Draft Environmental Management Plan (**EMP**)

Newcastle: Boschkop

To be amended after Environmental Authorisation is issued.

Table of Contents

TABLES

APPENDICES AND FIGURES

User Note: This Table of Contents section acts as a reference point for the Record of Issue, Executive Summary and Study Limitations sections as and when they might be required. Therefore, the structure of this section must not be altered in any way.

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1.0 INTRODUCTION

The purpose of an Environmental Management Plan (EMP) is to guide the planning and design, construction and operational phases of the development. The EMP should be 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 Point of departure for any EMP is to take a pro-active route by addressing and minimising any potentially significant problem before it occurs. In particular this EMP deals with 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

The majority of 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.

2.1.4 Decommissioning Phase

Thoughtful design, thorough monitoring and strict adherence to the EMP 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 EMP
- The PM should ensure that sufficient resources are available to the other role players to efficiently perform their tasks in terms of the EMP
- The PM must appoint an independent ECO to ensure strict adherence to the EMP

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 available on the construction site at all times, overseeing all phases of the construction activities.

2.2.4 Consulting Engineer (CE)

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

2.2.5 Environmental Control Officer (ECO)

The ECO 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, 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 EMP
- The ECO 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 EMP have been adhered to

2.2.6 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 Municipalitylor for the area.)

3.0 IMPLEMENTATION AND MONITORING

3.1.1 Auditing/Inspections

- The appointed ECO on a regular 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 on site inspections
- The contractor will use the formats presented in this EMP to report to the PM as to the compliance to this document

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.

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 EMP documentation and are subject to all terms and conditions contained within the EMP document. For each instance wherein 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.

4.0 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

5.0 EMP OBJECTIVES

This EMP 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

6.0 EMP CONTEXT

This EMP 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 EMP should always be available on site. All contractors and sub-contractors are to be familiar with the EMP and its contents.

7.0 LEGISLATION

The EMP 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)

8.0 PROJECT OVERVIEW

The land development area is planned

NB – Include Locality Map

9.0 TIMEFRAMES

The expected construction period will be phased with an estimated timeframe of 5 years.

10.0 RECEIVING ENVIRONMENT

The results of the specialist investigations include the following:

NB – Include Environmental Composite

11.0 ENVIRONMENTAL MANAGEMENT PLAN

Table 1: Environmental Management Plan

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.1 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 all 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 all 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.	√	√			DEVELOPER, PROJECT MANAGER, CONTRACTOR	Once-off		
c) Environmental incidents	The Contractor 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) Erosion sedimentation and	If possible, construction activities should be scheduled for the drier months to decrease the risk	√				DEVELOPER, PROJECT			

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
flooding	of erosion during heavy thunderstorms.					MANAGER			
e) Service systems	The service systems are to be designed according to the minimum requirements of, and submitted to the Local authority for approval. No construction activities must commence on site prior to obtaining the necessary approval. Underground services should be designed in such a way so as to require minimum maintenance to avoid disturbance of the underground and superficial environment.	√	√	√		PROJECT MANAGER, ENGINEER, CONTRACTOR			
f) Geology	Founding conditions for individual structures must be confirmed by a qualified geologist.	√				ENGINEER, GEOLOGIST			
g) Structures	Structures that are to be erected should be aesthetically pleasing and blend into the area as far as possible to minimise the visual impact.	√				DEVELOPER, ARCHITECT			
g) Landscape	The natural features of the site should be managed in a holistic manner.	√				DEVELOPER, LANDSCAPE ARCHITECT, ECO			
h) Crime, safety and security	The Developer must determine which security system should be utilised for the site. Entrance points of the construction road must be secured.	√	√			DEVELOPER, CONTRACTOR			

