

Proposed Fuel Service Station, Kenton-on-Sea, Eastern Cape Province

Environmental Management Programme (EMPr)

Report Prepared for

Seriso 616 (Pty) Ltd.

Report Number 489101/3



Report Prepared by

The logo for srk consulting, featuring a stylized orange 's' symbol followed by the text 'srk consulting' in a grey sans-serif font.

June 2015

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Acronyms

DEA: Department of Environmental Affairs (National)

DEDEAT: Department of Economic Development, Environmental Affairs and Tourism

EA: Environmental Auditor.

ECO: Environmental Control Officer

EMPr: Environmental Management Programme

RP: Representative Person (developer) who is responsible for the implementation of the EMPr.

1 Introduction and Scope of Report

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed to undertake an environmental assessment process for the proposed Kenton-on-Sea Fuel Service Station, which includes the compilation of this Environmental Management Programme (EMPr). The environmental management measures recorded in this EMPr are based on information supplied to SRK during the compilation of the Basic Assessment Report (report number 489101/2), including information from the applicant and the recommendations from specialists. This EMPr has been compiled to comply with the specific requirements of the National Environmental Management Act (No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations (2014).

It should be noted that the EMPr is written as if the project has been authorised. This approach in no way presupposes that the project will be authorised, rather, the style of writing is aimed at making the EMPr easier to read and more easily converted into a practical management tool should the application be approved.

SRK has exercised all due care in reviewing the supplied information provided during the course of the environmental assessment process and has included the requirements of commenting authorities. The appropriateness and practicality of the management measures presented in this EMPr has been considered in terms of comments received and discussed with the applicant as necessary. Seriso 616 (Pty) Ltd. is fully responsible for the implementation of the EMPr.

The EMPr has been provided to Seriso 616 (Pty) Ltd. for review, prior to submission, to determine whether the EMPr is implementable and accurate. SRK cannot be held responsible for failure of Seriso 616 (Pty) Ltd. to comply with the EMPr. The EMPr is by nature a dynamic document and NEMA provides for continual updating of the EMPr, with approval from the Competent Authority.

The aim of this EMPr is to ensure that construction, operation, and maintenance activities are conducted such that potential negative environmental impacts are minimised and positive impacts are enhanced. This EMPr is not a health and safety plan and this EMPr makes no attempt to satisfy the requirements of the Occupational Health and Safety Act.

1.1 Environmental Assessment Practitioner (EAP)

1.1.1 Expertise of EAP

This EMPr was prepared under the technical guidance of Karissa Nel, and reviewed by Rob Gardiner.

Karissa Nel (MEM, CEAPSA) is a Senior Environmental Scientist, with more than 9 years environmental consulting experience in Environmental Impact Assessments (EIA), Environmental Management Programmes (EMPr), environmental auditing and licensing. Her training is in zoology, microbiology, aquatic ecosystems, wetland assessment and environmental management. Karissa's CV is attached as Appendix A.

Rob Gardiner (MSc, MBA, Pr Sci Nat) is a Principal Environmental Scientist and head of SRK's Environmental Department in Port Elizabeth. He has more than 20 years environmental consulting experience covering a broad range of projects, including Environmental Impact Assessments (EIA), Environmental Management Systems (EMS), Environmental Management Programmes (EMPr), and environmental auditing. His experience in the development, manufacturing, mining and public sectors has been gained in projects within South Africa, Lesotho, Botswana, Angola, Zimbabwe, Suriname and Argentina.



