

## **Appendix F**

- Environmental Management Programme

# **ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP)**

for

**THE PROPOSED DEVELOPMENT OF PORTION 385 OF THE FARM  
WATERKLOOF 305 JQ, RUSTENBURG, NORTH WEST PROVINCE.**

**NWP/EIA/72/2012**

Prepared by

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## 1. INTRODUCTION

HydroScience cc, an independent Environmental Assessment Practitioner (EAP), has been appointed by the applicant, Esimio Beleggings, to undertake an Environmental Impact Assessment (EIA) process, in the form of a basic assessment, for the proposed township establishment of Portion 385 of the farm Waterkloof 305 JQ, Rustenburg, North West Province.

The proposed development more specifically refers to residential properties (low and medium density), a filling station, businesses, commercial & retail in terms of shops and hotel on the said property.

The property is currently partly developed with the Cynthiana hotel, a caravan park and camping area, roadhouse, car dealer and shop that exist on site. The following main activities will take place:

- Demolition of existing structures;
- Vegetation will be cleared in undeveloped area of approximately 8 ha;
- Bulk services (sewage, electricity, water supply and roads) will be extended (services exist on the site);
- Infrastructure will be established and structures (buildings, residential dwellings) will be built; and
- A filling station with underground storage of petrol and diesel will be developed.

The planned structures and infrastructure will include:

- Thirteen (13) large residential properties (low density – one unit per stand) with stand sizes varying between 2 130m<sup>2</sup> and 4 069m<sup>2</sup> over approximately 4 ha;
- Two (2) areas with high density units (46 units at a density of 30 units/ha over 1.588ha & 123 units at a density of 60 units/ha over 2.07ha);
- Hotel & offices;
- Retail and restaurant area (1.566ha)
- Internal roads;
- Extended infrastructure for bulk services (water supply and sewage); and
- A filling station (250m<sup>2</sup>) bordering the main road (R24/R30 or P16-1) which includes a take-away (150m<sup>2</sup>). The proposed filling station area (4 620.73m<sup>2</sup>) will be located at the new entrance to the site just off the R24/R30 (P16-1). The establishment of a filling station is based on existing rights for a filling station on the property. The filling station will require underground fuel storage tanks for petrol and diesel. Thirty (30) kilolitre (m<sup>3</sup>) tanks will be established for each of the following diesel 50ppm; diesel 500ppm; ULP 93; ULP 95.

The purpose of the Environmental Management Programme/Plan or EMP (this document) is to ensure that undue or reasonably avoidable adverse impacts of the project are prevented, that impacts which cannot be prevented are managed to reduce their significance and that the positive benefits of the project are enhanced.

The EMP will therefore:

- Define the various measures to be taken during the life of the project [pre-construction (design and planning), construction and operation] in order to enhance positive and minimise/reduce adverse environmental impacts and meet the performance specifications;
- Define the actions needed to implement these measures;
- Describe how this will be achieved; and
- Allocate responsibilities.

EMPs are important tools for ensuring that the management actions/measures arising from the EIA process are clearly defined and implemented through all phases of the project.

**Public participation process:** Details on the public participation process undertaken and the results thereof are contained in another report which forms part of the Basic Assessment Report.

## 2. IMPACT ASSESSMENT METHODOLOGY

The criteria defined in Table 1 have been used to assess the significance of the impacts identified in this study. The final decision regarding the significance of an impact took the following aspects into account:

- Intensity/severity of an aspect;
- Timing of an aspect;
- Probability of occurrence of the impact;
- Duration of an impact; and
- Extent of an impact.

**Table 1: Impact assessment methodology**

Probability of occurrence of impact		Intensity/severity of aspect	
• Definite: >90%	• High: 50 – 90%	• Severe: >90%	• Major: 50 – 90%
• Moderate: 15 – 49%	• Low: <15%	• Moderate: 15 – 49%	• Low: <15%
Timing of aspect	Duration of impact	Extent of impact (spatial scope)	
• Immediate	• Short-term: < 1 year	• On-site	• Local = 0 – 5 km radius
• Construction phase	• Medium-term: 1 – 5 years	• District	• Regional
• Operational phase	• Long-term: > 5 years	• National	
• Decommissioning	• Permanent		
Significance of impact			
<ul style="list-style-type: none"> <li>• <b>High:</b> the impact could render the development options controversial or the entire project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in project decision-making;</li> <li>• <b>Moderate:</b> The impact could, either in isolation or in combination with others, in the opinion of the environmental team, have a material influence on the decision-making process, including the specification of mitigating measures. Accumulation of such issues may lead to an increase in the overall impacts on a particular resource or receptor, giving rise to overall high significant impact. Mitigation measures and detailed design work may ameliorate impacts.</li> <li>• <b>Low:</b> May be of relevance in enhancing the design of the development and in consideration of mitigation measures. The impact is limited in extent, has low to medium intensity, whatever its probability of occurrence is, the impact will not have a material effect on the decision and is unlikely to require management intervention carrying significant costs.</li> <li>• <b>Negligible:</b> the impact is non-existent or insubstantial, is of little importance to any stakeholders and can be ignored.</li> </ul>			

### 3. POTENTIAL IMPACTS AND MANAGEMENT MEASURES

As part of the EMP, the identified environmental impacts that may result from the various phases of the project, their risks or potential impacts, the proposed management measures thereof and associated time frames are summarised in Table 2.

### 4. RESPONSIBILITY

The applicant will be responsible for the implementation of all mitigation and management measures as well as the compliance with this EMP (especially during the construction phase) by delegating his/her responsibilities to the Construction Contractor. Each Contractor involved in the project will comply with the EMP and will therefore appoint a Contractor's Representative (the title may vary), who is responsible for the on-site implementation of the EMP (or relevant sections of the EMP).