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.2 Soil									
11.2.1 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	All 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 all contractors whom in turn must provide copies to the construction workers. Instruct all drivers to use access point and determined route.	√	√			PROJECT MANAGER, ECO, CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
d) Vehicular fences	Fence off areas which are off limits to vehicles. Failure to adhere will result in spot-fines and all 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		
11.2.2 Erosion									
a) Erosion prevention	Demolition and construction activities should preferably take place during the dry months. All surface run-offs shall be managed in such a way so as to ensure erosion of soil does not occur. All 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.	√	√			ENGINEER, ECO, CONTRACTOR	Continuous		
b) Surface cladding	All 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 grass seed/planted with a suitable groundcover.	√	√			ECO, CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
c) Wet areas	No vehicles what so ever are allowed to move across any wet areas (e.g. drainage line), 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 all 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 be followed by the planting of grass or covering of the surface within 2 weeks.		√			CONTRACTOR	Once-off		
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		√			CONTRACTOR, ECO	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	water bodies, 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.								
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		
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		
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		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
c) Mowing of vegetation	Only areas directly affected by trenching and construction may be grubbed and stripped of topsoil. The vegetation on the remainder of the construction corridor, 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. 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 laying of pipes or infrastructure (on or adjacent to the site), 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 below the 1:100 year flood line / within the transitional zones.	√	√			ECO, CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
h) Stockpile covering	Cover stockpiles and surround downhill sides with a sediment fence 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		
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 and 4m^2 footprints in a designated materials storage area.		√			CONTRACTOR	Continuous		
l) Traversing topsoil	No vehicles are allowed to traverse the stockpiled topsoil areas.		√			CONTRACTOR	Continuous		
11.3 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		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
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 land-owners/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	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		
d) Disposal	Solid waste shall be disposed of in a manner approved by the Department of Water and Environmental Affairs (DWEA). All 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		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
f) Cleaning/clearing	Avoid the cleaning of the site camp or paved surfaces with soap. All 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 all 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		
11.3.2 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 in ecological sensitive areas /areas highly visible from the properties of the surrounding land-owners/ in areas where the wind direction will carry bad odours across the properties of adjacent landowners.	√	√			PROJECT MANAGER, CONTRACTOR	Once-off		
b) Disposal	No waste materials shall at any stage be disposed of in the open veld of adjacent properties, where the wind direction will carry bad odours across the		√			ECO, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	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.								
c) Waste Bins	Waste bins with lids shall be provided on site for all waste pertaining to food and drinks. These shall be supplied in close proximity to the area where the workers eat.		√			CONTRACTOR	Continuous		
d) Removal	The waste bins shall be cleared by a waste truck on a weekly basis.		√			CONTRACTOR	Continuous		
11.3.3 Chemical waste									
a) Design	Design the site in such a manner that chemical wastes are not located in close proximity to the permitted fire making area. These areas shall be predetermined and located in areas that are already disturbed. These areas shall not be within 100 m from any 1:100 year flood line or drainage lines. This area should be on a concrete base to avoid any possible seepage into the soil.	√				PROJECT MANAGER, CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
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	All 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	All 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	√	√			ENGINEER,	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	volume of the amount of fuel stored, as per agreement and approval of the ECO. No storage of any fuel will be allowed on site, other than what is approved by the applicable provincial government departments.					CONTRACTOR			
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 all 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 all 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		√			ECO, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	pumping has stopped.								
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		
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 vehicle maintenance yard and secured storage area will be established as far as is practicable, outside 1:100 year flood lines and buffer areas as determined by the wetland delineation. The maintenance yard should be indicated on the layout plan of the site.	√				PROJECT MANAGER, CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
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		
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		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	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.								
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		
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		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	immediately.								
b) Transporting materials	All 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) Normal working hours	Construction should be limited to normal working hours, which is stipulated to be from 06h00 to 18h00, Mondays to Fridays and Saturday from 06h00 to 15h00. 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		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	and friends, are allowed to stay on the site.								
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: Gauteng 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		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	Regulations.								