Figure 1: Site locality map for the proposed fuel service station, Kenton-on-Sea

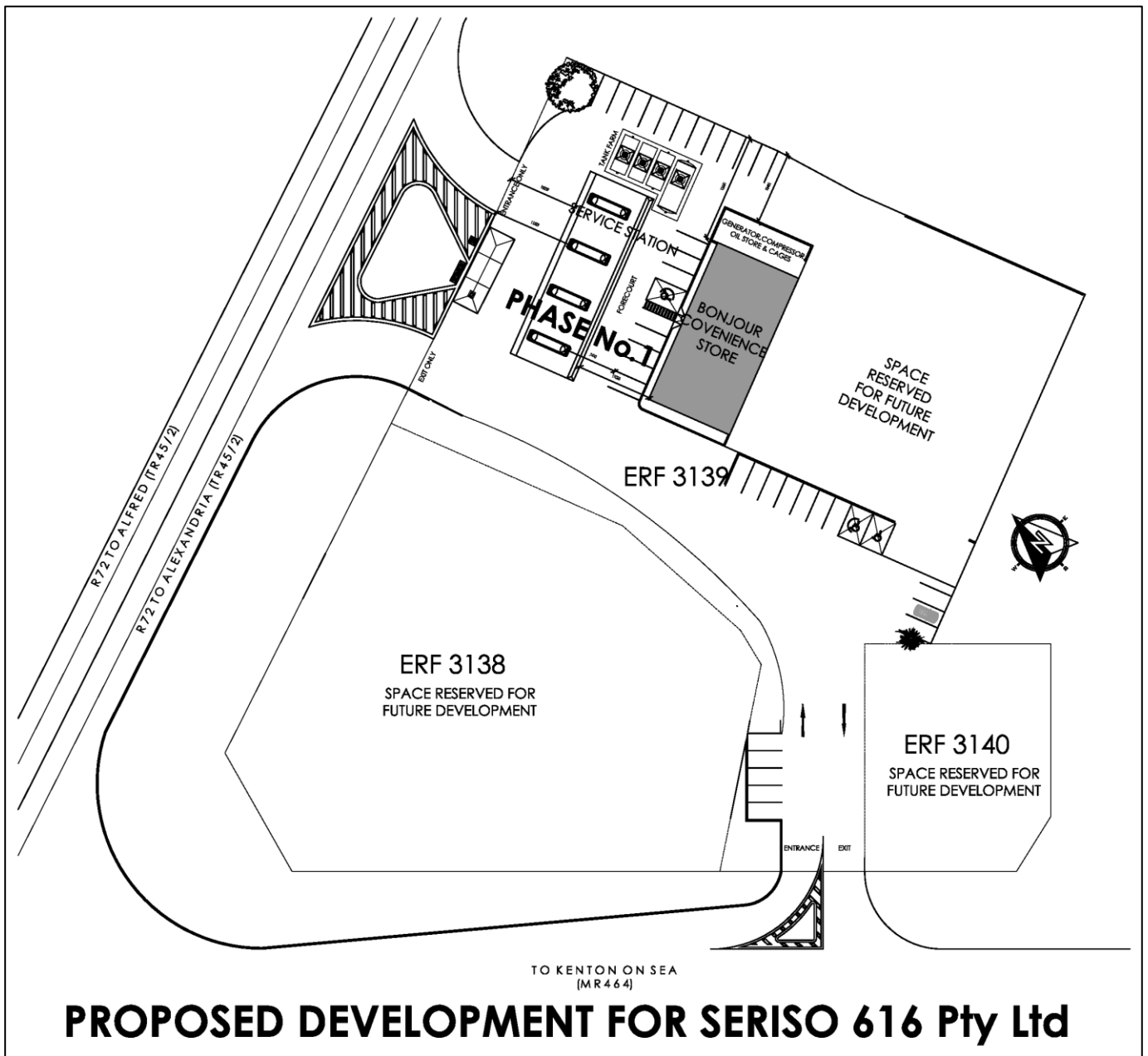


Figure 2: Site layout for proposed fuel service station

1.1.2 Environmental Assessment Practitioner Details

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2 Project Description and Environmental Aspects

2.1 Project Description

The proposed development involves the establishment of a fuel service station and associated infrastructure on Erf 3139, Kariega Heights in Kenton-on-Sea in the Eastern Cape Province. The property is zoned for “Business with special consent for a service station”. A Site Locality Plan is included in Figure 1 and Appendix A. Access to the proposed fuel service station will be off the N2 national road (R72) between Alexandria and Port Alfred.