The Contractor's representative can be:

- The site agent;
- Site engineer;
- A dedicated environmental officer; or
- An independent consultant.

The Contractor will ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that he/she can interact effectively with other site contractors, labourers, the Environmental Control Officer (ECO) and the public. The Contractor's Representative ensures that all sub-contractors working under the Contractor abide by the requirements of the EMP.

In the event of the Contractor appointing an Environmental Officer (EO), or officers, their primary role will be to coordinate the environmental management activities of the Contractor on site. The EO may also be required to perform the following roles:

- Support the ECO in the monitoring and execution of the EMP by maintaining a permanent presence on site;
- Inspect the site as required to ensure adherence to the management actions of the EMP;
- Complete Site Inspection Forms on a regular basis (e.g. daily or weekly);
- Provide inputs to the regular (e.g. monthly) environment report to be prepared by the ECO;
- Liaise with the construction team on issues relating to implementation of, and compliance with, the EMP;
- Maintain a record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; and
- Maintain a public complaints register in which all complaints are recorded.

The conditions of the authorisation and EMP must be brought to the attention of all persons (employees, workers, consultants, contractors etc.) associated with the undertaking of these activities and the applicant must take such measures that are necessary to bind such persons to the conditions thereof (contracts with penalties for non-compliances).

The applicant can further enforce this by running workshops with all employees in order to raise environmental awareness. These workshops should cover aspects such as fire prevention, strict use of ablution facilities and general duty of care. A pamphlet can be handed out on socially acceptable and environmentally responsible conduct such as water conservation, waste management etc.

## 5. COMPLIANCE, MONITORING AND REPORTING

Accurate and up-to-date records will be kept (by the EO or other appointed contractor's representative) of all system malfunctions resulting in non-compliance with the EMP. The applicant will also, within 24 hours, ensure that the relevant authorities are notified of the occurrence or detection of any incident which has the potential to cause, or has caused pollution of the environment, health risks or which is a contravention of any EMP or environmental authorisation condition. The applicant is then to submit an action plan indicating measures which will be taken to:

- Correct the impacts resulting from the incident;
- Prevent the incident from causing any further impact; and
- Prevent a recurrence of a similar incident.

A complaints register will be kept on site and all complaints from the public will be noted therein as well as measures taken to rectify the situation as described above.

## 6. ALTERATIONS TO THE EMP

As EMPs should remain dynamic and flexible, certain conditions may require the EMP to be revised. These conditions may include the following:

- Changes in legislation;
- Occurrence of unanticipated impacts or impacts of greater significance, intensity and extent than predicted;
- Inadequate mitigation, i.e. where the level of an environmental parameter is not conforming to the required level despite the implementation of measures; and
- Secondary impacts which occur as a result of the mitigation.

Table 2: Identified potential impacts, risks and proposed management measures.

Construction phase			
Vegetation			
<b>Loss of vegetation and habitat for animals</b>			
Vegetation will be removed throughout the site. This can lead to other indirect impacts such as erosion due to storm water flow velocity.			
<b>Impact Parameters:</b>	<b>Pos/Neg</b> Negative	<b>Probability</b> Definite	<b>Intensity</b> Moderate
			<b>Extent</b> Local
			<b>Duration</b> Permanent
<b>Impact Significance:</b> (Prior to mitigation)			
<b>Moderate</b>			
<p><b>Indigenous trees:</b> As suggested by the fauna and flora specialist as well as DAFF, indigenous trees should not be removed where possible but incorporated into the landscaping of the development to add to the aesthetic value of the site and maintain bird life. Protected species, according to the National Forest Act (Act 84 of 1998), such as the Marula tree identified, may not be removed by the applicant unless a permit has been applied for and obtained from DAFF.</p> <p><b>Alien infestation:</b> Where alien invasive plants occur, as identified by CARA, 1983 (Act 43 of 1983), that will not be removed for construction purposes, these must be uprooted, cut and/or chemically treated (use only approved chemicals as suggested by DAFF). The contractor's representative must appoint a registered weed control officer to chemically treat any invader species. Care must be taken to avoid the spread of seeds of alien vegetation.</p> <p><b>Fauna:</b> No fauna species may be captured or killed by any of the construction crew or inhabitants of the site during the operational phase. A trained person must be contacted to relocate animals if any are encountered, including snakes to the natural area in the western portion.</p> <p><b>Revegetation:</b> Any open space must be revegetated with indigenous species of grasses and trees to promote the re-establishment of avifaunal species and other fauna disturbed during construction.</p> <p><b>Western portion:</b> The western portion of the site should be left undisturbed except for the control of alien infestation. This is to protect the MPNE to the south west and add to the aesthetic value of the property.</p>			
<b>Management Measures:</b>			