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	All 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		
e) Equipment and materials	The Contractor should ensure that the handling of equipment and materials is supervised and adequately instructed.		√			CONTRACTOR	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 certain safety precautions should be followed (hard hats, boots, etc).		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
g) Fire extinguisher	Fires are restricted to certain areas to ensure safety on site. A fire extinguisher should be accessible at the site camp 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 all construction vehicles. A full-time fire prevention team and the associated equipment must be available on site.	√	√			CONTRACTOR	Continuous		
h) Emergency numbers	A list with all 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	Continuous		
i) Speed limits	Within the construction site a maximum speed limit of 20km/h must be enforced for all construction vehicles and 40km/h for light vehicles.		√			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.		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
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		
b) Access control	A system must be implemented where all 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	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	All negative effects caused by the erection of any temporary fences must be rehabilitated after			√		CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	construction is complete.								
11.8 Health									
11.8.1 Chemical Toilets									
a) Number of toilets	One (1) portable chemical toilet for every 10 workers must be established on site (not all 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 1:100 yr flood line. It is important, however, that toilets be placed in areas where the largest number of workers are 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		
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		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	that toilets are kept in a hygienic state.								
f) Toilet paper	Toilet paper shall be supplied to all 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									
a) Authorisation	In cases where blasting is required, an authorisation must be obtained from the Department of Mineral and Energy Affairs.	√	√			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		√			ECO,	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	between the ECO and Contractor.					CONTRACTOR			
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 surrounding residents of each blasting event in writing, 24 hours in advance before blasting events will take place.		√			ECO, CONTRACTOR	Continuous		
d) Safety precautions	Where services run over rocky areas, blasting will be prevented as far as possible – 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	All activities on site must comply with the regulations of the Animal Protection Act, 1962.		√			CONTRACTOR	Continuous		
b) Sensitive areas	No construction worker activity whatsoever will be	√	√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	allowed outside of the specific construction area.								
c) Snaring / hunting	Snaring and hunting of fauna by construction workers on or adjacent to the study area 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.		√			ECO, CONTRACTOR	Continuous		
11.11 Flora									
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 all 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 medicinal/ protected/ Red Data flora that will have to be removed shall be removed by a suitably qualified specialist and relocated. The applicable responsible person at the provincial department	√				FLORA SPECIALIST, ECO	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	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.								
c) Site access and circulation	Strictly no unauthorised access, land clearing, construction activities, vehicular traffic of any kind, pedestrian traffic or fires will be permitted external of specific construction areas or in sensitive vegetation areas.	√	√			ECO, CONTRACTOR	Continuous		
d) Drainage lines	No clearing of vegetation will be allowed within any wetland/ natural drainage areas other than as indicated by the ECO.	√	√			ECO, CONTRACTOR	Continuous		
e) Exotic / invader sp	All invader or exotic plant species must be removed from the site and disposed of at a landfill site. The National Department of Agriculture and Forestry (NDAF) will be consulted during this process.		√			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	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
						CONTRACTOR			
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		
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		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.12 Storm water									
a) Covering of wastes	Cover any wastes that are likely to wash away or contaminate storm water		√			ECO, CONTRACTOR	Continuous		
b) Bunded area	Build a bund around waste storage area to stop overflow into storm water		√			CONTRACTOR	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 a roadway.		√			ENGINEER, CONTRACTOR	Continuous		
e) Drainage channels	Drainage channels must be constructed along access roads every 50m to divert runoff during construction period.	√	√			ENGINEER, CONTRACTOR	Continuous		
f) Energy dissipaters	Energy dissipaters (gabions/grass bales etc.) must be installed at all potential large flow volume areas, especially during the construction phase where large areas will be open soil.		√			ENGINEER, CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
g) Engineering report	The engineer's service report will also specifically address storm water to the satisfaction of the Local Municipality. This report will only be set up once the development has been approved. This storm water design (as per civil engineers) for all 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, in order to increase infiltration into the soil. The swales should be vegetated with indigenous, riparian 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	Where feasible the utilisation of retention ponds should be applied. 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	√	√			ENGINEER, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	parking areas should by filtered in this fashion 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		√	√		CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	runoff from contaminants contained therein.								
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 drainage line or wetland.	√				ENGINEER	Continuous		
o) DWAF approval	Both storm water and excess effluent intended for irrigation must be purified according to DWEA standards. Approval must be obtained from DWEA for the abstraction of groundwater.	√				ENGINEER	Once-off		
11.13 Traffic Impact									
a)Departmental requirements	All 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	Once-off		
b) Delivery trucks	Deliveries by large construction vehicles may only take place during weekdays and pre-warning of at least one day prior to delivery must be given to the		√			ECO, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	ECO.								