An environmental assessment process was conducted in 2005 for the same development and was approved in 2006. This authorisation lapsed and a new application for environmental authorisation is required.

The proposed fuel service station will comprise of four Underground Storage Tanks (USTs), which will include one diesel tank, one Lead Replacement Product (LRP) tank, and two unleaded petrol tanks. A total storage capacity of 92 m³ is envisaged. The infrastructure associated with the proposed fuel service station will include:

- Associated underground pipework;
- Forecourt with four pump islands;
- Convenience store;
- Canopy to cover the forecourt area; and
- Parking bays.

The Site Development Plan showing the layout of the different components on the site is included in Figure 2 and Appendix C. It is anticipated that the fuel service station will be operating as a franchisee of Total South Africa, however this will be confirmed at a later stage in the project life cycle.

The relevant components of the development will be designed and constructed according to the following important SANS Standards (amongst others):

- SANS 10089-3: The installation, modification, and decommissioning of underground storage tanks, pumps/dispensers and pipework at service stations and consumer installations;
- SANS 1020: Power-operated dispensing devices for flammable liquid fuels; and
- SANS 10400: 1987 with special emphasis on regulation TT53.

2.2 Environmental Objectives

This section specifies the impact management objectives used to determine the extent of management action(s) required to mitigate the impacts identified during the impact assessment process.

2.2.1 Planning and Design

- Impacts on downstream aquatic resources

The storage of fuel in UST's and activities at the development site during the operational phase has the potential to impact on surface and/or groundwater resources if not correctly managed. Certain design measures need to be put in place to ensure that risks are mitigated during operation.

The impact management objective for water quality is:

- Prevent contamination of subsurface soils, groundwater and other downstream aquatic resources; and
- Plan for the installation of the relevant monitoring equipment for monitoring during the operational phase.

2.2.2 Pre-construction activities

No pre-construction environmental impacts have been identified.

2.2.3 Construction phase

- Impacts on Aquatic Resources and Soils

Although no surface or groundwater resources are present on the site, a drainage line flowing into the Kariega River exists to the north of the site. In addition, a small wetland was identified 300 m northwest of the site. This system will not be directly impacted on by the development as it is located upstream of the site.

The storage and handling of environmentally hazardous materials during the construction phase (e.g. cement, oils and fuels) has the potential to impact on surface and/ or groundwater resources if not correctly managed. This could lead to pollution of downstream watercourses (e.g. Kariega River).

This potential impact has been rated to be of LOW (-ve) significance without mitigation. If appropriate mitigation is implemented, the impact could be reduced to be INSIGNIFICANT.

The impact management objectives for water quality are:

- Prevent pollution of surface water & aquatic resources; and
 - Prevent pollution of groundwater.
- Clearing of vegetation:

As described above, the site is dominated by grassland with secondary invasion of woody bird dispersed trees and shrubs. It has been transformed in some areas due to numerous footpaths and vagrants living on the site. A few protected plant species still occur on the site.

Since this is a relatively small site (<1 ha), it is unlikely that the clearing of the vegetation, which is classified as least threatened according to Mucina and Rutherford (2006), will have a significant impact on the ecology of the larger area. Also, as the entire site will consist of built-up area, alien plants will not have an opportunity to establish on the site.

The final significance rating for this impact is MEDIUM (-ve) without mitigation. If appropriate mitigation is implemented, the impact could be reduced to be LOW.

The impact management objective for this impact is:

 - Minimise impacts to natural and protected vegetation; and
 - Obtain permits to remove protected plant species.
 - Air Quality/ Dust:

Dust, smoke and exhaust emissions resulting from construction activities (removal of vegetation, earthworks, increased vehicular traffic, topsoil stockpiles, etc.) is expected to have a nuisance impact on nearby residents, settlements and offices during this phase.

The final significance rating for this impact is VERY LOW (-ve) with or without mitigation.

The impact management objective for this impact is:

 - Minimise dust impacts.

