction phases, potentially harmful impacts originating in the operational phase will be minimised or eliminated the Proposed Mixed-Use Residential "Agrihood" Development with Associated Infrastructure on Portion 1, Portion 3, Portion 4, Portion 5, Portion 7, and Portion 8 of Erf 2054 Hilton, within the uMngeni Municipality, the following aspect are important during operations and is more thoroughly addressed under Items as indicated

- Waste management – 11.3.2
- Deliveries – 11.13
- Storm water management -11.1 and 11.2.2 and 11.12
- Maintenance of the wetlands – 11.14
- Noise – 11.6
- Traffic – 11.13

- Safety and security – 11.1 and 11.7

2.1.4. Decommissioning Phase

Thoughtful design, thorough monitoring and strict adherence to the EMPr during the construction and operational phases will ensure that the decommissioning phase (if and when applicable) will be done efficiently and with minimal damage to the bio-physical and social environments.

2.2 Roles and Responsibilities

Various role players have a range of responsibilities to perform during the different phases of a project:

2.2.1. Project Manager (PM) (Developer Representative)

- The PM will be responsible for overseeing the contract from initiation to completion of construction on the site.
- The PM will appoint a team of contractors, which will be responsible for the construction of the entire project.
- The PM will be responsible for ensuring that the development is implemented according to the requirements as set out in the EMPr.
- The PM should ensure that sufficient resources are available to the other role players to efficiently perform their tasks in terms of the EMPr.
- The PM must appoint an independent ECO to ensure strict adherence to the EMPr.

2.2.2. Resident Architects (RA)

Only architects approved by the PM will be allowed to work on the project and will oversee the individual contracts between the owners of the entire site or portions thereof and the contractors.

2.2.3. Resident Engineer (RE)

A resident engineer act as a direct, on-site resource for all technical aspects related to the development. He is not always available on the construction site, overseeing all phases of the construction activities.

2.2.4. Consulting Engineer (CE)

The engineer consulted during the construction period. They are not always available on site but were part of the specialist team during the design of the proposed development.

2.2.5. Environmental Control Officer (ECO)

The ECO and External Environmental Auditor will be appointed at the start of the construction phase and is mandated to do the following:

- Ensure that all contractors/subcontractors/employees are fully aware of their environmental responsibilities. This will take the form of an initial environmental awareness-training program in which requirements of this document will be explained.
- Any damage to the environment must be repaired as soon as possible after consultation between the ECO and/or External Auditor, Consulting Engineer and Contractor

- The ECO shall monitor their actions to ensure that the developer staff and/or contractor are adhering to all stipulations of the EMPr
- The ECO and External Auditor shall be responsible for monitoring the construction activities throughout the project by means of site visits and meetings. This should be documented as part of the site meeting minutes
- The ECO must sign off that the PM certify that they shall ensure that all clean-up and rehabilitation or any remedial action required, are completed prior to transfer of properties
- A post construction environmental audit is to be conducted to ensure that all conditions in the EMPr have been adhered to.

2.2.6 Contractor

The Contractor is appointed at the start of the construction phase and is responsible to do the following:

- Ensure that all subcontractors/employees are fully aware of their environmental responsibilities. This will take the form of an initial environmental awareness-training program by the ECO in which the requirements of this document will be explained.
- Further toolbox talks with an environmental theme must be conducted at least every 14 days to ensure that the subcontractors/employees rare consistently reminded that of the contents of the EMPr.
- Any damage to the environment must be repaired within 14 day maximum after the Contractor has been made aware of the non-compliances.
- The Contractor shall assign an appropriately knowledgeable representative who shall accompany the ECO during site visits to monitor the construction for compliance during site visits. The results of the site visit must be documented as part of the site meeting minutes for immediate action.
- The Contractors shall give feedback within 14 days to the PM, Engineer and ECO to demonstrate the remedial measures to rectify the noncompliance observed on site.
- The Contractor must sign off the undertaking to comply with the EMP and EA that they shall ensure that all clean-up and rehabilitation or do any remedial action required as instructed by the Engineer, ECO or PM.
- A post construction environmental audit will be conducted to ensure that all conditions in the EA and EMPr have been adhered to and that the site is in a condition that satisfies these requirements. If found not to be complement, the Contractor will be responsible to complete all work requires to the satisfaction of the ECO prior to the site being taken over by the Client.

2.2.7 Community Liaison Officer (CLO)

Where necessary / required a representative of the community, as nominated by the community, will be the CLO and has the role of representing the community and managing all communication between the ECO, the Contractor and the community (I&APs). (The details of the CLO are to be forwarded to the Ward Municipality or for the area.)

3.0 IMPLEMENTATION AND MONITORING

3.1.1 Auditing/Inspections

- The appointed ECO and External Auditor on a fortnightly basis, and also ad hoc basis will inspect the site where necessary
- The PM as well as the contractor's representative will accompany the ECO and External Auditor, onsite inspections
- The contractor will use the formats presented in this EMPr to report to the PM as to the compliance to this document
- One submission of ECO reports will be made to the Department on monthly basis during construction phase and comprise of two inspection reports.
- One submission of environmental audit reports will be made to the Department on monthly basis during construction phase and will comprise of two audit reports
- Once major construction is completed and no environmental infringements are noted on site, an ECO close-out report and final audit report will be submitted to the Department

When, in the opinion of the ECO and/or External Auditor, a construction activity will result in environmental damage, the ECO and/or External Auditor will issue instructions to the PM, who will in turn order the Contractor to halt the activity. Spot fines or penalties may be levied for non-compliance.

3.1.2 Methods Statements

Methods statements from the contractor will be required for specific sensitive actions on request of the authorities or ECO. All method statements will form part of the EMPr documentation and are subject to all terms and conditions contained within the EMPr document. For each instance where in it is requested that the contractor submit a method statement to the satisfaction of ECO, the format should clearly indicate the following:

- What – a brief description of the work to be undertaken
- How – a detailed description of the process of work, methods and materials
- Where – a description / sketch map of the locality of work
- When – the sequencing (phases) of actions with commencement date and completion date estimates

The contractor must submit the method statement before any particular construction activity is due to start. Work may not commence until the method statement has been approved by the ECO.

3.1.3 Record Keeping

All records related to the implementation of this management plan (e.g. site instruction book, ECO diary, methods statements etc.) must be kept together in an office where it is safe. Records should be kept for two years and at any time be available for scrutiny by any relevant authority.

When, in the opinion of the ECO, a construction activity will result in environmental damage, the ECO will issue instructions to the PM, who will in turn order the Contractor to halt the activity. Spot fines or penalties may be levied for non-compliance.

- The Contractors shall give feedback within 14 days to the PM, Engineer and ECO to demonstrate the remedial measures to rectify the noncompliance observed on site.

3.1.2. Installation prior to construction commencing.

Requirement	Comply	Date requested
1. Compile Environmental File to be kept on site at all time, according to the Table of Contents provided herewith.		
2. Complete the site establishment requirements		
3. Survey ALL sensitive areas as per the site plan attached.		
4. Install clear demarcation markers to identify the wetland, 32 buffer or any other sensitive areas as indicated on the site plan attached. 5. Varying from the site plan for the demarcation method, must be approved by ECO.		
6. Install toilets		
7. Submit site camp layout.		
8. Provide route plan for roads on site.		
9. Install measures to prevent hydrocarbon spills.		
10. Provide waste management plan.		
11. Demarcate CLEARLY waste management areas		
12. Provide eating and washing facilities at Site Camp		
13. Provide eating and washing facilities at construction camp		
14. Provide method statements for erosion control		
15. Provide method statements o prevent siltation on roads and into water courses.		
16. Provide method statements for rehabilitation to be implemented throughout the project timeframe.		
17.		

4. STANDARDS

- The ECO will keep written and photographic records of the site and it's surrounding before, after and during construction on the site
- The Contractor will keep records of construction activities, instructions received from the ECO and PM concerning environmental matters
- The ECO will keep records of cases of non-compliance and remedial actions taken
- Where no quantitative standards are applicable, visual standards will apply
- The contractor will rehabilitate the site to a condition acceptable to the ECO, and respond timeously to any complaints and instructions regarding construction activities

5. EMPR OBJECTIVES

This EMPr must be used during the pre-construction, construction, and operational phases of the proposed project. The objectives of this plan are to:

- Ensure all environmental safeguards are carried out correctly
- Manage site activities effectively and coordinate with other trades
- Minimise adverse impacts on the environment
- Ensure that environmental mitigation measures are in place from the start of the project
- Minimise disruption to fauna and flora
- Monitor the project
-

6. EMP CONTEXT AND ENVIRONMENTAL AUTHORISATION CONDITIONS

This EMPr fits into the overall planning process of the project and should be implemented by the developer as soon as the authorities have approved it. A copy of the EMPr should always be available on site. All contractors and sub-contractors are to be familiar with the EMPr and its contents.
Specific conditions of the ROD pertaining to the project will be included in the ROD **(Appendix C)**
The layout as approved in the ROD are attached as **Appendix D**

7. LEGISLATION

- The EMPr is compiled in order to comply with the following legislative documents:
- National Monuments Act, 1969 (Act 28 of 1969)
- National Parks Act, 1976 (Act 57 of 1976)
- Environmental Conservation Act, 1989 (Act 73 of 1989)
- National Environmental Management Act, 1998 (Act No. 107 of 1998)
- Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965)
- The National Water Act, 1998 (Act 36 of 1998)
- Mine Safety and Health Act, 1996 (Act 29 of 1996)
- The Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
- Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
- Animal Protection Act, 1962 (Act 71 of 1962)
- Local Municipality By-Laws
- Municipal Systems Act, 2000 (Act 32 of 2000)
- Municipal Structures Act, 1998 (Act 117 o 1998)

8. PROJECT OVERVIEW

The proposed Mount Verde Village is situated on Portion 1, Portion 3, Portion 4, Portion 5, Portion 7, and Portion 8 of Erf 2054 Hilton, within the uMngeni Municipality. The development site is located 450 metres east of Hilton Gardens in Pietermaritzburg. Regional access to the development area is provided via N4 while local access is provided via Mount Verde Drive which is an extension of Weir Drive, within the uMngeni Municipality, KwaZulu Natal Province. The entrance area must be upgraded to allow ease of movement through the entrance gate.

The site is approximately 86 hectares in extent.

Portion	Size (sqm)	Size HA
Portion 1	184874	18.4874
Portion 3	131875	13.1875
Portion 4	220190	22.019
Portion 5	84954	8.4954
Portion 7	159247	15.9247
Portion 8	79126	7.9126
Total	**860266**	**86.0266**

The zoning, under the uMngeni Local Municipality Town Planning Scheme, for the Mount Verde Village is "Urban Agriculture".

The Proposed Mixed-Use residential development with associated infrastructure will not only benefit the future residents in the area, but it will also assist urban integration, infill development and assist to achieve the overall development strategies of the UMngeni Local Municipality.

This development represents an opportunity for this vacant land to be developed to its highest potential at an appropriate scale and in an economically viable way.

While the development will benefit the greater community, the surrounding land owners cannot be ignored. The farming communities to the east and north must be considered and their livelihoods regarded.

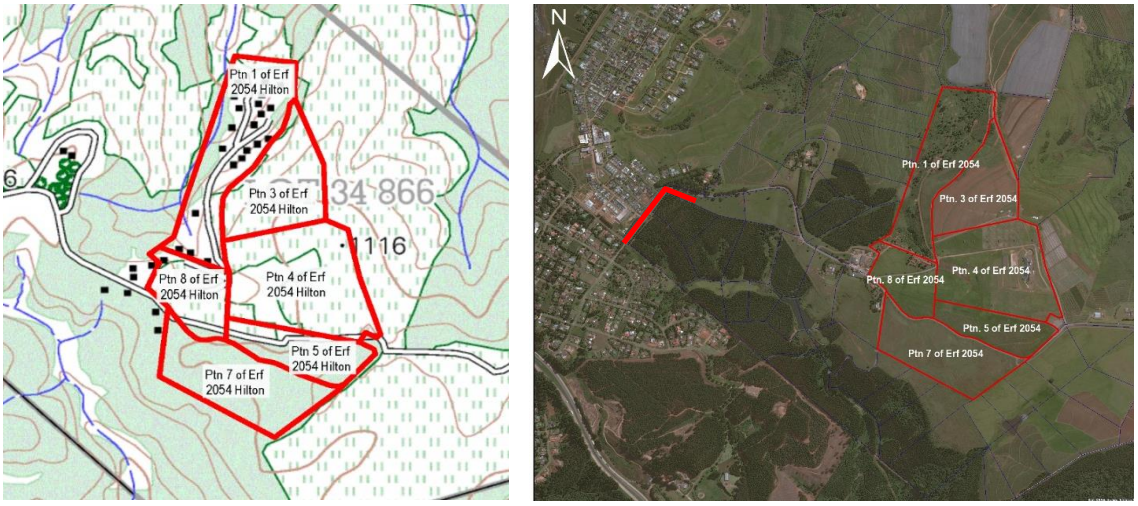

Figure 1: Google Location Map The proposed Mount Verde Village is situated on Portion 1, Portion 3, Portion 4, Portion 5, Portion 7, and Portion 8 of Erf 2054 Hilton, within the uMngeni Municipality. Entrance road to be upgraded is also indicated. **(Source: Google Earth)**