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 all-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	Continuous		
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	√	√			ENGINEER, CONTRACTOR	Once-off		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	cross under the road in safety.								
11.14 Sensitive Areas									
11.14.1 Rivers / Streams / Wetlands									
a) Flood line area	No activities may be allowed below any 1:100 year flood line or clearly definable drainage area.	√	√			CONTRACTOR	Continuous		
b) Fencing of potential natural drainage lines	During construction all identified natural drainage lines 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.	√				ECO, CONTRACTOR	Once-off		
c) No dumping	No dumping will be allowed within any drainage areas. No bins shall be located within 50m of these areas.		√			CONTRACTOR	Continuous		
d) No toilets	No chemical toilets shall be situated within 50m from the natural drainage areas.		√			CONTRACTOR	Continuous		
e) Surface runoff	All surface runoff shall be managed in such a way as to ensure that erosion of soil does not occur.	√	√			ENGINEER, CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
f) No vehicles	No vehicles whatsoever are allowed to move across the flood line areas unless authorised by the ECO, which could cause erosion scouring and compaction.		√			CONTRACTOR	Continuous		
g) No stockpiling	No topsoil stockpiling, or stockpiling of any other material, shall be allowed below the 1:100 year flood line.		√			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 on or adjacent to the site.		√			CONTRACTOR	Continuous		
k) No washing	No washing of clothes will be allowed in any water bodies on or adjacent to the site.		√			CONTRACTOR	Continuous		
l) No taking of water	No taking of water from water bodies for drinking or cooking purposes will be allowed, as potable water		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	should be available on site.								
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 vegetation disturbance within any natural drainage habitat zone and rocky outcrops. All 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		
o) Hardened surfaces	Any compacted or hardened surfaces will be located at least 50m outside of the outer boundary of the drainage lines and shall be rehabilitated upon construction completion.	√	√			ENGINEER	Once-off		
11.14.2 Rocky Outcrops									
a) Fencing	Rocky outcrop areas must be fenced off prior to any clearing or any construction activities.	√	√			CONTRACTOR	Once-off		
b) Maintain conservation area	The contractor will maintain the fences at all times and will ensure the protection of the conservation areas at all times.		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.14.3 Heritage / Cultural / Archaeological Sites									
a) Discovery of artefacts	Should any 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		
c) Structures older than 60 years	No buildings / structures older than 60 years shall be damaged / demolished, or archaeological artefacts removed, without written authorisation from SAHRA.	√	√			CONTRACTOR	Continuous		
d) Burial grounds	Any burial ground or grave 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		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
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 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		
11.15.2 Installation of services									
a) Requirements	The service systems are to be designed according to the minimum requirements of, and submitted to, the Local Authority for approval. Thus no construction activities must commence on site prior to obtaining the necessary approval.	√	√			ENGINEER, CONTRACTOR	Once-off		
b) Trenches	Excavate, close and rehabilitate trenches as soon as possible after site services pipes are installed. Avoid open trenches for any extended period of		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	time. This shortens the duration of impacts and improves the recovery of the vegetation. This limitation includes the grubbing of the trench area.								
c) Backfill material	All trenching and excavations must be properly backfilled and compacted as per sub clause 5.7.1 of SABS 1200 DB. The backfill material must be less permeable than surrounding soil layers so as to prevent erosion of the sides of trenches.		√			CONTRACTOR	Continuous		
d) Water pressure from surrounding soil	Caution must be exercised to prevent that the water pressure from the surrounding soil is not greater than that within the pipe, as this may lead to damage.		√			CONTRACTOR	Continuous		
e) 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, except when part of the construction scope of works. Any damage repairs shall be for the Contractor's account. No littering or dumping of rubble shall be permitted in the channel and all 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.		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
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.		√			CONTRACTOR, ECO	Once-off		
b) Fencing	The site camp shall be fenced and all 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 a wetland or 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		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
11.17 Environmental Awareness Training									
a) Training program	An environmental awareness-training program must be organized as part of the EMP to ensure that each employee knows his/her responsibilities regarding the EMP 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.	√	√			CONTRACTOR, ECO	Once-off		
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		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
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	All 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. All rehabilitated areas must be maintained and irrigated as required to ensure sufficient vegetation coverage. Re-seeding may be required if sufficient coverage has not been achieved after 6 months and shall be at the Contractor's expense.		√			LANDSCAPE ARCHITECT, CONTRACTOR	Once-off		
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		√			CONTRACTOR	Continuous		

POSSIBLE IMPACT	MITIGATION MEASURES	APPLICABLE PHASES				RESPONSIBLE PERSON	FREQ	COMPLIANT	
		DS	CO	OP	DE			YES	NO
	completed by the main contractor.								
g) Completion of work	On completion of works, the contractor shall clear away and remove from the site all 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		

APPENDIX A

ABBREVIATIONS AND DEFINITIONS

CE	Consulting Engineer
CO	Construction
DE	Demolition

DS	Design
DWEA	The Department of Water and Environmental Affairs – 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 Sections 21, 22 and 26 of the Environment Conservation Act
EMI	Environmental Monitoring Inspector – from Provincial Government (E.g. GDARD)
EMP	Environmental Management Plan
FAUNA	All 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	All 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 all 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).

FIGURE 1

LOCALITY MAP

FIGURE 2

ENVIRONMENTAL COMPOSITE