	<p>Additionally, the following recommendations by the vegetation specialist must be adhered to:</p> <ul style="list-style-type: none"> <li>• Remain within demarcated areas during construction to limit disturbances to surrounding areas as well as the MPNE and the steeper slopes on the western portion of the site throughout the project life;</li> <li>• Erect a fence (palisade to maintain visual value to residents) between the development and the ridge/steep slopes on the western side to limit access and so prevent illegal waste dumping and burning that currently impacts on this area as well as prevent disturbance to flora and fauna in this area;</li> <li>• Limit construction activities to the day time and working hours for the purpose of not disturbing activities and ecological processes of nocturnal birds, small mammal etc;</li> <li>• Avoid ground disturbance to the mole habitat found on site or remove the mole species through capture and release;</li> <li>• Have a Waste Management Plan in place to prevent pollution of the site and/or surrounding ecology which could further reduce the ecological integrity if not managed; and</li> <li>• Limit dust on site and the spreading thereof to surrounding vegetation.</li> </ul>										
<p><b>Impact Significance :</b> (Post mitigation)</p>	<p style="text-align: center;"><b>Low</b></p>										
<p><b>Soil stability and erosion.</b></p>											
<p><b>Potential impact:</b></p>	<p><b>Soil erosion</b></p>										
	<p>The removal of vegetation in certain areas during construction will result in exposure of the soil surface and therefore potential erosion during rainfall events.</p>										
<p><b>Impact Parameters:</b></p>	<table border="1"> <thead> <tr> <th data-bbox="925 1400 997 1695">Pos/Neg</th> <th data-bbox="925 1097 997 1400">Probability</th> <th data-bbox="925 795 997 1097">Intensity</th> <th data-bbox="925 492 997 795">Extent</th> <th data-bbox="925 190 997 492">Duration</th> </tr> </thead> <tbody> <tr> <td data-bbox="957 1400 997 1695">Negative</td> <td data-bbox="957 1097 997 1400">Moderate</td> <td data-bbox="957 795 997 1097">Very low</td> <td data-bbox="957 492 997 795">On-site</td> <td data-bbox="957 190 997 492">Medium term</td> </tr> </tbody> </table>	Pos/Neg	Probability	Intensity	Extent	Duration	Negative	Moderate	Very low	On-site	Medium term
Pos/Neg	Probability	Intensity	Extent	Duration							
Negative	Moderate	Very low	On-site	Medium term							
<p><b>Impact Significance:</b> (Prior to mitigation)</p>	<p style="text-align: center;"><b>Low</b></p>										
<p><b>Management Measures:</b></p>	<p>To reduce the likelihood of exposed soils being eroded by surface runoff, construction activities should be limited to the dry season when the probability of rainfall events is very low. All areas stripped of vegetation during construction and not destined to be covered by hard surfaces (buildings, roads etc) should be re-vegetated with appropriate indigenous ground cover as quick as possible at the close of construction. Any surface runoff must be managed according to a stormwater management plan if construction should take place in the wet season.</p>										
<p><b>Impact Significance :</b> (Post mitigation)</p>	<p style="text-align: center;"><b>Negligible</b></p>										



<b>Visual Impact</b>			
<b>Potential impact:</b> <u>Loss of aesthetic value</u>			
The more large trees removed, the more significant the visual impact will be as the site is located on a slope of a ridge.			
<b>Impact Parameters:</b>	<b>Pos/Neg</b> Negative	<b>Probability</b> Moderate	<b>Intensity</b> Medium
			<b>Extent</b> Local
			<b>Duration</b> Long term
<b>Impact Significance:</b> (Prior to mitigation) <b>Low</b>			
<b>Management Measures:</b>			
<ul style="list-style-type: none"> <li>• Indigenous tree species will be relocated or incorporated into the development for aesthetic purposes where possible.</li> <li>• No refuse or builders rubble generated on the premises may be placed, dumped or deposited on adjacent/surrounding properties including road verges, roads or public places and open spaces during or after the construction period of the new development.</li> <li>• No waste will be burnt.</li> <li>• No waste may remain on the construction site for more than two weeks and the applicant must abide by the guideline stipulations as in the South African Manual for Outdoor Advertising Control (SAMOAC).</li> <li>• Lastly the construction crew camp must be placed in a position removed from the adjacent properties.</li> <li>• The vegetation on the steeper slopes on the western side of the property will be left untouched except of the eradication of alien vegetation.</li> </ul>			
<b>Impact Significance :</b> (Post mitigation) <b>Negligible</b>			
<b>Soil and groundwater contamination</b>			
<b>Potential impact:</b> <u>Incorrect handling and spillage of building materials and hydrocarbons</u>			
Spillage of building aggregate (concrete, bitumen) and other construction related materials as well as hydrocarbons can cause soil, runoff and groundwater contamination.			
<b>Impact Parameters:</b>	<b>Pos/Neg</b> Negative	<b>Probability</b> Low	<b>Intensity</b> Low
			<b>Extent</b> On-site
			<b>Duration</b> Short term
<b>Impact Significance:</b> (Prior to mitigation) <b>Low</b>			
<b>Management Measures:</b> Construction contractor will ensure that all building materials / chemicals are effectively stored (containers) and managed (mixing etc) to prevent contamination. In the unlikely event of a spillage, sufficient clean-up procedures			