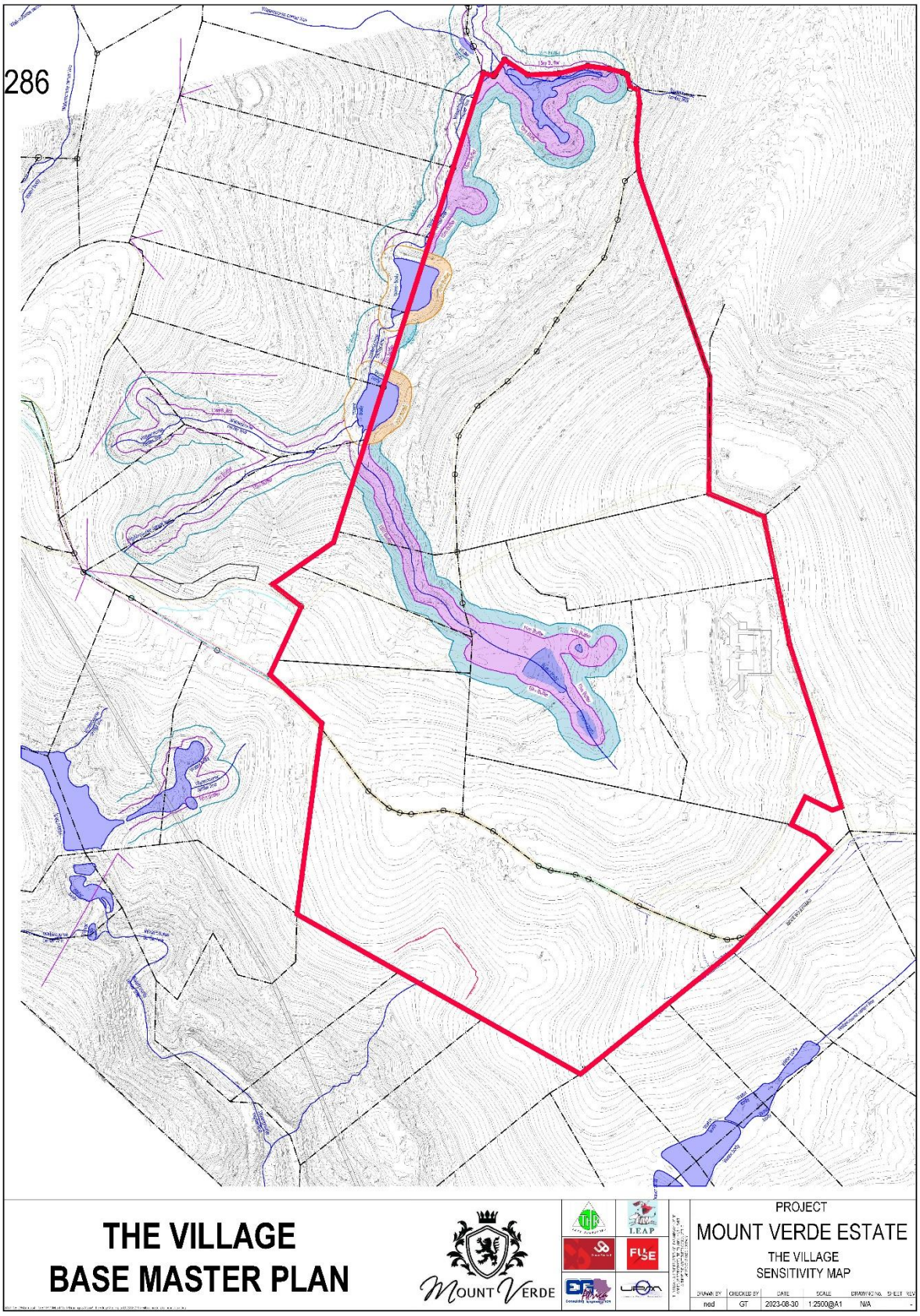

Figure 2: Sensitivity Map

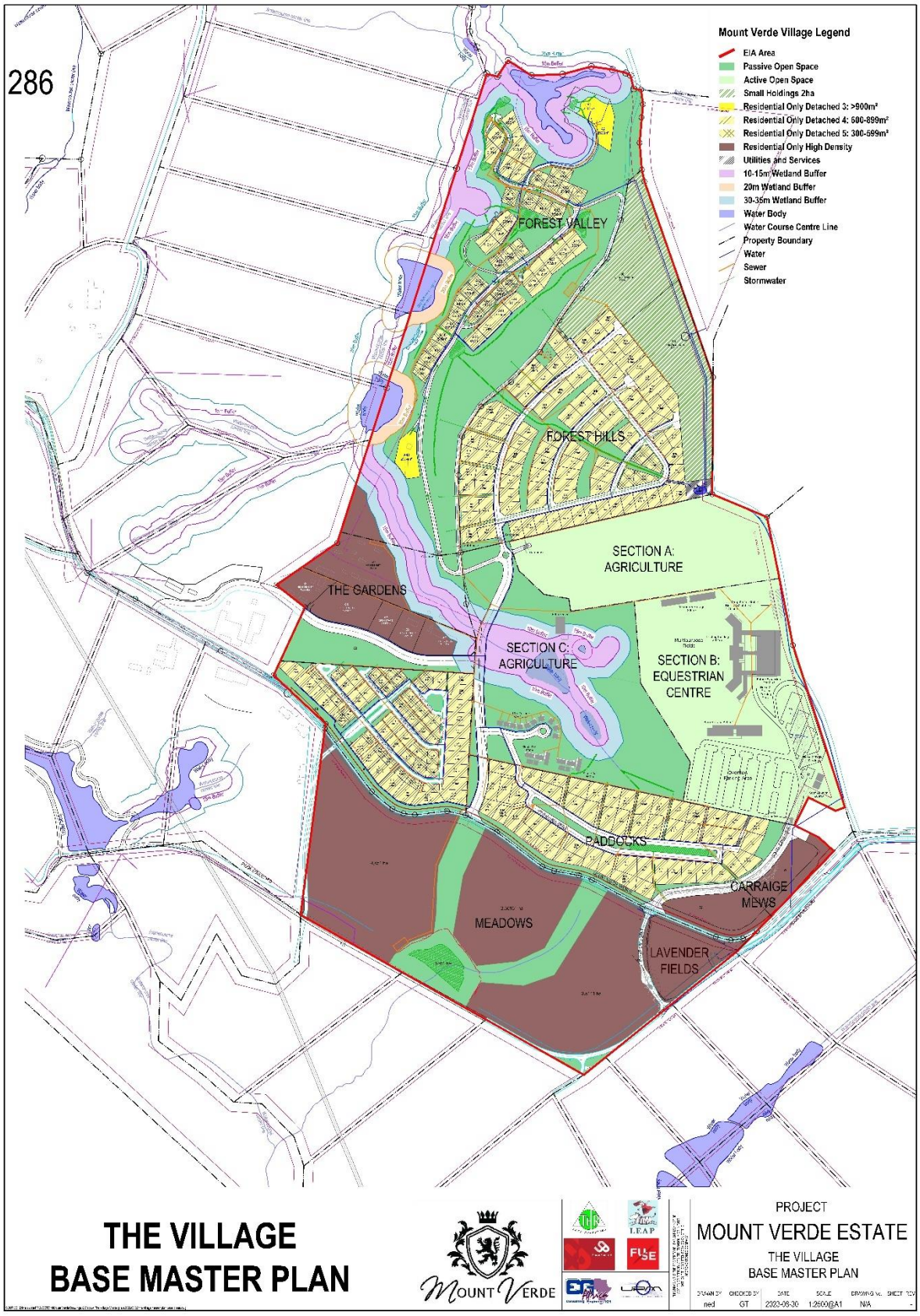

Figure 3: Proposed Layout Plan

9. TIMEFRAMES

The expected construction period will be phased with an estimated timeframe of approximately 10 years.

RECEIVING ENVIRONMENT

Topography and Drainage

The site is at an elevation ranging between 1000-1120 meters above mean sea level. It slopes to the north-west at an average gradient of approximately 10 %, to the Doringsrpuit that originates on Mount Verde. A small section along the southern boundary drains to the south into a tributary of the town Bush Stream.

Climatic Conditions

Hilton in Pietermaritzburg has a warm and temperate climate classified as Cfb under the Köppen climatic classification. The driest months in a year are June and the most precipitation falls in December. Pietermaritzburg experiences extreme seasonal variation in monthly rainfall.

General Geology

- According to the 1:250 000 scale geology map series 2930 Durban, the regional geology comprises of the rocks of the Karoo Supergroup. The site is predominantly underlain by the mudrock of the Volksrust Formation. Northern portion is underlain by fine- to coarse-grained sandstone, shale, coal seams of the Vryheid Formation, while the southern portion is underlain by the Karoo Dolerite Suite, which consist of an interconnected network of dolerite sills, sheets and dykes. The soils on the site tend to be acid, heavy and clay-rich and there are deposits of alluvium and landslip material.
- There are no dolomites underlying the site and will not impact the proposed development.

Agriculture

- Mottram and Associates conducted an agricultural assessment on one of the Mount Verde Farm portions and provided general information that is applicable to the conditions at Mount Verde Village.
- Cattle is allowed to roam in the area of the Mount Verde Village to keep the kikuyu under control, but the area allocated for the Mount Verde Village is currently not being utilised for any intense agricultural activities and is also located nearby other residential areas. Therefore, the property is not considered a viable farming unit and no impacts on agriculture, in respect of the proposed development, are anticipated.
- Sections of the Open spaces within each Hamlet will be used for Urban Agriculture in keeping with the theme and focus of the greater Mount Verde Farm.
- The Mount Verde Village comprise. 3.3% of the original Mount Verde Farm of approximately 2540 ha. The remainder of the land is already allocated to farming in land parcels of 5ha to 90 hectares.

Ecology

SDP Ecological and Environmental Services has been appointed to undertake a verification of the Terrestrial Biodiversity Assessment. Results of the study is herewith provided in the Draft EIA Report.

Vegetation type

- Based on Mucina and Rutherford (2006) (1986) and SANBI (2018), the study area forms part of the Grassland Biome and comprises two vegetation types namely, Moist Coast Hinterland Grassland and Midlands Mistbelt Grassland. Refer to Figure 15

Moist Coast Hinterland Grassland

- Moist Coast Hinterland Grassland is a subclass of Ngongoni Veld and is characterised as Vulnerable by Mucina & Rutherford (2006), however, the more recent and regionally appropriate assessments by Scott-Shaw and Escott (2011) have characterised it as Endangered.
- According to Mucina & Rutherford (2006), Moist Coast Hinterland Grassland can be described as dense, tall grassland that is dominated by the unpalatable grass, Aristida junciformis, and with a low plant species diversity owing to an Aristida monodominance. Other common grasses present include Chloris gayana, Hyparrhenia hirta, Sporobolus spp., Eragrostis spp., Cymbopogon validus and Themeda triandra. Various broadleaved herbs (forbs) that tend to be common include Stylochiton natalensis, Pentanisia prunelloides, Leonotis intermedia, Helichrysum spp., Senecio spp., Acalypha angustata, Vernonia tigna, Polygala virgata and Cyphostemma natalitium.
- Less than one percent is statutorily conserved in Protected Areas and the conservation target is 25% (Mucina & Rutherford, 2006)

Midlands Mistbelt Grassland

Midlands Mistbelt Grassland is Endangered and is one of the most threatened vegetation types in KwaZulu-Natal (Mucina & Rutherford, 2006; Jewitt, 2011). Only 0.5% is statutorily conserved in Protected Areas and the conservation target is 23% (Mucina & Rutherford, 2006). This vegetation and habitat type typically is dominated by forb rich, tall, sour *Themeda triandra* grassland which is often invaded by *Ngongoni grass, Aristida junciformis subsp. junciformis*

Habitat Assessment

The site has been broadly transformed for agricultural purposes, including livestock, cultivation and silviculture, with such activities having been undertaken for more than a century. Agricultural operations have been ongoing within the Hilton area, progressively 'fragmenting' natural grassland habitats and driving disturbance and habitat transformation. Such transformation has given rise to early seral graminoid states on much of the land, supporting mosaics of sourveld within affected areas.

Floral Assessment

- The site has a definitive graminoid structure with 73% of all species being grasses. Evidently the graminoid *P clandestinium* is the dominant species across all sites with *Digitaria eriantha* showing a sub-dominance. This state indicates that all grassland environments within the study area are managed with the purpose of providing suitable grazing for livestock. Notably a number of exotic species (9.7%) are evident and these species generally comprise of the herb component of the grassland, and are testimony to ongoing disturbance on these sites

- The site is considered to have 5 communities comprising two outliers comprising of Felicia *filliculoides* and *Eragrostis curvula*. There is little distinction between communities, with only a singular graminoid community being evident, while most other communities show a variation of graminoid and herb species, confirming that the grassland environments are highly manipulated through management, with varying levels of disturbance.
- The pasture lands present on site are highly disturbed due to extensive grazing. The dominant exotic species, namely, *Rubus cuneifolis* and *Bidens Pilosa*, are typical of grassland environments in the region, affected by ongoing disturbance. The latter species presents dense stands, resulting in bush encroachment within invaded areas. Other exotic species include Acacia mearnsii which is a legacy of the silviculture operations underway on neighbouring lands.
- It is evident that the properties in general, are typical of livestock intensive farming operations and have been subject to both silvicultural and pastoral land uses for an extended period. Botanical species composition is therefore the product of management and relic farming operations.

Habitat Sensitivity Mapping

The Department of Environment, Forestry and Fisheries' screening tool, indicates that the study site is of a "low to medium plant sensitivity". Evidently the site has been designated as having a "low" plant sensitivity and as such, the presence of botanical specimens of conservation importance is limited. The same tool indicates that the area has a "high terrestrial sensitivity", suggesting that the area in question presents areas of importance in the conservation of habitat and other biota.

Fauna

Faunal populations across most taxa, within the subject area at Mount Verde will be in a state of flux, given the general transition already underway within the greater study area. Such changes have been indicated above, but have given rise to the following factors which will alter faunal ethos in many taxa and lead to changes in population structures:

- The transition from a forested environment dominated by mono specific commercial species.
- The emergence of a secondary graminoid habitat (see Section 6 above).
- On going farming practices, including the cultivation of crops and pasture, with animal husbandry.
- The emergence of a number of open aquatic systems through the establishment of attenuation structures.
- The establishment of an "urbanising" environment, with increased human settlement associated with general disturbances.

Summary

An assessment of the wetland and terrestrial environments at Mount Verde residential estate was undertaken to inform and support decision making by the appointed EAP, LEAP Environmental. The following salient findings can be stated in respect of this assessment:

1. The subject area can be described as highly transformed on account of widespread historical and contemporary silvicultural and agricultural activities. In addition, other changes to the systems within the

site including the establishment of instream dams and the establishment of roads and services have served to alter the environment.

2. The graminoid environments on the property do not align with Midlands Mistbelt Grassland veld type. The graminoid environment on this property is in a depauperate state with a moderate level of exotic plant invasion.
3. Two catchments are evident on the site, draining to the east and west of the property. These watercourses and wetland environments are moderately to highly disturbed, with a singular maturing system associated with irrigation being evident.
4. The identified HGM units, whilst disturbed and transformed do provide several ecosystem services. Thus, these natural features (except for HGM N4) are recommended to be preserved and subject to rehabilitation in order to improve functionality.
5. A 25 m wetland buffer is recommended around all wetland systems within the estate as per DWS guidelines.
6. A 15-meter wetland setback buffer along the boundaries of natural wetlands has been recommended as per DWS guidelines.
7. While limited information is available in respect of the treatment and disposal of sewerage from the site, other than the use of wastewater for irrigation, a number of measures have been proposed which include basic measures for pre-disposal discharge.
8. Given the artificial nature of HGM N4, a cautionary buffer of 10 meters is proposed as inundation of this low point may arise during high precipitation events.