	<p>will be carried out immediately.</p> <p>All reagents, reagent storage tanks and mixing units will be supplied with a bunded area built to contain 110% of the capacity of the facility, to contain any spilled material and return back into the system if possible. The system will be maintained in a state of good repair and standby pumps must be provided.</p> <p>Any hazardous substances will be handled according to the relevant legislation relating to transport, storage and use of the substance (Material Safety Handling Datasheets).</p> <p>All construction vehicles and equipment will be in a good working condition, will be parked/stored off site (when not working) and will be maintained off site to prevent any leakages or spillages of hydrocarbons (oil, grease, fuel). If emergency maintenance is required on site, drip trays and absorbent mats will be placed underneath the vehicles / equipment where maintenance work is done.</p> <p>If hydrocarbons are leaked or spilled, immediate clean-up and rehabilitation with a product such as that produced by Drizit or Ecodynamics will be used and contaminated soils will be removed for disposal (hazardous facility) or recycling/recovery off-site (waste manifest) or be rehabilitated in-situ. Clean-up and rehabilitation kits produced by Ecodynamics are environmentally friendly in that hydrocarbons can be recovered (recycling) and the remains biodegrade (no waste to be disposed).</p>										
<b>Impact Significance :</b> (Post mitigation)	<b>Negligible</b>										
<b>Potential impact:</b>	<b>Poor sanitary practises</b>										
<b>Impact Parameters:</b>	Improper sanitary practises or facilities could lead to soil and/or groundwater contamination.										
<b>Impact Significance:</b> (Prior to mitigation)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Pos/Neg</th> <th style="width: 33%;">Probability</th> <th style="width: 33%;">Intensity</th> <th style="width: 33%;">Extent</th> <th style="width: 33%;">Duration</th> </tr> </thead> <tbody> <tr> <td>Negative</td> <td>Low</td> <td>Low</td> <td>On-site</td> <td>Short term</td> </tr> </tbody> </table> <p style="text-align: center;"><b>Low</b></p>	Pos/Neg	Probability	Intensity	Extent	Duration	Negative	Low	Low	On-site	Short term
Pos/Neg	Probability	Intensity	Extent	Duration							
Negative	Low	Low	On-site	Short term							
<b>Management Measures:</b>	<p>Portable dry chemical toilets will be provided by the construction contractor for workers. Chemical toilets will be serviced as required to prevent overflows. Construction contractor will ensure that there are an appropriate number of mobile dry chemical toilets on site (typically 1 toilet for 20 people). Contractor to provide suitable ablation facilities (washing and changing area) for construction workers. No builders/workers will be housed on the site. Ablutions outside the provided facilities are not to occur under any circumstances.</p>										
<b>Impact Significance :</b> (Post mitigation)	<b>Negligible</b>										

<p><b>Potential impact:</b></p>	<p><b><u>Poor solid waste management practises</u></b></p> <p>Poor solid waste management practises can lead to soil contamination and unsightly construction zones as well as pests/vermin and associated health issues. Waste streams include:</p> <ul style="list-style-type: none"> <li>• Solid construction waste generated through construction activities and/or demolition of buildings.</li> <li>• Biodegradable waste generated through the removal of vegetation.</li> <li>• General waste produced by builders (biodegradable and non-biodegradable).</li> </ul>			
<p><b>Impact Parameters:</b></p>	<p><b>Pos/Neg</b> Negative</p>	<p><b>Probability</b> Moderate</p>	<p><b>Intensity</b> Low</p>	<p><b>Extent</b> On-site</p> <p><b>Duration</b> Short term</p>
<p><b>Impact Significance:</b> (Prior to mitigation)</p>	<p><b>Low</b></p> <p>Construction waste (building rubble) and general waste will be collected in suitable containers (skips on site) and be removed from site for disposal at the Rustenburg Local Municipal landfill/waste management facility by the building contractor on a regular basis (at least weekly or when skip is full). The construction contractor will ensure sufficient skips are available for storage of waste prior to removal off site to prevent overflow and littering on the site and surroundings. Non-biodegradable refuse such as glass bottles, plastic bags, etc. must be stored in suitable containers to allow for recycling and emptied on an as-required basis for recycling purposes during the construction and clean-up phase. Waste manifests (proof of removal and responsible disposal of waste) will be kept. Waste manifests for any hazardous waste removed (hydrocarbon contaminated soil for example) will also be kept. Furthermore, the contractor will ensure that no litter, refuse, waste, rubble and construction waste generated on the premises is placed, dumped or deposited on this, adjacent or surrounding properties during or after construction. Biodegradable waste (site/vegetation clearance) can be taken to a composting facility.</p>			
<p><b>Impact Significance :</b> (Post mitigation)</p>	<p><b>Negligible</b></p>			
<p><b>Socio-economic</b></p>				
<p><b>Potential impact:</b></p>	<p><b><u>Increase in workers in the area.</u></b></p> <p>An increase in workers in the area may pose security or safety risks. However, a positive impact can be recognised here as various employment opportunities may arise.</p>			
<p><b>Impact Parameters:</b></p>	<p><b>Pos/Neg</b> Negative &amp; positive</p>	<p><b>Probability</b> Moderate</p>	<p><b>Intensity</b> Low</p>	<p><b>Extent</b> Local</p> <p><b>Duration</b> Short term</p>
<p><b>Impact Significance:</b> (Prior to mitigation)</p>	<p><b>Low</b></p>			

<b>Management Measures:</b>	Construction contractor will ensure management of staff/workers and give instructions as to acceptable behaviour. Contractor will transport workers to and from the site on a daily basis to prevent movement of workers outside the property onto surrounding properties and within the area. No overnight stays and no loitering during working hours will be allowed. No ad-hoc employment in construction area as this will encourage job-seekers to loiter in the area. A security guard will keep watch during non-working hours to prevent illegal access and security problems on the site or in the surrounds. Finally, the site is to be fenced for the purposes of access control.			
<b>Impact Significance :</b> (Post mitigation)	<b>Low</b>			
<b>Potential impact:</b>	<b>Noise pollution</b>			
	Noise generated by construction crew/equipment.			
<b>Impact Parameters:</b>	<b>Pos/Neg</b> Negative	<b>Probability</b> Definite	<b>Intensity</b> Moderate	<b>Extent</b> Local
<b>Impact Significance:</b> (Prior to mitigation)	<b>Moderate</b>			
<b>Management Measures:</b>	Construction contractor will ensure vehicles are road worthy. Construction will take place only during regular working hours (7:00 – 17:00) and not on weekends or public holidays to minimize disturbance to neighbours. In the event that it becomes necessary to work on weekends or outside these hours, this will be discussed with neighbours.			
<b>Impact Significance :</b> (Post mitigation)	<b>Low</b>			
<b>Potential impact:</b>	<b>Increase in traffic</b>			
	Increase in traffic due to movement of heavy construction vehicles can impact on traffic flow on public roads. Vehicles that are used for construction purposes will be travelling outside the boundaries of the site in order to retrieve materials used on site. This will influence the traffic along the R24 (P16-1). The construction vehicles are heavy-duty and thus travel at a lower speed than the rest of the traffic that use the R24.			
<b>Impact Parameters:</b>	<b>Pos/Neg</b> Negative	<b>Probability</b> High	<b>Intensity</b> Moderate	<b>Extent</b> Local
<b>Impact Significance:</b> (Prior to mitigation)	<b>Low</b>			
<b>Management Measures:</b>	All construction vehicle drivers will be trained in terms of driving protocols, i.e. adhering to speed limits, ensuring materials are safely secured, etc. Sign boards will be erected on both sides of all access roads to make the public aware of slow moving construction vehicles entering and exiting the site. The credentials of the drivers will be			