The proposed Mount Verde Mixed Use ”Agrihood” Development, as presented in Figure 2, has taken due consideration of the various wetland and related features evident on the site and as such, no variation to the proposed layout is recommended. It follows that direct impacts on wetland and riverine environments may emanate from the disposal of waste waters through irrigation, therefore this matter would require further consideration in terms of treatment and the nature of receiving environments.
Subject to the above and implementation of sound construction management and monitoring on the site, it is recommended that the proposed development in its present layout be sanctioned by the relevant authorities.

Wetland Assessment

A Wetland Assessment was completed by SDP Ecological and Environmental Services (2022). Results of the study is herewith included in the Draft EIA Report.

The summary of the conducted Wetland Assessment by SDP Ecological and Environmental Services (2022) is presented below.

NFEPA Wetlands

Five HGM units were identified namely: 1) HGM N1 lies within a deeply incised channel; 2) HGM N2 is a small wetland habitat, driven by sub surface seep; 3) HGM N3 is largely driven by sub surface flows; 4) HGM N4 (maturing artificial wetland system); and 5) HGM S1 is a channelled valley bottom wetland.

These HGM units are divided by a watershed with the northern catchment flowing into the Doringspruit River, whilst the comparatively smaller system along the southern periphery of the estate flows into a low-lying dam.

PES Category
The Present Ecological Status (PES) of the northern system comprising of 4 HGM units has a Category 'D', where wetlands are 'largely modified' whilst the southern system, comprising of a single HGM unit has been attributed with a PES category of 'C' indicating a moderately modified catchment.

EIS Category
The wetlands on site are of ***Moderate*** ecological importance and sensitivity, suggesting 'little' significance at a local scale and that the system is not highly sensitive to flow modifications with a substantial capacity for 'use'. The establishment of dams, as well as broad cultivation, have consequently affected the integrity of the wetland system

Functionality Assessment of Wetlands
Most channels identified in the northern system, presented evidence of seasonal and perennial flow, sustained by lateral seepage and surface runoff from the upper catchment. Broad manipulation of this system has arisen, because of extensive anthropogenic activities, both past and present and including the establishment of dams and roadways resulting in flow retardation and alteration of natural hydrological processes. The state of the 4 HGM units also varies considerably due to intensity and proximity of disturbance.

The southern wetland system has scoured and incised channels, which has altered the hydrology and geomorphology of this system. Given such manipulation, the effectiveness of physical services of this wetland system, such as sediment trapping, and erosion control are likely to be impaired.

Buffer Recommendation
Given the poor, modified state of the watercourses and wetland environments within Mount Verde as well as the limited ecological risk posed by the proposed development, a moderately conservative non-development buffer of 15 meters is recommended.

Conclusion
Rehabilitation of the wetlands, which is strongly encouraged, may also necessitate controlled encroachment, during which care must be taken not to further impact negatively on the systems. Water Quality Deterioration, Alien Vegetation Encroachment, and Erosion and Sedimentation measures have been provided in this report to aid in guiding the planning process.

Cultural Heritage Impact Assessment

A cultural Phase 1 Heritage Impact Assessment and Desktop Palaeontological Assessment for the proposed site has been undertaken by Umlando (2022) in accordance with the National Heritage Resources Act 25 of 1999 (NHRA). Detailed results of the study will be included in the Draft EIA Report.

Field Survey

- Based on the assessment of the area it is clear that there are no sites of cultural heritage origin and significance located here. The buildings identified have been demolished and some buildings have 'Corobrick' and not
- "Coronation' stamps. The property has high to very palaeontological sensitivity, due to Permian aged sedimentary rocks of the Volksrust and Vryheid formations underlying the site.

Conclusion

- From a cultural heritage point of view the development should therefore be allowed to continue. However, the subterranean presence of archaeological or historical sites, features or objects must always be taken into consideration. If any are uncovered during the development process a heritage specialist/archaeologist should be called in to investigate and recommend on the best way forward.

INFRASTRUCTURE AND SERVICES

Traffic

Zutari (Pty) Ltd have been appointed by Mount Verde (Pty) Ltd to prepare a Traffic Impact Assessment for the proposed residential component of the Mount Verde development on a site described as Portions 1 to 5 of the Farm Mt Verde No. 18081. The residential component of this development will consist of 295 single dwelling units and 491 high density units.

The proposed development is located on Weir Drive, Hilton which falls under the jurisdiction of the Umngeni Municipality north-west of Pietermaritzburg. A single boom/gatehouse access off Weir Drive is proposed to serve the entire development. The current zoning is Agriculture.

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The proposed development, described as Portions 1 to 5 of the Farm Mount Verde No. 18081, is situated in the Hilton area of the Umngeni Municipality, in the vicinity of the Hilton interchanges on the N3. Vacant land is located to the north and east of the Mount Verde estate and a residential estate is located to the south and the west of the Mount Verde estate.

The traffic generated by this proposed development may have an impact on Weir Drive from the location of the proposed access, then southbound through the Elizabeth Drive intersection, through the Monzali Drive intersection and through to Hilton College Avenue. The formal controlled access gatehouse is located off the end of Weir Drive and is not expected to have an impact on the surrounding intersections.

The proposed residential component of the Mount Verde Estate on a site described as Portions 1 to 5 of the Farm Mount Verde No. 18081 can therefore be supported from a traffic and transportation perspective.

Civil

Umsunguli Project Management cc was appointed by Mount Verde (Pty) Ltd to undertake an Engineering Report on the provision of Infrastructure Services and Storm Water Management for the proposed development.

- Where bulk services are not available, the infrastructure will be provided by the Developer. In terms of bulk services, the following will be implemented or provided:
  - Bulk Water – Provided by UMDM as a single bulk connection at the main entrance, in terms of the existing Service Level Agreement
  - Bulk Sewer – Provided by the Developer
  - Bulk Roads – Provided by the Developer, which includes the upgrade of certain municipal roads, as per TIA recommendation
  - Bulk Stormwater – Provided by the Developer
  - Bulk Electricity – Partially provided by Eskom, with additional capacity by Developer through off-grid and energy saving mechanisms
- the provision of services to the proposed development will be designed to norms and standards in accordance with the "Guidelines for Human Settlement Planning and Design" (Red Book) or to municipal standards in terms of the bulk roads or any service level agreement concluded, where applicable.

The conclusion is that the Mount Verde Development can proceed, subject to the following conditions:

- Implementing the recommendations of the Traffic Impact Assessment prepared by Zutari.
- Concluding an agreement between the Developer and uMngeni Municipality regarding the upgrade of municipal roads, based on specific traffic trip generation triggers, as well as the timing of the upgrades and associated costs, as per TIA recommendations.
- Consultation with the Engineers of the Shared Infrastructure Committee (SIC) on the proposed upgrades of the main gate house entrance and Mount Verde Avenue.
- Upgrading the bulk water storage facility, based on the implementation program of the various development nodes.
- Constructing a modular Waste Water Treatment Works, including a buffer tank, based on the implementation program of the various development nodes to ensure the quality of the treated effluent complies with standard limits.
- Implement stormwater management through the construction of multiple stormwater attenuation ponds, including the implementation of rainwater harvesting.

Electrical Supply

EG Africa Consulting engineers were appointed by Mount Verde (Pty) Ltd to undertake an Electrical Engineering investigation.

The developer has obtained a bulk supply from Eskom at 11000V on the eastern side of the development. The developer will reticulation to the new development and the line will consist of a combination of overhead and underground MV line (11000V) and underground LV (400/230V) electrical cable. These services will be installed in the road reserves and omnibuses as far as possible.

The LV reticulation will be fed from the ground mounted miniature substations to the Distribution kiosk strategically positioned to feed each stand via underground LV cable.

At the Distribution kiosk a 3/1pole 40A MCCB and space for the meter will be provided for connection to each stand.

Each homeowner will be metered via a pre-payment meter. The meter will be purchased from the Developer's service provider and the meter must be installed in the distribution kiosk along the site boundaries.

An LV cable will be installed from the metering kiosk to the closest point on each property. The supply cable to the dwelling will be joined to this cable at the homeowners cost.

IMPACTS AND MITIGATION MEASURES

As approved by KZN EDTEA through the acceptance of the Scoping report, the relevant issues were evaluated in terms of the most important parameters applicable to the environmental management. Several mitigation measures have been identified that could manage the impacts or mitigate them successfully.

CONCLUSION

The development proposal accommodates and avoids the sensitive areas, and in the areas, that have been identified as development land, has no fatal flaws in terms of the institutional, bio-physical, or socio-economic environments.

Table 1: Mitigation measures

Activity	Mitigation
Ecology & Wetland	
Impacts on Terrestrial Vegetation	• Where vegetation needs to be "opened" to gain access it is recommended that the herbaceous species are cut short rather than removing them. That will ensure that they regrow during the growing season. If possible "soil saver blankets" could be placed over the vegetation to prevent erosion and unnecessary trampling; • The removal of indigenous woody species should be avoided as far as possible; • An AIP Management/Control Plan should be implemented by a qualified professional. No chemical control of AIPs to occur without a certified professional; • Removal of alien invasive species should preferably commence during the pre-construction phase and continue throughout the construction and operational phases. AIPs should be cleared within the study area before any vegetation clearing activities commence, thereby ensuring that no AIP propagules are spread, or soils contaminated with AIP seeds during the construction phase; • The construction footprint must be kept as small as possible to minimise impact on the surrounding environment; • Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction activities. Additional road

	construction should be limited to what is absolutely necessary, and the footprint thereof kept to a minimal; • No collection of floral SCC or medicinal plants must be allowed by construction personnel; • No hunting or trapping of faunal species is to be allowed by construction personnel; • Informal fires by construction personnel should be prohibited, and no uncontrolled fires whatsoever should be allowed; • No construction rubble or cleared alien invasive species are to be disposed of outside of demarcated areas, and should be taken to a registered waste disposal facility; • All soils compacted as a result of construction activities should be ripped and profiled and reseeded; • Appropriate sanitary facilities must be provided during the construction of the development and must be removed to an appropriate waste disposal site; • No dumping of litter, rubble or cleared vegetation on site should be allowed, especially within the Freshwater Habitat. Infrastructure and rubble removed because of the construction activities should be disposed of at an appropriate registered dump site away from the development footprint. No temporary dump sites should be allowed in areas with natural vegetation, especially near the Freshwater Habitat; • If any spills occur, they should be immediately cleaned up to avoid soil contamination that can hinder floral rehabilitation later down the line. Spill kits should be kept on-site within workshops. In the event of a breakdown, maintenance of vehicles must take place with care, and the recollection of spillage should be practised, preventing the ingress of hydrocarbons into the topsoil; • Upon completion of construction activities, it must be ensured that no bare areas remain, and that indigenous species be used to revegetate the disturbed area; • Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon it; • It is recommended that where fencing is installed, such fencing allows for movement of small mammals, such as palisade fencing, as opposed to solid constructions such as walls. Should the perimeter be walled in, it is recommended that small opening be left to allow for continuous movement of small mammal species. Such openings must be continuously monitored and cleared of debris to ensure continued movement is possible; • A Re-vegetation and Rehabilitation Manual should be prepared for the use of contractors, landscape architects and grounds men to rehabilitate areas that became degraded due to construction activities;

	• All alien vegetation should be eradicated within the study site and invasive species as listed in this report should be given the highest priority; • The use of herbicides shall only be allowed after a proper investigation into the necessity, the type to be used, the long-term effects and the effectiveness of the agent. Application shall be under the direct supervision of a qualified technician; • All surplus herbicide shall be disposed of in accordance with the supplier's specifications and not close to or near the wetland/river areas; • A properly qualified ECO should be appointed to monitor all activities and to report any actions that could or potentially could have a negative effect on the environment. The ECO should be especially aware of any negative effects the proposed development could have on the wetland areas and should also keep records of all actions related to the environmental management plan that should be available on site for inspection. It is also recommended that photographic records are kept before, during and after construction of the various activities; • Adequate waste management measures must be implemented preventing possible illegal dumping and littering of adjacent sensitive areas; • All stormwater and runoff generated by the development activities must be appropriately managed; • Clearing activities and earth scraping should preferably be restricted to the dry season in order to prevent erosion; • Sandbags should be packed along the contour lines to prevent any soil washing into the wetland/river areas of the site; • Storm water and runoff should ideally be channeled through the grassland buffer areas and not directly into the endorheic pans; • Any animals encountered in the areas could be relocated away from the development site; • During the construction phase, workers must be limited to areas under construction and access to natural undeveloped areas must be strictly regulated, preventing uncontrolled hunting, poaching and gathering of firewood and medicinal plants; • The Site Manager and ECO must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase; • Animals unearthed or disturbed should ideally be released in appropriate habitat away from the development; and • Construction activities should be limited to the daylight hours preventing disturbances to the nocturnal activities of certain species and nearby human populations.
Impacts on streams and wetlands	• The project footprint must be limited as much as possible (this includes clearing of vegetation which must be restricted to what is essential);

	• Delineated extent of the CVB wetland and NEMA 32m Zone of Regulation be demarcated as "no go" areas during the construction phase; • Construction and site clearing must take place during the dry season to reduce impacts such as surface runoff and to limit potential impacts to the CVB wetland as a result of construction activities; • Implement an Alien and Invasive Plant management plan as part of the rehabilitation plan for the CVB wetland; • An adequate stormwater management plan, including designs according to the principles of Sustainable Urban Drainage System (SUDs), must be incorporated into the design of the development; • Existing access and gravel roads must be utilised to ensure no encroachment or indiscriminate vehicle movement and limit disturbance to the CVB wetland; • Ensure that access roads do not traverse the wetland or infringe on the wetland boundary and associated 32 m NEMA ZoR; • An ECO must be appointed in order to ensure water related aspects are adequately mitigated for the life of the proposed development; • Dust suppression measures must be implemented (such as spray watering on gravel roads) throughout the proposed development activities to prevent excessive dust which may smother hydrophytic vegetation in the CVB wetland; • Any exposed soil/soil stockpiles must be protected for the duration of the construction phase with a suitable geotextile (e.g. Geojute or hessian sheeting) in order to prevent erosion and sedimentation of the CVB wetland during trenching activities; • Contractor laydown and storage areas must remain outside of the specified 32m GDARD setback zone around the wetland/river respectively, and only essential personnel must be permitted within this setback zone, the wetland zone; • Effective and strict erosion control throughout the construction phase is imperative. Erosion berms should be installed to prevent gully formation and further siltation of the watercourses. Erosion controls must be regularly maintained, at minimum on a fortnightly basis, particularly if rain is forecast or immediately following a rainfall event; • Fresh concrete and cement mortar should not be mixed within proximity of the CVB wetland or 32m NEMA ZoR; • Concrete spillage outside of the demarcated area must be promptly removed and taken to a suitably licensed waste disposal site; • A washout area should be designated outside of the confines of the CVB wetland and 32m NEMA ZoR; • Careful planning of the placement of construction machinery must be undertaken beforehand to ensure minimum impact on the CVB wetland;

	• CVB wetland must not inundate as a result of leaks or spillages associated with joining of the pipelines to the municipal networks, and that an emergency plan should be compiled to ensure a quick response and attendance to the matter in case of a leakage or bursting of a pipeline; • Should a blockage occur, possible steps must be taken to prevent the pollution of the CVB wetland during repair including the placement of sheeting around the manholes used for access as well as containment barrels for any effluent withdrawn; • The potential for small attenuation ponds may be incorporated as part of the development before entry into the CVB wetland; • The use of stone pitching, or alternatively a bioswale is recommended to manage the water that enters into the CVB wetland from hardened surface runoff as this will assist in preventing significant impacts on the hydrological functioning of the CVB wetland and reduce the risk of erosion and incision from stormwater discharge; • The installation of small ponds collecting water from hardened surface runoff and any bioswales must ensure that stormwater outputs do not result in excessive erosion and incision of the CVB wetland; • No concrete structures be installed and that the attenuation pond network release water into the CVB wetland via a bioswale which is lined with cobbles and indigenous vegetation; • Proposed small attenuation ponds must also be incorporated into a suitable and site-specific Stormwater Management Plan (SWMP); • Stormwater management plans should consider the proximity of the development and associated infrastructure to the CVB wetland to ensure that runoff patterns within the landscape are maintained as natural as possible; • Any construction vehicles facilitating laydown of the stormwater infrastructure must be regularly inspected for leaks and to be refuelled on sealed surfaces to prevent ingress into soil and subsequent leaching into the CVB wetland; • Areas where soils are exposed or destabilised need to be stabilised; • Edge effects (impacts on areas beyond the construction footprint due to ineffective care and management) during construction need to be strictly controlled through ensuring good housekeeping and strict management of activities near the watercourses or their associated setback zones; and • Following completion of construction, reprofiling of disturbed areas must take place, and must be revegetated with indigenous gramminoid species. The species composition to be utilised in re-seeding must be determined by a suitably qualified botanist in consultation with a suitably qualified freshwater ecologist (if the wetland areas are encroached upon)
• Heritage	

	• It is always best to preserve burial grounds and graves in situ. The amended development footprint areas must also allow for a buffer area of 100m around these burial grounds and graves. Additionally, burial grounds and property. This plan would guide the way in which these sites can be managed and preserved over time;
	• If it proves impossible for one or more of the identified burial grounds and graves to be preserved in situ, the following mitigation measures are required:
	  o A grave relocation process must be undertaken
	  o A detailed social consultation process, at least 60 days in length, comprising the attempted identification of the next-of-kin in order to obtain their consent for the relocation
	  o Bilingual site and newspaper notices indicating the intent of the relocation
	  o Permits from the relevant and legally required authorities.
	  o An exhumation process that keeps the dignity of the remains and family intact
	  o An exhumation process that safeguards the legal rights of the families as well as that of the mining company
	  o The process must be done by a reputable company well versed in the mitigation of graves
	• An on-site assessment and report by an architectural historian is required for Historical Structures;
	• An archival and historical desktop study must be undertaken of the Historical Structures. This study will be aimed at compiling the history of the structures, their ownership as well as their individual ages;
	• Documentation of structures before destruction. This requires that the remains be mapped, photographed and described in a report. Additionally, a site layout plan must be compiled;
	• In cases where the archival and historical desktop study has revealed that the structure(s) are older than 100 years, an attempt must be made to identify any archaeological middens associated with this site during the recording of the site layout plan. Should such middens be identified, archaeological test excavations would be required. Such test excavations may only be undertaken once a permit is received from SAHRA. If no such middens are found, no test excavations would be required. An archaeological mitigation report must be compiled and s destruction permit application lodged with SAHRA to allow for the destruction of the site; and
	• In cases where the structures are dated to older than 60 years but younger than 100 years, a stakeholder engagement process would usually be required by the Provincial Heritage Authorities. Such stakeholder engagement would likely include bilingual site notices and bilingual

		newspaper notices. A report must be compiled on the stakeholder engagement. After completion of the previous items a destruction application can be submitted to the Provincial Heritage Authority. This permit application must be submitted with the reports and documentation compiled during these previous activities

10. GENERAL ENVIRONMENTAL MANAGEMENT PROGRAM

Table 1: Environmental Management Program

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
10.1. Planning									
a) Appointment and duties of ECO	The Developer must appoint an independent ECO who must monitor the contractor's compliance to the EMP. The developer must provide contractors with a copy of the EMP. The priority of the ECO is to maintain the integrity of the development conditions as outlined in the EMP. The ECO must form part of the project management team and attend relevant project meetings.	√	√			DEVELOPER, ECO, CONTRACTOR	Continuous		
b) EMP	This EMP must be made binding to the Contractor, as well as sub-contractors and should be included in the tender documentation for the construction contract. The EMP is also binding to the owner during the operations of the facilities.	√	√			DEVELOPER, PROJECT MANAGER, CONTRACTOR	Once-off		
c) Environmental incidents	The Contractor and Owner must take corrective action to mitigate an incident appropriate to the nature and scale of the incident and must also rehabilitate any residual environmental damage caused by the incident or by the mitigation measures themselves.		√			CONTRACTOR, ECO	Continuous		
d)Flooding, erosion and sedimentation	If possible, construction activities should be scheduled for the drier months to decrease the risk of erosion during heavy thunderstorms. Storm water must not be allowed to flow directly into the wetland or stream situated on site. It must be directed to the road to be accepted into the municipal system. Where upgrading of systems is required according to the stormwater	√		√		DEVELOPER, PROJECT MANAGER			

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	management plan and the municipal guidelines must be implemented.								
e) Service systems	Care must be taken not to damage existing services infrastructure situated on the site. Should any services infrastructure be damaged it must be repaired immediately	√	√	√		PROJECT MANAGER, ENGINEER, CONTRACTOR			
f) Geology	Geological monitoring should commence during the Construction Phase by the Geotechnical engineer Site specific investigations must be conducted on erven planned for major structures prior to design finalization and construction.	√				ENGINEER, GEOLOGIST			
g) Structures	Road Infrastructure must be maintained in good standing at all times	√		√		DEVELOPER, ARCHITECT OWNER			
g) Landscape	The natural features of the site such as the wetland and stream including the 32m buffer zones situated on the site should be managed in a holistic manner. Sections where vegetation has been removed as part of the construction activities or unnecessarily, must immediately, upon instruction from the ECO, be re-vegetated with indigenous vegetation.	√				DEVELOPER, LANDSCAPE ARCHITECT, ECO			
h) Crime, safety and security	Entrance points of the construction site for the road must be secured. A 24-hour guard service must operate in the area and must conduct regular patrols. The intention is that the guards are visible on the streets and not only inside the facility. Workers must not be allowed to wonder through the neighbourhood before, during or after working hours.	√	√	√		DEVELOPER, CONTRACTOR			

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	Loitering must be avoided by clearly indicated signs showing **NO JOBS** placed around the outside of the site								
10.2. Soil									
10.2.2. Compaction									
a) Designated Routes	Designated routes shall be determined for the construction vehicles and designated areas for storage of equipment. These areas shall preferably be already disturbed. The construction camp must be situated on an already disturbed area and approved by the relevant municipal department.	√	√			PROJECT MANAGER, ECO, CONTRACTOR	Once-off		
b) Compacted areas	Areas that are compacted by machinery shall be ripped prior to them being rehabilitated with topsoil and grass seed. The compaction of the soil will be avoided by primarily using areas where existing disturbances exist at a level that precludes vegetation.		√			CONTRACTOR	Continuous		
c) Access points & routes	Clearly mark the site access point and routes on site to be used by construction vehicles and pedestrians. Provide an access map to contractors whom in turn must provide copies to the construction workers. Instruct drivers to use access point and determined route.	√	√			PROJECT MANAGER, ECO, CONTRACTOR	Once-off		
d) Vehicular fences	Fence off areas which are off limits to vehicles. Failure to adhere will result in spot-fines and damage will immediately be rehabilitated at the Contractor's expense.	√	√			ECO, CONTRACTOR	Once-off		
e) Excavated areas	Mark out the areas to be excavated to ensure that only necessary areas are excavated.	√	√			ECO, CONTRACTOR	Once-off		
10.2.3. Erosion									
a) Erosion prevention	Construction activities should preferably take place during the dry months. Surface run-offs shall be managed in such a way	√	√			ENGINEER, ECO, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	so as to ensure erosion of soil does not occur. Surfaces that are susceptible to erosion shall be covered with a suitable vegetative cover as soon as construction is completed. Or where erosion may potentially occur, dissipaters such as gravel beds or straw bales must be installed to prevent erosion.								
b) Surface cladding	Surfaces that are susceptible to erosion, shall be protected either by cladding with biodegradable material or with the top layer of soil being seeded with indigenous grass seed/planted with a suitable groundcover.	√	√			ECO, CONTRACTOR	Once-off		
c) Wet areas	No vehicles whatsoever are allowed to move across any wet areas (especially the wetland and stream on the site as well as wet soils areas after rainfall events), other than those specifically designated as access, which could cause erosion scouring and compaction.		√			CONTRACTOR	Continuous		
d) Swales	Erosion caused by construction methods or unusually heavy rainstorms must be prevented and managed by building retention swales and cut-off swales to direct the water to shallow slow flowing slope.		√			CONTRACTOR	Continuous		
e) Downhill areas	Straw bales should be placed and adequately secured on downhill locations where erosion may occur to prevent washouts and to retain siltation and topsoil from the site. A supply of straw bales must be kept on site for this purpose.		√			CONTRACTOR	Continuous		
f) Clearing of large areas	Where it is necessary to clear large areas, the clearing activities must immediately be followed by the planting of grass indigenous to the area or covering of the surface within 2 weeks.		√			CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
g) Clearing on slopes	If clearing occurs during the rainy season, an earth berm must be created along the up-slope side of the construction area, at the edge of the cleared area and should be constructed of stones from within the cleared area and covered with soil being removed within the area being cleared. For areas close to the wetland and stream on the site, it is also recommended that berms be created on the down-slope side of the cleared area to reduce the sediment load in the storm water run-off.		√			CONTRACTOR, ECO	Once-off		
h) Clearing footprints	The area being cleared of vegetation for the construction activities must be limited to a minimum. Only the footprint of the structure may be cleared. Areas should only be cleared a maximum of two weeks before construction begins.		√			CONTRACTOR, ECO	Continuous		
i)Contaminated areas.	Areas that are in any manner contaminated must be removed according to the recommendations of the specialist. If required the contaminated areas must be disposed of in a suitable manner as directed by the applicable legislation. Clearance certificates must be obtained and provided to the applicable and mandatory authorities.	√	√	√	√	CONTRACTOR, ECO	Continuous		
11.2.3. Topsoil									
a) Stripping of topsoil	The top (200-300mm) layer (as applicable) of all areas to be excavated for the purposes of construction shall be stripped and stockpiled in areas where this material will not be damaged, removed or compacted. This stockpiled material shall be used for the rehabilitation of the site. Weeds appearing on the stockpiled topsoil shall be removed by hand before seeding.	√	√			CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
b) Storing	In order to minimize erosion and siltation and disturbance to existing vegetation, it is recommended that stockpiling be done/ equipment be stored in already disturbed/exposed areas.	√	√			ECO, CONTRACTOR	Continuous		
c) Mowing of vegetation	Only areas directly affected by construction may be grubbed and stripped of topsoil. The vegetation on the remainder of the construction areas, where possible, may only be mowed short and shall not be removed.		√			CONTRACTOR	Once-off		
d) Grass component	When the stripping of topsoil takes place, the grass component shall be included in the stripped topsoil. Weeds must be removed by hand. The soil will contain a natural grass seed mixture that may assist in the re-growth of grass once the soil is used for back filling and rehabilitation.		√			CONTRACTOR	Once-off		
e) Infrastructure	During the construction of road and services infrastructure, topsoil shall be kept aside to cover the disturbed areas immediately after such activities are completed. Measures should be taken to ensure that no rocks or any other materials are placed on the top layer of soil. No more than 500 meters may be excavated at any one time.		√			CONTRACTOR	Continuous		
f) Designated areas	Stockpiling will only be done in designated places where it will not interfere with the natural drainage paths of the environment.	√	√			ENGINEER, ECO, CONTRACTOR	Continuous		
g) Flood line areas	No stockpiling shall be allowed within the wetland and stream including the 32m buffer areas or within the transitional zones.	√	√			ECO, CONTRACTOR	Once-off		
h) Stockpile covering	Cover stockpiles and surround downhill sides with a sediment fence or straw bales to stop materials washing away.		√			CONTRACTOR	Continuous		
i) Runoff prevention	Care must be taken to prevent the runoff of silt from open soil and stockpiles into the sensitive areas.		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
j) Removal areas	Remove vegetation only in areas designated during the planning stage.	√	√			CONTRACTOR	Once-off		
k) Stockpile footprint	Strip topsoil at start of works and store in stockpiles no more than 2m high in a designated materials storage area.		√			CONTRACTOR	Continuous		
l) Traversing topsoil	No vehicles are allowed to traverse the stockpiled topsoil areas.		√			CONTRACTOR	Continuous		
10.3. Waste Management									
11.3.1. Construction waste									
a) Planning	Plan the site before starting – for access, deliveries, construction areas, washout area, waste, stockpiles, and chemicals storage. Plan routes for trucks and also vehicles with limited turning ability. Indicate this on site and on maps prior to the event.	√				PROJECT MANAGER, ECO, CONTRACTOR	Once-off		
b) Storage	Temporary waste storage points on site shall be determined. These storage points shall be accessible by waste removal trucks and these points should not be located in areas highly visible from the properties of the surrounding landowners/tenants/in areas. These areas should also be already disturbed. The storage of solid waste on site, until such time that it may be disposed of, must be in the manner acceptable to the relevant Authority.	√	√			PROJECT MANAGER, ECO, CONTRACTOR	Once-off		
c) Waste Plan	The Civil engineer must prepare a Waste Management Plan. Coordinate with other trades on site and nearby businesses for potential reuse or 'waste exchange'. Coordinate with other trades working on site regarding site management, timing of works and waste management (recycling and reuse potential).	√				CONSULTANT, ECO, CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
d) Disposal	Solid waste shall be disposed of in a manner approved by the Gauteng Department of Agriculture and Rural Development. Solid waste must be removed and transported to a recognised waste disposal site on a weekly basis.	√	√			CONTRACTOR	Continuous		
e) Record keeping	Keep records of waste reuse, recycling and disposal for future reference. Provide information to ECO.		√			CONTRACTOR	Continuous		
f) Cleaning/clearing	Avoid the cleaning of the site camp or paved surfaces with soap. Roads should be cleared of any obstruction and should be swept clean with a broom, as to avoid the waste from entering the storm water systems.		√	√		CONTRACTOR	Continuous		
g) Waste removal	On completion of works, the contractor shall clear away and remove from the site construction paint, surplus material, foundations, plumbing and other fixtures of every kind. Areas thus cleared shall be graded and scarified to restore the ground as near as possible to its original profile.			√		CONTRACTOR	Once-off		
i)hazardous waste.	Waste that can be classified as Hazardous must be tested and then must be removed according to the recommendations of the specialist. If required the contaminated areas must be disposed of in a suitable manner as directed by the applicable legislation. Clearance certificates must be obtained and provided to the applicable and mandatory authorities.	√	√	√	√	CONTRACTOR, ECO	Continuous		
10.3.2. Household waste									
a) Storage	Temporary waste storage points on the site should be determined. These storage points should be accessible by waste removal trucks and these points should not be located	√	√	√		PROJECT MANAGER, CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	in ecological sensitive areas /areas highly visible from the properties of the surrounding landowners/ in areas where the wind direction will carry bad odours across the properties of adjacent landowners.								
b) Disposal	No waste materials shall at any stage be disposed of in public areas or adjacent properties, or where the wind direction will carry bad odours across the properties of adjacent tenants or landowners. The piling of any material that could rot and release unpleasant smells into the air will not be permitted. Burning of waste is not permitted. Spot fines of up to R100 may be administered if the employees are found to be polluting the area in any way.		√	√		ECO, CONTRACTOR	Continuous		
c)Recycling	Several waste bins must be provided and clearly marked, or colour coded according to industry standards to allow for recycling of waste into • Paper • Biodegradable • Glass • Plastics • General			√					
d) Waste Bins	Waste bins with lids shall be provided on site at convenient locations. These shall also be supplied in close proximity to the area where the workers eat.		√	√		CONTRACTOR	Continuous		
e) Removal	The waste bins shall be cleared by municipal services on a weekly basis. During municipal strikes special arrangements must be made to have the waste removed via private waste removal services.		√	√		CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.3.2. Chemical waste									
a) Design	Design the site in such a manner that chemical wastes (such as paint, thinners, etc. are not located in close proximity to any fire. These areas shall be predetermined and located in areas that are already disturbed. These areas shall not be within 100 m from the wetland or stream situated on the site. This area should be on a concrete base to avoid any possible seepage into the soil.	√		√		PROJECT MANAGER, CONTRACTOR	Once-off		
b) Contamination	Cover any wastes that are likely to wash away or contaminate storm water. Build a bund around waste storage area to stop overflow into storm water		√	√		CONTRACTOR	Continuous		
c) Containers	Hazardous waste (fuel, lubricants, chemicals, diesel, etc) shall be placed in specifically designed containers and properly sealed. Should any fuel storage tank be required on site, the Contractor shall ensure that he has complied with the necessary legal requirements for the erection of such tanks.		√	√		CONTRACTOR	Continuous		
d) Collection	Containers shall be collected on a weekly basis by certified chemical removal companies (such as OILKOL or WASTETECH).		√	√		CONTRACTOR	Continuous		
e) Disposal	All chemical waste shall be disposed of at a certified waste disposal site and proof of this disposal shall be sent to the contractor and ECO.		√	√		CONTRACTOR	Continuous		
11.4. Fuel, Fuelling and Maintenance									
11.4.1. Fuel storage									
a) Storage	Fuel storage shall be within the construction camp, and within a bunded area with at least 110% of the volume of the amount of fuel stored, as per agreement and approval of the ECO. No	√	√			ENGINEER, CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	storage of any fuel will be allowed on site, other than what is approved by the applicable provincial government departments.								
11.4.2. Fuelling									
a) Re-fuelling	Refuelling will take place in an area such designated, with sufficient surface sealing such as a plastic liner to prevent spillage and soil contamination. Where not approved by a provincial government department – refuelling will be done off-site.	√	√			ENGINEER, CONTRACTOR	Continuous		
b) Drip trays and spill kits	Drip trays (min 10cm deep) are to be placed under vehicles if they stand for more than 3 hours. The drip tray must be able to contain 110% of the total amount/ volume of oil in the vehicle. Spill kits must be available in vehicles that transport hydrocarbons for dispensing to other vehicles on the site. The dispensing devices (pump heads) must be compatible with the vehicles to which they are dispensing. In addition, the dispensing devices must be fitted with the necessary valves/ apparatus that will ensure that the nozzles do not drip fuel after pumping has stopped.		√			ECO, CONTRACTOR	Continuous		
c) Decontamination	In the event of spills from vehicles, the area should be cleaned immediately using a bioremediation product, such as *Petro-Clean ™* The absorbent and soil must be placed in a bin and removed from the site by a certified company and disposed of as a hazardous waste at a licensed commercial facility. No Hydrocarbons may escape into the environment. A spill recovery kit must be on site, along with trained personnel.		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
d) Notification	Applicable provincial and local government departments, local municipalities and adjacent landowners must be notified within 24 hours of a spillage or leak.		√	√		ENGINEER, CONTRACTOR			
11.4.3. Maintenance									
a) Design	The maintenance yard and secured storage area will be established as far as is practicable, outside 32m buffer areas of the wetland and stream situated on the site as determined by the wetland delineation. The maintenance yard should be indicated on the layout plan of the site.	√		√		PROJECT MANAGER, CONTRACTOR OWNER	Once-off		
b) Maintenance area	The maintenance of vehicles and equipment used for any purpose during the development will take place only in the maintenance yard. Any breakdown in the field requires the presence of a spill treatment team and equipment. This team must prevent and mitigate any spills that occur in this situation.		√			ENGINEER, ECO, CONTRACTOR	Continuous		
c) Equipment	Equipment used in the development process must be adequately maintained so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid.		√			ENGINEER, CONTRACTOR	Continuous		
d) Machinery	Machinery or equipment used on the site must not constitute a pollution hazard in respect of the above substances. The main contractor or ECO shall order such equipment to be repaired or withdrawn from use if he or she considers the equipment or machinery to be polluting and irreparable.		√			ENGINEER, CONTRACTOR	Continuous		
e) Buildings and facilities	Buildings, yards, paving areas, gardens, outside fencing or walls, etc. must be maintained in good standing at all times. Maintenance must be carried out expeditiously and with care to maintain the residential character of the area at all times.	√	√	√		CONTRACTOR OWNER			