	verified by the construction contractor. No construction material must obstruct vehicle movement on public roads. Vehicles will only be able to exit the site towards Rustenburg.			
<b>Impact Significance :</b> (Post mitigation)	<b>Negligible</b>			
<b>Air pollution</b>				
<b>Potential impact:</b>	<b>Emissions into the atmosphere</b>			
	Emissions may be released into the atmosphere resulting from vehicles and machinery (carbon monoxide emissions, smoke), dust (site clearance), solvents, cooking fires (workers) and malodours as a result of waste not being removed from the construction site.			
<b>Impact Parameters:</b>	<b>Pos/Neg</b>	<b>Probability</b>	<b>Intensity</b>	<b>Extent</b>
	Negative	Moderate	Moderate	Local
<b>Impact Significance:</b> (Prior to mitigation)	<b>Moderate</b>			
	All vehicles and machinery/equipment used on, or entering, the site must be maintained and serviced regularly to ensure that they do not emit smoke or fumes. The contractor's representative or environmental officer must ensure that all on-site vehicles comply with the old SABS 0181 standards (now SANS 10181:2003 in conjunction with SANS 10281:2003).			
	Dust must be suppressed, on access roads and construction sites, during dry periods, by the regular application of water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that will not result in the generation of runoff.			
<b>Management Measures:</b>	Any solvent based finishes such as paints, varnishes, sealants and polishes will contain minimal levels of volatile organic compounds (VOC) and no chloro fluoro carbons (CFC) which may harm the atmosphere. Water-based paints are to be used where possible (interior) and plant based stains and sealants must be considered as these are more environmentally-friendly. Earthcote and Envirolite (midas) produce environmentally-friendly paints.			
	No ad hoc cooking fires are to be allowed on site except in designated cooking areas.			
	Waste must be disposed, as soon as possible, to a municipal transfer station, skip or on a permitted landfill site. Waste must not be allowed to stand on site to decay, resulting in malodours and attracting vermin. Waste may not be burned on site.			

<p><b>Impact Significance :</b> (Post mitigation)</p>	<p>A complaints register must be kept throughout the construction and operational phase.</p> <p style="text-align: center;"><b>Low</b></p>			
<b>Disturbance of surrounding environment</b>				
<p><b>Potential impact:</b></p>	<p><b>Loss of ecological integrity within the surrounding environment</b></p> <p>Disturbance and constructions activities must remain within demarcated areas to not impact the ecological integrity of the surrounding environment.</p>			
<p><b>Impact Parameters:</b></p>	<p><b>Pos/Neg</b> Negative</p>	<p><b>Probability</b> Moderate</p>	<p><b>Intensity</b> Moderate</p>	<p><b>Extent</b> Local</p> <p><b>Duration</b> Medium term</p>
<p><b>Impact Significance:</b> (Prior to mitigation)</p>	<b>Moderate</b>			
<p><b>Management Measures:</b></p>	<p>Disturbance to the surrounding farm steads north and south may not take place. Disturbance of the MPNE to the south west and the steep slopes on the western portion of the site is prohibited and can be limited by walling in or fencing the area of construction and by instructing construction staff that no activities may take place outside of the demarcated area. This includes dumping, storage of construction material or trespass of staff onto adjacent land.</p>			
<p><b>Impact Significance :</b> (Post mitigation)</p>	<b>Low</b>			
<b>Collapsible Soils</b>				
<p><b>Potential impact:</b></p>	<p><b>Collapse of infrastructure due to collapsible soil</b></p> <p>During the geotechnical specialist study, collapsible soils were identified.</p>			
<p><b>Impact Parameters:</b></p>	<p><b>Pos/Neg</b> Negative</p>	<p><b>Probability</b> Moderate</p>	<p><b>Intensity</b> Moderate</p>	<p><b>Extent</b> On-site</p> <p><b>Duration</b> Short term</p>
<p><b>Impact Significance:</b> (Prior to mitigation)</p>	<b>Moderate</b>			
<p><b>Management Measures:</b></p>	<p>The design of heavier structures such as double- and three-storey structures should take cognizance of the potentially problematic foundation conditions on the property. It is recommended that the foundation excavations for residential structures be inspected by a competent person prior to construction in order to determine whether disturbed ground conditions were caused by historic activities. Where present, the disturbed ground should be reinstated properly in accordance with a civil engineer's requirements prior to construction of residential units. The design and construction of raft foundations (whether soil or concrete) should be done in accordance and under supervision of a civil or structural engineer.</p>			