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.5. Air Pollution									
11.5.1. Dust control									
a) Water dampening	The liberation of dust into the surrounding environment shall be effectively controlled by the use of, *inter alia*, water spraying and/or other dust-allaying agents, such as dust nets. Regular and effective damping down of working areas (especially during the dry and windy periods) must be carried out to avoid dust pollution that will have a negative impact on the surrounding environment. When necessary, these working areas should be damped down every 3 - 4 hours.		√	√		CONTRACTOR	Continuous		
b) Speed of trucks	The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions and excessive dust. Preferably trucks should not exceed a speed of 20km/hr on any dirt roads or temporary construction roads.		√			CONTRACTOR	Continuous		
c) Fires	No burning of refuse or vegetation is permitted.		√			CONTRACTOR	Continuous		
d) Screens	The building area is to be physically screened off with a shade cloth fence at least 1.8m in height, to prevent dust from being blown onto the neighbouring properties.		√			CONTRACTOR	Continuous		
e) Clearance of vegetation	Should construction in areas that have been stripped not be commencing within a short period of time the exposed areas shall be re-vegetated or stabilised. Soil stabilising measures could include rotovating in straw bales (at a rate of 1 bale/20 m^2), applying mulching or brush packing, or creating windbreaks using brush or bales.		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.5.2. Fire									
a) Fires on site	A designated area shall be assigned for fire making by the construction workers, so as to ensure that run-away veld fires do not occur. This will reduce air pollution by excessive smoke.	√	√			CONTRACTOR	Once-off		
11.5.3. Machinery									
a) Exhaust fumes	Machinery or equipment used on the site must not constitute a pollution hazard in respect of air pollution via excessive exhaust fumes. This shall be inspected regularly by the contractor and rectified immediately.		√			CONTRACTOR	Continuous		
b) Transporting materials	Vehicles transporting material that can be blown off (e.g. soil, rubble, etc.) must be covered with a tarpaulin, and speed limits of 20km/h must be adhered to.		√			CONTRACTOR	Continuous		
11.6. Noise Pollution									
11.6.1. Working hours									
a) Construction working hours	Construction should be limited to National Buildings Regulated working hours,. No work should be allowed on Sundays and Public Holidays, except in extreme emergencies and with the prior approval of the Project Manager and ECO and with notification to the direct surrounding landowners.	√	√			PROJECT MANAGER, ECO, CONTRACTOR	Continuous		
11.6.2. Staying on site									
a) Construction workers	Except for 24-hour security guards (max 2), no workforce for any of the contractors, nor their family and friends, are allowed to stay on the site.		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
b) Accommodation	Alternative accommodation shall be arranged for construction workers by the contractors, should they be too far from their permanent residence, and need accommodation closer to the site.	√	√			CONTRACTOR	Continuous		
11.6.3. Noise on site									
a) Noise Regulations	Site workers must comply with the Provincial noise requirements as outlined in Provincial Notice No. 5479 of 1999: Noise Control Regulations. The contractor is required by contract to adhere to SABS 1200 and ISO 9000 safety measures during construction on the entire site. And to fit silencers to frilling and other machinery as required.		√	√		CONTRACTOR	Continuous		
11.7. Safety and Security									
11.7.1. Safety									
a) Site and crew	The site and crew are to be managed in strict accordance with the Occupational Health and Safety Act (85 of 1993) and the National Building Regulations.		√	√		CONTRACTOR	Continuous		
b) Informal settlement	No informal settlement will be allowed on the premises or in the adjacent roads leading to the construction site.		√	√		CONTRACTOR	Continuous		
c) Informal trading	No informal trading will be allowed at the entrances to the property, or the adjacent roads. It is the responsibility of the contractor to remove any informal traders and discourage the workers from using these informal traders.		√	√		CONTRACTOR	Continuous		
d) Dangerous areas	Dangerous areas and deep excavations should be barrier taped to ensure visibility of these areas in compliance with the Occupational Health and Safety Act (85 of 1993). In the case where demolition of buildings can pose a threat to workers or visitors to the site, emergency officers must be summoned.		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
e) Equipment and materials	The Contractor should ensure that the handling of equipment and materials is supervised and adequately instructed.		√			CONTRACTOR OWNER	Continuous		
f) Sign boards	Clear sign boards should be erected at the entrance to the site to indicate that a construction site is being entered and that OHSA safety precautions should be followed		√			CONTRACTOR OWNER	Continuous		
g) Fire extinguisher	A fire extinguisher should be accessible, and the personnel should receive training in the use of a fire extinguisher. Furthermore, a fire extinguisher must at all times be available wherever welding or similar activities take place and be present on construction vehicles. A full-time fire prevention team and the associated equipment must be available on site.	√	√	√		CONTRACTOR OWNER	Continuous		
h) Emergency numbers	A list with the relevant emergency telephone numbers shall be pasted up in the site office (hospital, fire department, police, ambulance, etc.) for easy access in the event of an accident	√	√	√		CONTRACTOR OWNER	Continuous		
i) Speed limits	Within the construction site a maximum speed limit of 20km/h must be enforced for construction vehicles and 40km/h for light vehicles. Speed limit signs must be installed at the site entrance.		√			CONTRACTOR	Continuous		
j) Traffic impact	Vehicular movement beyond the property boundaries should be limited during peak hours. Access to the site must follow current and established routes. Speed limits must be adhered to at all times.		√	√		CONTRACTOR OWNER	Continuous		
11.7.2. Security									
a) Security guards	Due to the requirement for security, the construction teams will not be housed on site, and will have to travel to/from site, however security officers (max 2) will remain on site for the purpose of guarding the equipment.	√	√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
b) Access control	A system must be implemented where staff will carry ID. Access control will be enforced, the site could be swept, and a search could be done each night for construction workers. The provincial government departments will be allowed access to site at any time of the day	√	√	√		CONTRACTOR OWNER	Continuous		
c) Fencing	Fencing is required during the construction phase of the project to demarcate the boundaries of the construction site and work camp. Erection of the fence must occur with minimal impact on the natural environment. The fence will ensure that access to and from the site will be restricted to staff only.		√			CONTRACTOR	Once-off		
d) Casual access	No casual access to the work camp and the construction site will be allowed.		√			CONTRACTOR	Continuous		
e) Fence rehabilitation	Negative effects caused by the erection of any temporary fences must be rehabilitated after construction is complete.			√		CONTRACTOR	Once-off		
11.8. Health									
11.8.1. Chemical Toilets									
a) Number of toilets	Chemical toilet must be established on site as per the SHEQ requirements, (not in the contractor's camp, but within reasonable walking distance from where the workers are working).	√	√			CONTRACTOR	Continuous		
b) Location	Chemical toilets shall not be in close proximity to any natural drainage channels or wetlands. Chemical toilets shall not be within 100 m of the wetland and stream. It is important, however, that toilets be placed in areas where the largest number of workers is located on a daily basis.	√	√			ECO, CONTRACTOR	Continuous		
c) French drains	No French drain systems may be installed due to potential ground water pollution.	√				ENGINEER, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
d) Usage	No person is allowed to use any other area than chemical toilets.		√			CONTRACTOR	Continuous		
e) Inspections	Regular inspections shall be carried out to ensure that toilets are kept in a hygienic state.		√			CONTRACTOR	Continuous		
f) Toilet paper	Toilet paper shall be supplied to toilets.		√			CONTRACTOR	Continuous		
g) Cleaning	Toilets shall be cleaned by a certified company on a weekly basis.		√			CONTRACTOR	Continuous		
h) Locking	Toilets must be secured to the ground so that they cannot be overturned and have a sufficient locking mechanism operational at all times.		√			CONTRACTOR	Continuous		
11.9. Blasting on Site – It is not anticipated that blasting is required, however should blasting be required the following measures must be implemented									
a) Authorisation	In cases where blasting is required, an authorisation must be obtained from the Department of Minerals and the Department of Energy.	√	√			PROJECT MANAGER, ENGINEER, CONTRACTOR			
a) Magazine area	The ECO, Contractor and Safety Officer will earmark a suitable area on site for a temporary magazine for the duration of the construction. This magazine however will only be used to store the daily stock and not for stock to be stored for a long period.	√	√			ECO, SAFETY OFFICER, CONTRACTOR	Once-off		
b) Blasting times	Blasting will only take place after confirmation between the ECO and Contractor.		√			ECO, CONTRACTOR	Continuous		
c) Notification	Blasting shall be limited to specific, pre-agreed periods of the day so as to minimize disturbance and shall be agreed upon with the ECO. The ECO shall be notified in writing 3 days in advance with a two weekly daily schedule of when blasting operations will take place and where so that he can notify		√			ECO, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	surrounding residents of each blasting event in writing, 24 hours in advance before blasting events will take place.								
d) Safety precautions	If blasting is required, it will be covered blasting with the necessary Safety precautions of Red flags, Siren and Safety signs. Where blasting will be near a road the Metro Police must be notified to arrange traffic for duration of blasting operation.		√			ECO, CONTRACTOR	Continuous		
11.10. Fauna									
a) Regulations	Activities on site must comply with the regulations of the Animal Protection Act, 1962 and NEMPAA 2003.		√			CONTRACTOR	Continuous		
b) Sensitive areas	No construction worker activity whatsoever will be allowed outside of the specific construction area.	√	√			CONTRACTOR	Continuous		
c) Snaring / hunting	Snaring and hunting of fauna by construction workers on or adjacent to the site are strictly prohibited and the Local Municipality shall prosecute offenders. It should also be a condition of employment that any employees/ workers caught poaching will be dismissed.		√			CONTRACTOR	Continuous		
d) Training	Workers must be trained on how to deal with fauna species as intentional killing will not be tolerated. Awareness campaigns and regulations must be implemented and maintained among residents so that the corridors and buffers can double as recreational parks and public open space.		√			ECO, CONTRACTOR	Continuous		
e) Lighting	During the construction phase, artificial lighting must be restricted to areas under construction only. Where lighting is required for safety or security reasons, this should be targeted at the areas requiring attention. Yellow sodium lights or		√			ECO, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	Compressed Flourescent Bulbs (CFL"s) should be prescribed as they do not attract as many invertebrates (insects) at night and will not disturb the existing wildlife. Sodium lamps require a third less energy than conventional light bulbs.								
f) Fencing	Ideally fences should not restrict the natural migratory movements of certain animals. The site offers limited suitable migratory habitat. Electric fences have a negative impact on certain animal species including Bushbabies, geckoes, chameleons, bullfrogs and tortoises. Palisade fencing with adequate gaps is recommended for the conserved public open spaces.		√			ECO, CONTRACTOR	Continuous		
11.11. Flora – No Red Data floral species were found on site during the ecological assessment									
a) Site inspection	Before any vegetation is removed, a suitably qualified person (i.e. on ECO request of a vegetation specialist) shall inspect the study area for any plant/ grass/ tree species that could be transplanted to other similar/ suitable areas. This includes Red Data or Protected, or rare plants that may be found during the flora site assessment or during construction operations.	√	√	√		FLORA SPECIALIST, ECO, CONTRACTOR	Once-off		
b) Sensitive flora	Any other medicinal/ protected/ Red Data flora found on the site will have to be removed shall be removed by a suitably qualified specialist and relocated. The applicable responsible person at the provincial department must be notified in the event of such plants being identified, who will then advise the ECO regarding what steps need to be taken and who will be responsible for the relocation and transplantation processes.	√		√		FLORA SPECIALIST, ECO	Once-off		
c) Site access and circulation	Strictly no unauthorised access, land clearing, construction activities, vehicular traffic of any kind, pedestrian traffic or fires	√	√	√		ECO, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	will be permitted external of specific construction areas or in sensitive vegetation areas.								
d) Drainage lines	No clearing of vegetation will be allowed within the wetland or the Stream except for the sections where the road crossings are constructed, these areas must be rehabilitated with indigenous vegetation as soon as the crossings has been constructed.	√	√			ECO, CONTRACTOR	Continuous		
e) Exotic / invader species	Invader or exotic plant species **must** be removed from the site and disposed of at a landfill site. The National Department of Agriculture, Forestry and Fisheries (NDAFF) will be consulted during this process. Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used During the operational phase an annual assessment should be undertaken to check that no disturbance is occurring to the river and that alien plant species are being adequately controlled in the area, especially in the more sensitive areas.		√	√		FLORA SPECIALIST, CONTRACTOR	Continuous		
f) Landscaping	The use of indigenous vegetation should be optimised during the landscaping of the development.	√	√	√		FLORA SPECIALIST, LANDSCAPE ARCHITECT, LANDSCAPE CONTRACTOR	Once-off		
g) Wood harvesting	Wood harvesting of any trees or shrubs on the study area or adjacent areas for firewood shall be prohibited and subject to a fine.		√	√		CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
h) Retaining flora	On site floral assets and tree clumps shall be identified and retained where possible. Floral assets intended to be retained shall be clearly marked on site and be fenced off until they have been removed.	√	√	√		FLORA SPECIALIST, ECO, CONTRACTOR	Continuous		
i) Street trees	No street trees planted by the Local Municipality may be removed without prior approval by Urban Forestry / the relevant department.	√	√	√		FLORA SPECIALIST, CONTRACTOR	Continuous		
j) Removing flora	No indigenous trees or floral assets may be removed without permission from the specialist or in some cases a flora removal permit may be required.		√	√		FLORA SPECIALIST, CONTRACTOR	Continuous		
j) Vegetation along services	No trees, hedges or other large vegetation types may be planted along or over service pipelines/ areas, due to the risk of damage and for ease of maintenance purposes.	√	√	√		LANDSCAPE ARCHITECT, LANDSCAPE CONTRACTOR, CONTRACTOR	Continuous		
11.12. Storm water									
a) Covering of wastes	Cover any wastes that are likely to wash away or contaminate storm water		√	√		CONTRACTOR OWNER	Continuous		
b) Bunded area	Build a bund around waste storage area to stop overflow into storm water		√	√		CONTRACTOR OWNER	Once-off		
c) Natural flow	Natural storm water must flow freely, either as sheet flow or where necessary in open grass swales, to allow for infiltration and retention. Natural veld grass must be left undisturbed as far as possible, to allow natural drainage.		√	√		ENGINEER, CONTRACTOR	Continuous		
d) Piping of flow	Natural storm water must not be piped other than in areas where it runs perpendicularly cross the roadway.		√	√		ENGINEER, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
e) Drainage channels	Drainage channels must be constructed along the road every 50m to divert runoff during construction period.	√	√	√		ENGINEER, CONTRACTOR	Continuous		
f) Energy dissipaters	Energy dissipaters (gabions/strawbales etc.) must be installed at potential large flow volume areas, especially during the construction phase where large areas will be open soil.		√	√		ENGINEER, CONTRACTOR	Once-off		
g) Engineering report	The stormwater management plan completed by the Engineers specifically address storm water to the satisfaction of the City of Tshwane Metropolitan Municipality. This report will be set submitted to the Municipality once the development has been approved. This storm water design (as per civil engineers) for hard surfaces will ensure the proper management and precautionary measures are taken into account.	√		√		ENGINEER	Once-off		
h) Vegetated swales	Where feasible the use of vegetated swales should be used to accommodate surface runoff during construction, in order to increase infiltration into the soil. The swales should be vegetated with indigenous, wetland vegetation in order to provide habitat for bird life and other aquatic and semi-aquatic species. Where feasible, the swales should be provided adjacent to the property boundaries along the natural gradient.	√	√	√		ENGINEER, ECO, CONTRACTOR	Continuous		
i) Retention ponds	Retention ponds should be constructed. Retention ponds manage storm water runoff to prevent flooding and downstream erosion, and to improve water quality in adjacent water bodies.	√		√		ENGINEER	Once-off		
j) Alkaline soils	Where alkaline soils occur and the design of the development permits, swales should be used to infiltrate surface runoff, as this promotes the removal of metals from runoff. Especially runoff from parking areas should by filtered in this fashion	√	√	√		ENGINEER, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	before passing into the underground storm water sewer system.								
k) Design of swales	The cross-section of the swale should be parabolic or trapezoidal in shape with side slopes no steeper than 1:3, to maximise the wetted channel perimeter. It is recommended that the longitudinal slope not exceed 2% where possible and that a maximum slope of 4% be used. Where a 4% slope must be exceeded, check dams should be provided at a minimum interval of 17m. As a rule of thumb, the total surface area of the swale must be 1% of the area that drains into the swale. The surface of the swale must be carefully constructed, to avoid compaction, which will inhibit dense vegetation growth and effective runoff infiltration. The installation of vegetated filter strips parallel to the top of the channel banks can help to treat sheet flows entering the swale.	√		√		ENGINEER	Once-off		
l) Maintenance of swale	Maintenance of the swale should include periodic mowing of the grass (never shorter than the design flow depth of the channel). Bare areas should be re-seeded, and debris and blockages regularly removed. Sediment depositions should be regularly removed from the swale, to prevent pollution of the runoff from contaminants contained therein.		√	√		CONTRACTOR	Continuous		
m) Hydrological Engineer	Please note that the recommendations for the design of the swales are guidelines only and that the designs of the swales, sedimentation ponds and check dams must be done by a hydrological engineer.	√		√		CONTRACTOR	Once-off		
n) Wetland	Storm water outflows will not enter directly into the wetland or stream.	√		√		ENGINEER	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
o) DWS approval	Both storm water and excess effluent intended for irrigation must be purified according to DWS standards. Approval must be obtained from DWS for the abstraction of groundwater.	√		√		ENGINEER	Once-off		
11.13. Traffic Impact									
a) Departmental requirements	Requirements from the provincial roads and traffic departments and the Local Municipality must be adhered to and precautionary measures taken to provide safe and effective traffic management.	√		√		ENGINEER OWNER	Once-off		
b) Delivery trucks	Deliveries by large vehicles may only take place during weekdays and pre-warning of at least one day prior to delivery must be given to the facility manager to ensure adequate space and manoeuvrability inside the facility and in the adjacent roads. Large delivery trucks should not be scheduled at the same time as events.		√	√		CONTRACTOR OWNER	Continuous		
c) Site access	The access of large trucks will be investigated by the PM to provide a suitable access route that does not become a nuisance to surrounding residents. Only a specified number of trucks at any one time will be allowed onto the property as agreed to between the PM and the ECO based on the capacity of the site to carry the number of trucks.		√			ENGINEER, CONTRACTOR	Continuous		
d) Wheel wash	Establish an weather site access and wheel wash or shake down to prevent soil and materials from being tracked onto the road.		√			CONTRACTOR	Continuous		
e) Peak traffic hours	Construction vehicles and activities must aim to avoid peak hour traffic times (weekdays 7-8am and 5-6pm)		√	√		CONTRACTOR OWNER	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
f) Legislation	Access roads and traffic planning will adhere to Gautrans and the Local Municipality requirements.	√				ENGINEER	Once-off		
g) Established tracks	Access and travelling on site must follow current and established tracks only.		√			CONTRACTOR	Continuous		
h) Road construction	Where roads cross open areas the traffic calming features will have a 300mm pipe sleeve under it for potentially occurring amphibians and mammals to cross under the road in safety.	√	√			ENGINEER, CONTRACTOR	Once-off		
11.14. Sensitive Areas									
11.14.1. Wetland and stream situated on the site									
a) Flood line and wetland buffer areas	No activities may be allowed within the 32m buffer zones surrounding the Wetland and Stream	√	√	√		CONTRACTOR OWNER	Continuous		
b) Fencing of the Wetland	During construction the wetland and stream affected by the construction of proposed development must be fenced off. The fence must be erected on a conservation line determined by the ECO. No construction worker or vehicular access shall be allowed within this area, unless authorised by the ECO.	√	√	√		CONTRACTOR OWNER	Once-off		
c) No dumping	No dumping will be allowed within any drainage areas, the wetland and stream. No bins shall be located within 50m of these areas.		√			CONTRACTOR	Continuous		
d) No toilets	No chemical toilets shall be situated within 100m from the natural drainage areas or the wetland		√			CONTRACTOR	Continuous		
e) Surface runoff	Surface runoff must be directed away from the Wetland and the stream and must be filtered or put into a municipal system prior to being released. Surface runoff shall be managed in such a way as to ensure that erosion of soil does not occur.	√	√	√		ENGINEER, CONTRACTOR OWNER	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
f) Vehicle access	No vehicles whatsoever are allowed to move across or within the 32 meter buffer zones of the wetland and stream		√			CONTRACTOR	Continuous		
g) No stockpiling	No topsoil stockpiling, or stockpiling of any other material, shall be allowed within the 32 metre buffer zones surrounding the wetland and stream		√			CONTRACTOR	Continuous		
h) Siltation ponds	Where natural drainage channels join up with man-made channels, siltation ponds/ stilling basins shall be implemented in order to allow for the sediments to settle before the water is dispersed into the natural system.	√	√	√		ENGINEER, CONTRACTOR	Continuous		
i) Longitudinal connectivity	No activity is allowed that will impede the longitudinal connectivity of drainage areas, as this will hamper efficiency and flow.	√	√			WETLAND SPECIALIST, CONTRACTOR	Continuous		
j) No bathing	No bathing will be allowed in any of the water bodies (wetland and stream) on or adjacent to the site.		√			CONTRACTOR	Continuous		
k) No washing	No washing of clothes will be allowed in any water bodies (the wetland and stream) on or adjacent to the site.		√			CONTRACTOR	Continuous		
l) No taking of water	No taking of water from water bodies (the wetland and stream) for drinking or cooking purposes will be allowed, as potable water should be available on site.		√			CONTRACTOR	Continuous		
m) No urinating	No urinating will be allowed anywhere on site, as this will result in an immediate fine.		√			CONTRACTOR	Continuous		
n) Sensitive zones rehabilitation	Considerable attention must be given to avoid any unnecessary vegetation disturbance within any natural drainage habitat zones, or the wetland and stream. Potential disturbances within these areas shall immediately be reported to the ECO and rehabilitated with appropriate vegetation (a specialist must be consulted in this regard).		√			WETLAND SPECIALIST, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.14.2. Heritage / Cultural / Archaeological Sites									
a) Discovery of artefacts	Should any other Cultural / Archaeological artefacts be discovered during construction activities, construction shall immediately cease and the National, Cultural and History Museum shall be contacted for investigation. The area must be barrier taped immediately until the ECO can communicate appropriate methods of protection to the contactor.		√			CONTRACTOR, HERITAGE SPECIALIST, ECO	Continuous		
b) Fencing	Any archaeological sites present on site shall be fenced and at least 5 metres around it should be safeguarded from construction and development.	√	√			CONTRACTOR	Once-off		
d) Burial grounds	Any burial ground or found on site will be reported immediately to the Contractor, ECO and Project Manager. An undertaker must also be contacted who will place advertisements in the newspapers. This should be investigated by a specialist and recommendations made.		√			PROJECT MANAGER, CONTRACTOR, ECO	Continuous		
e) Suspicious artefacts	The ECO will be notified of any suspicious artefacts prior to it being moved or removed.		√			CONTRACTOR	Continuous		
11.15. Services									
11.15.1. Disruption in services									
a) Informing ECO	If any disruption in services (electricity, water, sewage) are foreseen during the construction of proposed development, the contractor must inform the ECO at least 4 days prior to these activities, to enable the ECO to inform the surrounding land owners of such possible disruptions.		√			CONTRACTOR	Continuous		
b) Existing storm water channels and other services	Existing storm water channels and services are not to be impacted upon in any way during the course of construction of proposed development except when part of the construction		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	scope of works. Any damage repairs shall be for the Contractor's account. No littering or dumping of rubble shall be permitted in the storm water channel and potential blockages shall be removed immediately. Where necessary these areas should be clearly fenced off with white poles at 5m centres, with blue wire and orange barrier netting.								
11.16. Contractor's Site Camp									
a) Establishment of site camp	A work site will be established and maintained for storing construction equipment on a non-sensitive area to be agreed upon by the ECO and contractor. The contractor shall furnish the Engineer on site with a site plan indicating the layout of site offices, facilities, such as chemical toilets, areas for stockpiling of materials and provision of containers, prior to commencement of construction.		√			CONTRACTOR, ECO	Once-off		
b) Fencing	The site camp shall be fenced and materials shall be stored within this camp. All hazardous materials i.e. fuel, polyethylene liners, etc. shall be stored in an appointed area that is fenced off and has restricted access.		√			CONTRACTOR	Continuous		
c) Camp location	The site camp shall not be situated within a natural drainage line or within 50m from the wetland and stream. It should also be situated in an area that is already disturbed.		√			CONTRACTOR	Once-off		
d) Rehabilitation of camp	The area where the camp was established must after the construction period be rehabilitated to guidelines in this document or as otherwise directed by the ECO.		√			CONTRACTOR, VEGETATION SPECIALIST, ECO	Once-off		
11.17. Environmental Awareness Training									
a) Training program	An environmental awareness-training program must be organized as part of the EMPr to ensure that each employee	√	√			CONTRACTOR, ECO	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	knows his/her responsibilities regarding the EMPr and the environment in general. Attendance certificates must be issued. Additional training as required, i.e. encounters with Red Data or other fauna should be arranged and provided.								
b) Appropriate activities	The employees, construction workers and maintenance crews will receive instruction in the appropriate activities that could take place among the natural resources of the area.		√			ECO	Once-off		
11.18. Rehabilitation & Landscaping									
a) Master Plan	A Landscape Master Plan will be prepared that stipulates that the existing indigenous vegetation must be retained on site. This plan should be strictly adhered to. A landscaping programme is to be submitted to the applicable Provincial and Local Government department together with the construction programme.	√				LANDSCAPE ARCHITECT	Once-off		
b) Landscaping	The use of indigenous vegetation should be optimised during the landscaping of the development. Landscaping should enhance the aesthetic appeal of the development/ mitigate the visual impact as far as possible.	√				LANDSCAPE ARCHITECT	Once-off		
c) Compacted areas	Compacted areas (including backfilled trenches) should be ripped prior to them being rehabilitated.		√			CONTRACTOR	Continuous		
d) Reseeding	Stored topsoil and reseeding must be used to rehabilitate all open soil areas following construction activities. Any proclaimed weed or alien invader plant shall be cleared by hand before seeding. Rehabilitated areas must be maintained and irrigated as required to ensure sufficient vegetation coverage. Re-seeding may be required if sufficient coverage		√			LANDSCAPE ARCHITECT, CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	has not been achieved after 6 months and shall be at the Contractor's expense.								
e) Timeframe	Rehabilitation/ landscaping is to be done immediately after the involved works are completed.		√			CONTRACTOR	Once-off		
f) Rehabilitation by Sub-contractors	The Contractor is responsible for the actions and works of the sub-contractors and is required to complete the rehabilitation work if the sub-contractor fails to do so. Payment may be withheld from the sub-contractor in the event that the work must be completed by the main contractor.		√			CONTRACTOR	Continuous		
g) Completion of work	On completion of works, the contractor shall clear away and remove from the site construction paint, surplus materials, foundations, plumbing and other fixtures, rubbish and temporary works of every kind. Areas thus cleared shall be graded and scarified to restore the ground to its original profile as near as practicable before topsoil placement.		√			CONTRACTOR	Once-off		
h) Cement mixing	Cement mixing shall be done only at specifically selected sites. After construction activities ended the cement shall be crushed and removed from the site. This mixing area shall then be ripped and rehabilitated.		√			CONTRACTOR	Continuous		
i) Natural features	The natural features of the site should be managed in a holistic manner.	√				LANDSCAPE ARCHITECT	Continuous		
11.19. Advertising									
a) Design	A graphic design of the advertisement will be subject to the approval of the Directorate of Integrated Environmental Management, Directorate of Marketing, Directorate of Local Economic Development and Directorate of Public Safety.	√				ARCHITECT, CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
b) Requirements	Advertisements will not obstruct traffic view, movement of pedestrians, cause visual pollution or appear to be unsightly. It will be tastefully low key, as will be defined by the Local Municipality and will not unrightfully interfere with other existing advertising rights.	√		√		ARCHITECT, CONTRACTOR	Continuous		
c) Lease	The lease of the advertising space will be valid for a period of 12 months after which the applicant can request for renewal.	√		√		PROJECT MANAGER	Continuous		
11.20. Penalties									
a) Payment of penalties	Any person who contravenes any of the provisions of the laws and by-laws will be guilty of an offence and on conviction liable to a fine not exceeding R20 000 (Twenty-thousand Rand) or in default of payment, to imprisonment for a period of not exceeding 6 months.	√	√	√		DEVELOPER, ENGINEER, CONTRACTOR, ARCHITECT, ECO	Continuous		