	<p>During installation of the underground tanks, the side walls of the cavity must be supported or battered back to an adequate slope if constructed on areas where collapsible soils have been identified. The excavations must be inspected by a geotechnical engineer prior to placing any concrete, backfilling, foundations or underground tanks and all excavation conditions must be done in accordance to SABS 1200D. A secondary containment unit should be implemented, as well as leak detection measures. Damp proofing precautions should be undertaken and implemented beneath the storage tanks.</p>										
<p><b>Impact Significance :</b> (Post mitigation)</p>	<p style="text-align: center;">Low</p>										
<p><b>Operational phase</b> (Indefinite)</p>											
<p><b>Storm water</b></p>											
<p><b>Potential impact:</b></p>	<p><b>Increased storm water runoff</b></p> <p>The proposed development will lead to an increase in impermeable surfaces, i.e. buildings, roofs, paved walkways, drive ways, roads etc. An increase in such impermeable surfaces, minimises the surface area available for water infiltration and prevents the effective infiltration of precipitation into the soils and therefore leads to an increase in surface water flow volumes to be managed as well as the velocity at which it flows. The contribution of the proposed development to increased surface runoff is likely to be relatively small (small contribution given the size of property in comparison to the sub catchment as a whole).</p>										
<p><b>Impact Parameters:</b></p>	<table border="1"> <thead> <tr> <th data-bbox="901 1406 981 1704">Pos/Neg</th> <th data-bbox="901 1106 981 1406">Probability</th> <th data-bbox="901 804 981 1106">Intensity</th> <th data-bbox="901 504 981 804">Extent</th> <th data-bbox="901 192 981 504">Duration</th> </tr> </thead> <tbody> <tr> <td data-bbox="981 1406 1045 1704">Negative</td> <td data-bbox="981 1106 1045 1406">Definite</td> <td data-bbox="981 804 1045 1106">Medium</td> <td data-bbox="981 504 1045 804">Local</td> <td data-bbox="981 192 1045 504">Long term</td> </tr> </tbody> </table>	Pos/Neg	Probability	Intensity	Extent	Duration	Negative	Definite	Medium	Local	Long term
Pos/Neg	Probability	Intensity	Extent	Duration							
Negative	Definite	Medium	Local	Long term							
<p><b>Impact Significance:</b> (Prior to mitigation)</p> <p><b>Management Measures:</b></p>	<p style="text-align: center;"><b>Moderate</b></p> <p>A storm water management plan for the development, that will take cognisance of the contribution of the entire catchment, will be put in place by a qualified civil engineer. The engineer will ensure that proper storm water management and erosion control practices are enforced during site clearance and construction. The site storm water management system will be linked to the municipal storm water system in the area. The storm water design will be done in accordance with the "Guidelines for Human Settlement Planning and Design" compiled under the patronage of the Department of Housing by the CSIR.</p> <p>An efficient storm water drainage system must be installed around all structures, roads and parking bays to effectively collect and drain surface water. All storm water drainage structures will be located along the road reserves. All surface areas where vehicle movement will take place (i.e. roads and parking bays) must be sealed</p>										

	<p>by means of bitumen, concrete paving or a concrete slab, to prevent the infiltration of liquids (such as hydrocarbons leaked from vehicles) into the underlying soil. The soil material underlying this layer must be compacted to prevent ingress of liquids through zones of weakness (i.e. along joints) within the surface seal.</p> <p>Storm water runoff from the filling station will be directed by the storm water drains via catch pits to sand and hydrocarbon separators prior to reuse or release in the storm water drains on site. Technologies are available for recycling that can be considered by the applicant, including recycling of grey water and storm water capture and use for washing and non-drinking purposes. The storm water management plans must be approved by local authority prior to commencement of construction activities.</p> <p>Rainwater harvesting methods should be considered for the residential area. The water can be used to irrigate gardens.</p>			
<b>Impact Significance :</b> (Post mitigation)	<b>Low</b>			
<b>Socio-economic</b>				
<b>Potential impact:</b>	<b>Socio-economic upliftment</b>			
<b>Impact Parameters:</b>	The project will benefit the local community by providing housing and employment opportunities in the area.			
<b>Impact Significance:</b> (Prior to mitigation)	Pos/Neg Positive	Probability Definite	Intensity Moderate	Extent Local Duration Long term
<b>Management Measures:</b>	<p style="text-align: center;"><b>Moderate (Positive)</b></p> <p>Due to the establishment of additional housing units in the area, additional employment opportunities may arise as the demand for domestic workers and gardeners (or garden services) will most likely increase. Also the employment of filling station attendants, shop assistants, hospitality, hotel and restaurant staff.</p> <p>A complaints register must be kept throughout the operational phase.</p> <p>Considering the mining problems in Rustenburg with associated job losses lurking (Anglo Platinum announced planned 14 000 retrenchments on 15 January 2013), creating alternative work opportunities are becoming increasingly important.</p> <p>Another filling station in this area and on this route will impact on the financial situation of existing filling stations. The filling station in this development was included due to existing rights and it is therefore not possible to mitigate</p>			



	this negative impact on surrounding filling stations (refer to map in Appendix A to view locality of all filling stations on this route).		
<b>Impact Significance :</b> (Post mitigation)	<b>Moderate (Positive) Negative on surrounding filling stations</b>		
<b>Potential impact:</b>	<b>More pressure on service provision</b>		
<b>Impact Parameters:</b>	Need for public services from the municipality due to the new development and the residents that occupy it.		
	<b>Pos/Neg</b>	<b>Probability</b>	<b>Intensity</b>
	Negative	Definite	Low
			<b>Extent</b>
			Local
			<b>Duration</b>
			Long term
<b>Impact Significance:</b> (Prior to mitigation)	<b>Low</b>		
<b>Management Measures:</b>	Will link to existing municipal services already present on the site. Due to the small area with limited residential units usage of public services will not greatly increase.		
<b>Impact Significance :</b> (Post mitigation)	<b>Negligible</b>		
<b>Potential impact:</b>	<b>Traffic increase</b>		
	Increase in traffic due to additional residential units with associated increase in local residents, as well vehicles that will utilise the filling station and commercial/retail facilities.		
<b>Impact Parameters:</b>	<b>Pos/Neg</b>	<b>Probability</b>	<b>Intensity</b>
	Negative	Definite	Moderate
			<b>Extent</b>
			Local
			<b>Duration</b>
			Long term
<b>Impact Significance:</b> (Prior to mitigation)	<b>Moderate</b>		
<b>Management Measures:</b>	Traffic studies have been conducted within this region due to the numerous development applications and it was established that various road upgrades will be made in the area in anticipation of the various developments in the area. Introduce speed reducing elements at the access points to the proposed filling stations, e.g. speed humps and ensure that no advertising boards are erected in close proximity to the access point that can result in decreased visibility to traffic to or from the development.		
<b>Impact Significance :</b> (Post mitigation)	<b>Low</b>		