ABBREVIATIONS AND DEFINITIONS

ARCH	Architect
CE	Consulting Engineer
CO	Construction
DE	Demolition
DS	Design
DWS	The Department of Water and Sanitation – both national office and their various regional offices, which are divided across the country on the basis of water catchment areas.
ECA	Environment Conservation Act (Act 73 of 1989)
ECO	Environmental Control Officer
EIA	An Environmental Impact Assessment as contemplated in the national Environmental Management Act (Act 107 of 1998)
EMI	Environmental Monitoring Inspector – from Provincial Government (E.g. GDARD)
EMPr	Environmental Management Program
FAUNA	Living biological creatures, usually capable of motion, including insects and predominantly of protein-based consistency.
FENCE	A physical barrier in the form of posts and barbed wire or any other concrete construction, ("palisade"- type fencing included), constructed with the purpose of keeping humans and animals within or out of defined boundaries.
FLOOD LINE	The line or mark to which a flood could rise, every 50 (1:50 year flood line), or 100 (1:100 year flood line) years
FLORA	Living plants, grasses, shrubs, trees, etc., usually incapable of easy natural motion and capable of photosynthesis.
GDARD	Gauteng Department of Agriculture and Rural Development
IEM	Integrated Environmental Management
MPRDA	The Mineral and Petroleum Resources Development (Act 28 of 2002)
NEMA	National Environmental Management Act (Act 107 of 1998)
NHRA	National Heritage Resources Act (Act 25 of 1999)
NWA	National Water Act (Act 36 of 1998)
OP	Operational
PENALTY	A fine against the contractor by the PM as per request from the ECO. This could also be used for the benefit of the labourers (such as a camp braai).
PM	Project Manager
RA	Resident Architect
ROD	Record of Decision (approval or dismissal of project) as issued by GDACE
SABS	South African Bureau of Standards
SAHRA	South African Heritage Resource Agency
SAMOAC	South African Manual for Outdoor Advertising Control
SPOTFINE	A fine against a labourer by the PM as per request from the ECO. This fine should be used for the labourers' benefit.

SWALE A depression between slopes that provides for drainage

TLB Tractor, Load & Backhoe

TOPSOIL The layer of soil covering the earth which-

(a) provides a suitable environment for the germination of seed;

(b) allows the penetration of water;

(c) is a source of micro-organisms, plant nutrients and in some cases seed; and

(d) is not of a depth of more than 0,5 metres or such depth as the Minister may prescribe for a specific prospecting or exploration area or mining area.

VEGETATION Any and forms of plants, see also Fauna

WETLAND A wetland is defined as land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil (Water Act 36 of 1998).

APPENDIX A

Table of Contents for On site Environmental File

No	Document	Check	Comments
1	Environmental Authorisation	☐	
2	Environmental Authorisation Amendments (If applicable)	☐	
3	Water Use Licence	☐	
4	EMPr	☐	
5	Site Induction proof	☐	
6	Environmental Education / Awareness Training / Toolbox Talks	☐	
7	Site Planning and Layout	☐	
8	Method Statements and Site Instructions	☐	
	a. Site Clearing Programme	☐	
	b. Topsoil Stripping and Stockpiling	☐	
	c. Access Routes / Haul Roads	☐	
	d. Exposed Surfaces	☐	
	e. Prevention of Soil Erosion	☐	
	f. Stockpile Management	☐	
	g. Stormwater Management		
	h. Refueling	☐	
	i. Emergency Repairs to Machinery / Vehicles	☐	
	j. Ready Mix, Concrete, Mortar, Plastering		
	k. Painting	☐	
9	Hazardous Substances and Materials		
	a. MSDS	☐	
	b. Storage Requirements	☐	
10	Waste Management		
	a. Services Provider Contract	☐	
	b. Storage Requirements	☐	
	c. Quantity and Proof of Responsible Disposal	☐	
11	Public Complaints Procedure		
	a. Procedure	☐	
	b. Register	☐	
12	Audits	☐	

APPENDIX B

EMP Checklist

EMP Checklist Results DATE

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
		only 1 or 0			
1	Environmental Management System	18	18	R 0.00	R 18,000.00
1.1	Latest revision of signed Environmental policy is on display in office and on notice boards	1	1		R 1,000.00
1.2	Declaration of understanding has been signed	1	1		R 1,000.00
1.3	A site specific Aspects and Impacts Register has been compiled	1	1		R 1,000.00
1.4	Site Specific Objectives and Targets completed. Action plan in place	1	1		R 1,000.00
1.5	An Environmental Officer has been appointed	1	1		R 1,000.00
1.6	Employees, subcontractors and management has completed the Environmental Induction within the last 12 months	1	1		R 1,000.00
1.7	The complaints register is available and up to date	1	1		R 1,000.00
1.8	Relevant Environmental Method Statements have been completed and signed off by the project manager	1	1		R 1,000.00

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
1.9	The Incident register is available and up to date	1	1		R 1,000.00
1.10	The Start-up and Monthly Checklist is up to date and has been signed off by the project manager	1	1		R 1,000.00
1.11	The Facilities Checklist is up to date and has been signed off by the project manager	1	1		R 1,000.00
1.12	Waste Management Checklist has been completed	1	1		R 1,000.00
1.13	Borrow pit and spoil Checklist has been completed	1	1		R 1,000.00
1.14	NCR's have been closed and addressed	1	1		R 1,000.00
1.15	The NCR's register is available and up to date	1	1		R 1,000.00
1.16	Internal Audit report action plan has been completed and signed off by the project manager	1	1		R 1,000.00
1.17	Internal Environmental Inspection report has been communicated, actioned and signed off by the project manager	1	1		R 1,000.00
1.18	Environmental Monthly report has been submitted to head office	1	1		R 1,000.00
2	Legal Documentation	7	6	**R 0.00**	**R 7,000.00**
2.1	Is a copy of the EMP and ROD stored on the site for easy reference?	1	1		R 1,000.00
2.2	DWA permits obtained for river, stream or wetland crossing?	1			R 1,000.00
2.3	DWA permits obtained for the removal of protected species of plants?	1	1		R 1,000.00

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
2.4	DWA permits obtained for abstraction of construction water from rivers, dams or boreholes	1	1		R 1,000.00
2.5	DMR permits obtained for the use of borrow pits, spoil areas, sand mines and materials used for batching and ready mix	1	1		R 1,000.00
2.6	Environmental file on site, transmittal note signed off	1	1		R 1,000.00
2.7	Have audits and incident records being made available to the authorities?	1	1		R 1,000.00
3	Environmental Awareness Training	4	4	**R 0.00**	**R 4,000.00**
3.1	Employees have general understanding of EMP/ROD trough toolbox talks and additional environmental awareness is on display on notice boards	1	1		R 1,000.00
3.2	Records of training kept up to date	1	1		R 1,000.00
3.3	Specific training on awareness	1	1		R 1,000.00
3.4	Specific training on legal liability	1	1		R 1,000.00
4	Site Establishment and Demarcation	4	4	**R 0.00**	**R 32,000.00**
4.1	Site configuration/ method statement corresponds with approved plan	1	1		R 1,000.00
4.2	Site fencing and demarcation of facilities remain intact	1	1		**R 10,000.00**
4.3	Sewage and effluent infrastructure intact				**R 10,000.00**

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
4.4	Work areas properly and safe guarded/ barricading	1	1		**R 10,000.00**
4.5	Designated smoking areas with designated bin – no paper	1	1		R 1,000.00
5	Access and Traffic	9	9	**R 0.00**	**R 87,000.00**
5.1	Construction routes clearly defined and contractor is making use of existing roads as far as possible	1	1		**R 5,000.00**
5.2	Entry and exit points strategically placed to ensure as little impact on traffic as possible	1	1		**R 5,000.00**
5.3	Entry and exit points controlled by security	1	1		**R 5,000.00**
5.4	Construction vehicles must be clearly marked (yellow light)	1	1		R 1,000.00
5.5	Access points clearly indicated by signage	1	1		**R 5,000.00**
5.6	40km/h speed limit on access roads	1	1		R 1,000.00
5.7	Nobody allowed driving in the veld, causing damage to vegetation or creating new access road within written permission	1	1		**R 50,000.00**
5.8	Deliveries and construction traffic within construction hours	1	1		**R 5,000.00**
5.9	No parking of any type of vehicles outside the de-markated construction & site camps' areas	1	1		**R 10,000.00**
6	Borrow Pit and Spoil Areas	6	6	**R 0.00**	**R 14,000.00**

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
6.1	Topsoil, Overburden and Primary STOCKPILE CLEARLY DEMARCATED ON SITE DRAWING, FENCED OFF AND SECURE	1	1		**R 5,000.00**
6.2	Designated spoil areas separate and identified by means of site drawing	1	1		R 1,000.00
6.3	Top soil berms not exceed 2m in height and area indicated onsite drawing	1	1		R 1,000.00
6.4	Topsoil not compacted or driven over	1	1		R 1,000.00
6.5	Dust suppression in place	1	1		**R 5,000.00**
6.6	Documentation as per checklist is on file	1	1		R 1,000.00
7	Waste Management	10	10	**R 0.00**	**R 27,000.00**
7.1	No littering on site allowed	1	1		R 1,000.00
7.2	Enough bins available to manage waste	1	1		**R 5,000.00**
7.3	Waste and scrap areas clearly demarcated	1	1		R 1,000.00
7.4	Waste and scrap areas have adequate capacity	1	1		R 1,000.00
7.5	Waste equipment (bins, skips) in good condition	1	1		R 1,000.00
7.6	Loose waste material covered or tied down (skip nets)	1	1		R 1,000.00
7.7	Excess concrete to be dumped in designated area and truck to wash out at area.	1	1		**R 5,000.00**
7.8	Waste regularly disposed of	1	1		**R 10,000.00**
7.9	Documentation as per checklist is on file	1	1		R 1,000.00
7.10	Training on waste recycling and disposal through toolbox talks	1	1		R 1,000.00

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
8	Hydrocarbons	22	22	**R 0.00**	**R 12,000.00**
8.1	Oils, fuels and greases inventory list and bund capacity on display	1	1		R 1,000.00
8.2	Relevant MSDS available in MDSDS register	1	1		R 1,000.00
8.3	Property stored in impermeable bunded areas with roof	1	1		R 1,000.00
8.4	Bunded area able to contain 110% in case of spill	1	1		R 1,000.00
8.5	Proper decanting equipment used to prevent spills (hand pump, funnels)	1	1		R 1,000.00
8.6	Spill response material/ equipment on site with adequate absorbents. No natural material used to absorb spills	1	1		R 1,000.00
8.7	Spills recorded on Incident report reported and properly cleaned up	1	1		R 1,000.00
8.8	Spilled material stored properly and disposed of at approved disposal site	1	1		R 1,000.00
8.9	Documentation as per Checklist is on file	1	1		R 1,000.00
8.10	Spill response plan available and display	1	1		R 1,000.00
8.11	Training on spill management – toolbox talk	1	1		R 1,000.00
8.12	Regular cleaning of oil separators and disposal of old oil, oil filters and rags	1	1		R 1,000.00
8.13	Capacity fuel within legal limits in bunded area as per SANS specs	1	1		**R 5,000.00**
8.14	Refuelling conducted by appointed staff in dedicated area	1	1		**R 5,000.00**

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
8.15	Soil protected from contamination by concrete slab or drip tray	1	1		**R 5,000.00**
8.16	Spill response equipment on hand with adequate absorbents, no material used to absorb spills	1	1		**R 5,000.00**
8.17	Spill recorded on incident report reported and properly cleaned up	1	1		**R 5,000.00**
8.18	Fire fighting equipment at hand	1	1		**R 5,000.00**
8.19	Soil protected from contamination by concrete slab or drip tray	1	1		**R 5,000.00**
8.2	Spill response equipment on hand with adequate absorbents, no material used to absorb spills	1	1		**R 5,000.00**
8.21	Spill recorded on incident report reported and properly cleaned up	1	1		**R 5,000.00**
8.22	Fire fighting equipment at hand	1	1		**R 5,000.00**
9	Vehicle and Plant maintenance	5	5	**R 0.00**	**R 9,000.00**
9.1	Conducted by trained staff in dedicated workshop areas	1	1		R 1,000.00
9.2	Soil protected from contamination by concrete slab or drip trays	1	1		**R 5,000.00**
9.3	Spill response equipment on hand with adequate absorbents, , no material used to absorb spills	1	1		R 1,000.00
9.4	Spill recorded on incident report reported and properly cleaned up	1	1		R 1,000.00
9.5	Service truck crew to be specifically trained for maintenance on site	1	1		R 1,000.00
10	Wash Bays	9	9	**R 0.00**	**R 18,000.00**
10.1	Impermeable sloping concrete basis	1	1		R 1,000.00

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
10.2	Bunded walls in tact and efficient	1	1		R 1,000.00
10.3	Proper constructed silt trap	1	1		R 1,000.00
10.4	3 Stage oil separator, installed correctly	1	1		R 1,000.00
10.5	Unblocked drains to oil separator	1	1		R 1,000.00
10.6	Water use monitored – no wastage	1	1		R 1,000.00
10.7	Wheeled plant to be washed in the constructed wash bay	1	1		R 1,000.00
10.8	Tracked plant to be washed on site with cold water after excess oil and grease have been removed	1	1		R 1,000.00
10.9	Proper temporary storm water control	1	1		**R 10,000.00**
11	Batching Plants/ Mixing Areas	10	10	**R 0.00**	**R 31,000.00**
11.1	Impermeable concrete basis or surface	1	1		R 1,000.00
11.2	Filters / socks on silo's in working order	1	1		R 1,000.00
11.3	Bunded curing compound area	1	1		R 1,000.00
11.4	Sedimentation / containment ponds for wash water	1	1		R 1,000.00
11.5	Designated spoil area for excess concrete	1	1		R 1,000.00
11.6	Bunded wash bay for mixer trucks	1	1		**R 5,000.00**
11.7	Wash water is disposed into sewer or removed by an approved contractor and correctly disposed	1	1		**R 5,000.00**
11.8	Unblocked drains	1	1		R 1,000.00
11.9	Drip trays for parked plant	1	1		**R 5,000.00**
11.10	Proper temporary storm water control	1	1		**R 10,000.00**
12	Sewage and Sanitation	11	11	**R 0.00**	**R 36,000.00**

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
12.1	Enough toilets provided (1 per 30 persons)	1	1		**R 5,000.00**
12.2	Safety and conveniently accessible (within 100m)	1	1		**R 5,000.00**
12.3	Ablutions not placed within 50 m of river, stream, storm water channel or wetland	1	1		**R 10,000.00**
12.4	Ablution facilities in tact and working – not leaking	1	1		**R 5,000.00**
12.5	Separate screened / facilities toilets for men and woman	1	1		R 1,000.00
12.6	Seats and doors intact and working	1	1		R 1,000.00
12.7	Toilet paper available	1	1		R 1,000.00
12.8	Chemical toilets are placed level and secured to prevent spillage	1	1		**R 5,000.00**
12.9	Facilities are regularly emptied and cleaned	1	1		R 1,000.00
12.10	Documentation per checklist is on file	1	1		R 1,000.00
12.11	Facilities to be used at all times – no urination and / or deification on site	1	1		R 1,000.00

13	Supply of water for Human Consumption	4	4	**R 0.00**	**R 5,000.00**
13.1	Proof of water is fit for human consumption				R 1,000.00
13.2	Water taken from approved points	1	1		R 1,000.00
13.3	Water supply to working area on site	1	1		R 1,000.00
13.4	Water use monitored – no wastage	1	1		R 1,000.00
13.5	Contamination of water points reported, recorded, addressed	1	1		R 1,000.00

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
14	Staff Areas	17	17	**R 0.00**	**R 5,000.00**
14.1	Demarcated undercover seating	1	1		R 1,000.00
14.2	Dust free well illuminated and clean	1	1		R 1,000.00
14.3	Refuse bins available with secured lids	1	1		R 1,000.00
14.4	No accumulation of food scraps outside bins	1	1		R 1,000.00
14.5	No open fires for food preparation	1	1		R 1,000.00
14.6	Sufficient space provided for bags and clothes	1	1		R 1,000.00
14.7	Sufficient lighting and ventilation	1	1		R 1,000.00
14.8	Sufficient privacy from outside	1	1		R 1,000.00
14.9	Area clean and disinfected	1	1		R 1,000.00
14.1	All sub-contractors have space available for a change area	1	1		R 1,000.00
14.11	Refuse bins available with secured lids	1	1		R 1,000.00
14.12	Sufficient privacy from outside	1	1		R 1,000.00
14.13	Area kept clean and hygienic	1	1		R 1,000.00
14.14	Hot and cold water available	1	1		R 1,000.00
14.15	Containment tank for shower / wash water	1	1		R 1,000.00
14.16	Regular emptied and cleaning of tank	1	1		R 1,000.00
14.17	Prevention of stagnant water	1	1		R 1,000.00
15	Storm Water Management	6	6	**R 0.00**	**R 42,000.00**
15.1	Temporary drainage infrastructure in place and should include sediment filtration measures	1	1		**R 10,000.00**
15.2	Sedimentation traps / filtration infrastructure is being maintained	1	1		**R 10,000.00**
15.3	Erosion gullies are repaired after rainfall events	1	1		**R 10,000.00**

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
15.4	Stagnant water to be cleared out where possible	1	1		R 1,000.00
15.5	Storm water contamination to be reported and recorded	1	1		R 1,000.00
15.6	Municipal storm water inlets to be protected by biddim	1	1		**R 10,000.00**
16	Air Pollution Management	7	7	**R 0.00**	**R 31,000.00**
16.1	Dust suppression equipment working & available	1	1		**R 5,000.00**
16.2	Vehicle speed adjusted to condition of unpaved roads	1	1		**R 5,000.00**
16.3	Water for dust suppression taken from approved points	1	1		**R 5,000.00**
16.4	No excessive smoke from vehicles and plant	1	1		**R 5,000.00**
16.5	No excessive cement dust from filling silo's	1	1		**R 5,000.00**
16.6	No excessive dust from moving aggregate to batch plant and loads to be covered to minimise dust	1	1		**R 5,000.00**
16.7	Dust reported, recorded and corrective action taken	1	1		R 1,000.00
17	Noise Management	5	5	**R 0.00**	**R 13,000.00**
17.1	Noise generating equipment list available on site and is on display	1	1		R 1,000.00
17.2	Noise generating equipment in good working order	1	1		**R 5,000.00**
17.3	After hours work has been authorised	1	1		**R 5,000.00**
17.4	Noise levels recorded to ensure compliance	1	1		R 1,000.00
17.5	Noise incidents reported, recorded and addressed	1	1		R 1,000.00

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
18	Fire Prevention	6	6	R 0.00	R 6,000.00
18.1	Fire prevention equipment in good order – serviced	1	1		R 1,000.00
18.2	Fire breaks in place where needed	1	1		R 1,000.00
18.3	No fire allowed on site unless in a designated area and permission has been obtained	1	1		R 1,000.00
18.4	Fire emergency contact numbers available on site	1	1		R 1,000.00
18.5	Fire incidents reported, documented and addressed	1	1		R 1,000.00
18.6	Fire awareness training through toolbox talks	1	1		R 1,000.00
19	Sensitive Areas	4	4	R 0.00	R 57,000.00
19.1	Sensitive areas demarcated and fenced off	1	1		**R 50,000.00**
19.2	Relevant signage posted	1	1		**R 5,000.00**
19.3	Environmental awareness training on sensitive areas through induction and toolbox talks	1	1		R 1,000.00
19.4	Encroachment on sensitive areas reported	1	1		R 1,000.00
20	Fauna	4	4	R 0.00	R 4,000.00
20.1	Rules communicated to employees through induction and toolbox talks	1	1		R 1,000.00
20.2	Incident reported and recoded	1	1		R 1,000.00
20.3	Follow – up training to be given after incident	1	1		R 1,000.00
20.4	Disciplinary procedures in place for offenders	1	1		R 1,000.00
20.5					
21	Flora	5	5	R 0.00	R 9,000.00

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
21.1	Construction footprint kept to the minimal regarding clearing of vegetation	1	1		**R 5,000.00**
21.2	Rules communicated to employees through induction and toolbox talks	1	1		R 1,000.00
21.3	Incident reported and recoded	1	1		R 1,000.00
21.4	Follow – up training to be given after incident	1	1		R 1,000.00
21.5	Disciplinary procedures in place for offenders	1	1		R 1,000.00
22	Protection of Heritage Resources	4	4	**R 0.00**	**R 4,000.00**
22.1	Before work commences in specific area, final check for heritage resources to be done	1	1		R 1,000.00
22.2	Procedure to report finds in place	1	1		R 1,000.00
22.3	Work stopped and area secured	1	1		R 1,000.00
22.4	Relevant parties informed of finds	1	1		R 1,000.00
23	Rehabilitation	4	4	**R 0.00**	**R 4,000.00**
23.1	Rehabilitation method statements in place	1	1		R 1,000.00
23.2	Rehabilitation conducted according to MS and EMP	1	1		R 1,000.00
23.3	Rehabilitated area monitored as construction continue	1	1		R 1,000.00
23.4	Encroachment and access on rehabilitated area restricted	1	1		R 1,000.00

	RESULTS SUMMARY	Target	Achieved	Fine this ECO report	Potential fine
1	Environmental Management System	18	18	R 0.00	R 18,000.00

No	ASPECTS/IMPACT	Score	Achieved this ECO inspection	Fine for this ECO report	Potential Fine Imposed for noncompliance
2	Legal Documentation	7	6	R 0.00	R 7,000.00
3	Environmental Awareness	4	4	R 0.00	R 4,000.00
4	Site Establishment and Demarcation	4	3	R 0.00	R 32,000.00
5	Access and Traffic	9	7	R 0.00	R 87,000.00
6	Borrow Pits and Spoil Areas	6	3	R 0.00	R 14,000.00
7	Waste Management	10	8	R 0.00	R 27,000.00
8	Hydrocarbons	22	22	R 0.00	R 12,000.00
9	Vehicle and Plant Maintenance	5	5	R 0.00	R 9,000.00
10	Wash bays	9	9	R 0.00	R 18,000.00
11	Batch Plant / Mixing Areas	10	10	R 0.00	R 31,000.00
12	Sewage and Sanitation	11	9	R 0.00	R 36,000.00
13	Supply of Water for Human Consumption	4	4	R 0.00	R 5,000.00
14	Staff Areas	17	17	R 0.00	R 5,000.00
15	Storm Water Management	6	4	R 0.00	R 42,000.00
16	Air Pollution Management	7	7	R 0.00	R 31,000.00
17	Noise Management	5	5	R 0.00	R 13,000.00
18	Fire Prevention	6	6	R 0.00	R 6,000.00
19	Sensitive Areas	4	2	R 0.00	R 57,000.00
20	Fauna	4	4	R 0.00	R 4,000.00
21	Flora	5	5	R 0.00	R 9,000.00
22	Flora	4	4	R 0.00	R 4,000.00
23	Rehabilitation	4	4	R 0.00	R 4,000.00
	Compliance sum	181	181	R 0.00	R 475,000.00
	Compliance percentage		100%		
	Previous percentage		100%		

APPENDIX C

Record of Decision

APPENDIX D

Layout