<b>Potential impact:</b>	<b>Health and Safety</b>			
	The handling and storage of fuel holds a certain amount of safety-related risks. It is important that standard industry safety measures are implemented thereby reducing the risk of explosions and fire-related incidences occurring.			
<b>Impact Parameters:</b>	<b>Pos/Neg</b> Negative	<b>Probability</b> Moderate	<b>Intensity</b> High	<b>Extent</b> Local
<b>Impact Significance:</b> (Prior to mitigation)	<b>Moderate</b>			
<b>Management Measures:</b>	<ul style="list-style-type: none"> <li>Staff must regularly be informed of the necessary emergency and safety procedures and be competent in the work they are employed to do.</li> <li>Ensure that staff is familiar with the Occupational Health and Safety Act and Policy. All the necessary safety regulations must be abided by including building codes and fire practice requirements.</li> <li>Provide adequate facilities on site to treat emergencies to staff and/or the public.</li> <li>Ensure that the contact details of the police and/or Security Company, ambulance service and fire brigade are available on site.</li> <li>Ensure adequate and appropriate fire fighting equipment.</li> <li>A fire break should be established between the filling station and the rest of the property to prevent spread of fires.</li> <li>Do not allow for the congregation of vagrants on the site and CCTV systems are to be installed.</li> </ul>			
<b>Impact Significance:</b> (Post mitigation)	<b>Low</b>			
<b>Potential impact:</b>	<b>Generation of noise</b>			
	Increase in noise due to additional residential units and consequent increase in daily human activities that generate noise. As well as the operation of commercial shops, restaurant and filling station.			
<b>Impact Parameters:</b>	<b>Pos/Neg</b> Negative	<b>Probability</b> Definite	<b>Intensity</b> Low	<b>Extent</b> Local
<b>Impact Significance:</b> (Prior to mitigation)	<b>Low</b>			
<b>Management Measures:</b>	<ul style="list-style-type: none"> <li>The body corporate/home owners association appointed can lay down rules on noise after 10pm and other regulations that must be complied with by residents to reduce the nuisance of noise.</li> <li>Ensure that the activities of the filling station, shops and restaurant abide by the Rustenburg Local Municipality Noise by-laws, with regards to the abatement of noise caused by mechanical equipment, extraction fans and</li> </ul>			

	<p>refrigerators.</p> <ul style="list-style-type: none"> <li>• Ensure that noise from the site does not negatively impact on the surrounding properties.</li> <li>• The placement of noise creators must be determined during the conceptual development phase as the architects need to design the buildings with noise reduction measures in mind.</li> <li>• Comply with the provisions of SABS Code of Practice 0103-1994 for the recommended sound and noise levels for different areas of occupancy and activities for residential and non-residential indoor spaces.</li> </ul>										
<b>Impact Significance :</b> (Post mitigation)	<b>Negligible</b>										
<b>Air Quality</b>											
<b>Potential impact:</b>	<b>Emissions into the atmosphere</b>										
	Fuel emissions due to the operation of the filling station.										
<b>Impact Parameters:</b>	<table border="1"> <thead> <tr> <th>Pos/Neg</th> <th>Probability</th> <th>Intensity</th> <th>Extent</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>Negative</td> <td>High</td> <td>Low</td> <td>Site</td> <td>Long term</td> </tr> </tbody> </table>	Pos/Neg	Probability	Intensity	Extent	Duration	Negative	High	Low	Site	Long term
Pos/Neg	Probability	Intensity	Extent	Duration							
Negative	High	Low	Site	Long term							
<b>Impact Significance:</b> (Prior to mitigation)	<b>Low</b>										
<b>Management Measures:</b>	<ul style="list-style-type: none"> <li>• Fuel emissions can be reduced by the installation of the following equipment: <ul style="list-style-type: none"> <li>◦ Vapour recovery systems at the tanks (expensive option)</li> <li>◦ Vapour recovery systems at the fuel point</li> <li>◦ Carbon filters on the vents</li> </ul> </li> <li>• Regular monitoring of all filters, extraction fans, refrigeration compressors and air conditioning units must take place to ensure acceptable working conditions.</li> <li>• Regular monitoring of pump devices to ensure acceptable working conditions and the implementation of an air quality emission monitoring plan.</li> </ul>										
<b>Impact Significance :</b> (Post mitigation)	<b>Negligible</b>										
<b>Groundwater Quality</b>											
<b>Potential impact:</b>	<b>Groundwater contamination</b>										
	During the operation of the filling station there is potential for the underground storage tanks to crack or leak as a result of unstable soil structures creating unnecessary movement below the ground (collapsible soils identified during geotechnical investigation). This may result in leakage of hazardous substances.										
<b>Impact Parameters:</b>	<table border="1"> <thead> <tr> <th>Pos/Neg</th> <th>Probability</th> <th>Intensity</th> <th>Extent</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>Negative</td> <td>High</td> <td>Moderate</td> <td>Local</td> <td>Medium term</td> </tr> </tbody> </table>	Pos/Neg	Probability	Intensity	Extent	Duration	Negative	High	Moderate	Local	Medium term
Pos/Neg	Probability	Intensity	Extent	Duration							
Negative	High	Moderate	Local	Medium term							

<b>Impact Significance:</b> (Prior to mitigation)	<b>Moderate</b>
<p><b>Management Measures:</b></p>	<ul style="list-style-type: none"> <li>• A qualified engineer must inspect the site, paying special attention to the excavations prior to the placing of any concrete and/or backfilling and underground storage tanks (UST).</li> <li>• The installation of drainage channels, containment tanks and separators etc that are already incorporated into the design of the filling station.</li> <li>• Storage tanks and dispensing equipment must be installed to SABS standards as follows:             <ul style="list-style-type: none"> <li>◦ SABS 089, 1535 and 0131 relating to tank installation.</li> <li>◦ SABS 0108 relating to classification of hazardous locations and selection of apparatus for such installations.</li> <li>◦ SABS 0400 relating to building regulations.</li> </ul> </li> <li>• The USTs must be built according to the applicable specifications to ensure that high standards are adhered to in terms of product and installation methods. This will reduce the risk of underground leakages.</li> <li>• Pipes that deliver fuel to the pumps must be adequately sealed from the surrounding soil.</li> <li>• A cut-off trench that drains into a sump tank with a sealed base must be installed on the downstream side of the filling station, to prevent the lateral spread of liquid pollutants from the site.</li> <li>• The surface of the forecourt must be impermeable to any liquid/hazardous substance so that it will not be able to penetrate into the underlying soil.</li> <li>• In the event of continued spillages onto the forecourt area, groundwater contamination may result. This is reflected by the change in the water chemistry.</li> <li>• The underground tanks and pipelines must be monitored regularly to detect leaks and unnatural discharges as soon as possible.</li> <li>• The relevant authorities must be kept informed of spills and contingency plans must be in place to minimise pollution should a spill occur.</li> <li>• Dipstick electronic readings of the fuel tanks must be taken daily and documented on site to keep record of and reconcile volumes of fuel for early detection of leakages.</li> <li>• Stock reconciliation must be performed monthly and all fuel lines and fuel dispensers must be leak-proof.</li> <li>• Contamination clearing specialists for the area must be identified and their details available at all times.</li> <li>• Routine monitoring of fuel levels, water levels, abstraction volumes, rainfall figures and water quality is strongly recommended. These data will form the basis from which any changes in the groundwater regime are recognised.</li> <li>• Leak detection facilities must be installed around the fuel storage tanks and monitored according to the set monitoring programme.</li> <li>• The installation of leak detection facilities around the storage facilities must be regarded as a minimum</li> </ul>

	<p>requirement. This will serve as a monitoring system of the unsaturated zone and ensure the detection of leakages from the pipe network and storage facilities.</p> <ul style="list-style-type: none"><li>• Vapour samples must be taken according to a three monthly monitoring programme.</li></ul>
Impact Significance : (Post mitigation)	Low

## 7. IMPACT OF NO-GO OPTION

The following negative impacts in terms of the no-go option were identified:

- **Deterioration of site:** Currently, facilities/structures are dilapidated and accommodation standards are low. Without the necessary upgrades, the site will remain in the current state with low living standards which could reduce the local market value of properties and attract crime. This in turn has safety and security risks to the local community.
- **Contribution to existing housing issues:** As Rustenburg is experiencing existing housing shortages; not moving forward with the project will result in amplifying this issue.
- **Loss of Gross Domestic Product (GDP):** An opportunity to not only contribute to the local GDP of Rustenburg, but also of the Province as a whole will be lost if the development does not move forward.

## 8. MONITORING PROGRAM

During the construction and operational phase of the proposed project, monitoring and auditing of compliance with this EMP and with OHS Act Construction Regulations are to be conducted. An Audit Protocol for both the construction phase and the actual operational phase has to be drawn up by a suitably qualified person to include but not be limited to aspects listed below.

### 8.1 Construction Phase

The following aspects need to be audited:

- a) All UST installations to comply to required standards as set out by regulatory authorities and include:
  - Tank Specification to comply with set Standards:
    - SABS 089, 1535 and 0131 relating to tank installation;
    - SABS 0108 relating to classification of hazardous locations and selection of apparatus for such installations; and
    - SABS 0400 relating to building regulations.
  - Secondary containment of tank and piping;
  - Certification of tests carried out on completion of tank installation to ensure they don't leak; and
  - Sign off by an independent engineer of above audits.
- b) EMP compliance: to be checked by an Environmental Auditor.
- c) Noise and / or Light Monitoring
  - A record of complaints must be kept on the premises which will record all noise and / or light complaints as well as the measures taken to address these complaints.
- d) Foundations
  - Foundations of buildings according to specifications in geotechnical report and to be checked and inspected by a registered professional civil engineer.

### 8.2 Operational Phase

The following auditing systems to be implemented by filling station manager:

- a) Filling Station Consumption statistics:
 

An electronic management system will be implemented. Wet Stock Management to be installed at the proposed development as per the requirements of most oil companies. These

systems are procedures that involve taking accurate opening and closing daily measurements of tank dips, pump sales, deliveries and stock transfer. This will ensure:

- Preventing spillage due to overfill;
- Leak detection; and
- Product and client turnover.

b) Monthly audits must be undertaken by the filling station manager as well as the oil company's (company not known at this time) regional managers. Log sheets must be filled in and actions noted according to the oil company policies.

c) Occupational Health and Safety Act Compliance

- A register to be compiled to indicate that the employees have been informed as to their rights under the Act; and
- Accident records must be kept, as per the Act.