- Noise Disturbance:

Noise from construction activities (such as plant, machinery, vehicles and possible blasting of the rock where the UST's will be installed) will be of a temporary nature and will only occur during working hours.

The final significance rating for this impact is VERY LOW (-ve) with or without mitigation.

The impact management objective for this impact is:

- Minimise noise impacts.

- Waste Management:

General construction waste will be generated during the construction period. Lack of proper management of the waste on the site may lead to dumping and wind-blown litter creating a negative visual impact as well as impacting on the surrounding natural ecosystems.

The final significance rating for this impact is LOW (-ve) without mitigation. If appropriate mitigation and management are implemented, the impact could be reduced to be VERY LOW.

The impact management objective for this impact is:

- Legally compliant management of solid waste.

- Traffic flow and safety impacts

The proposed site is located at the entrance to Kenton-on-Sea. Traffic congestion could possibly occur at this intersection as a result of construction vehicles moving onto and from the site during construction.

This impact was rated as VERY LOW (-ve) and remains as such even after mitigation measures have been applied.

The impact management objectives for this impact are:

- Maintain a safe environment for all road users.

- Paleontological disturbance:

Although the site is of low paleontological significance, the greatest likelihood of fossil material being impacted would be in the form of large mammal bone deposits within the unconsolidated sands. There is a reasonable chance of this occurring. These are likely to be associated with archaeological material. It is also likely that calcareous deposits of the Alexandria Formation will be disturbed during excavation for fuel tanks, associated piping and foundations. Any Bokkeveld Group sediments excavated will most likely be too weathered and degraded to be of palaeontological value.

The final significance rating for this impact is VERY LOW (-ve) with or without mitigation.

The impact management objective for this impact is:

- No impact on palaeontological resources.

- Archaeological disturbance:

According to the Archaeological Letter of Exemption, whereby the proposed project is exempted from a full Phase 1 Archaeological Impact Assessment, the proposed area for development is of low archaeological cultural sensitivity. No archaeological heritage sites, features, or remains were documented during the survey, although it is possible that archaeological heritage material may occur below the surface. If any archaeological or heritage material were to be discovered it is very unlikely that it would be in situ. However, there is always a possibility that human remains or other archaeological and historical material may be uncovered during the development. Such

material must be reported to the Eastern Cape Provincial Heritage Resources Agency (ECPHRA) (043 745 0888) or the Albany Museum (046 622 2312) if exposed.

The final significance rating for this impact is VERY LOW (-ve) with or without mitigation.

The impact management objective for this impact is:

- No impact on archaeological resources.
- Socio-economic:

The proposed development will result in the direct creation of job opportunities (e.g. the use of local labourers) for the local labour force during the construction phase. This will also involve transfer of skills and the improvement of the quality of life for families of individuals employed. Indirect job opportunities (industries that provide construction materials and services for the project) is also expected as a result of the construction of the proposed development.

The significance rating for this impact is VERY LOW (+ve) but can be changed to LOW (+ve) if mitigation measures are implemented.

The impact management objectives for this impact are:

- Maximise employment of local labour; and
- Maximise skills transfer.

2.2.4 Rehabilitation after construction

Note that no closure phase is proposed and therefore post closure measures are not applicable for the listed activities.

Rehabilitation should commence immediately after construction in the relevant areas using topsoil stripped before construction. Rehabilitated areas should be monitored and measures must be implemented to ensure that topsoil does not wash away. If erosion and/or sedimentation of downstream areas occur, appropriate measures must be implemented to prevent further erosion and to trap any excessive sediments generated during and after construction.

The management objectives for this impact are:

- Rehabilitation as soon as possible after construction to prevent impacts.

2.2.5 Operational phase

- Soil and Groundwater:

According to the Groundwater Specialist Investigation, groundwater contamination risk for this site is from possible spillages or leakages of hydrocarbon on the surface or subsurface. The movement of liquids through the Algoa aquifer is regarded “rapid” (the hydraulic conductivity of sandstone can be up to 8.6 cm/day; and in sand up to 86.4 m/day), since it is an intergranular aquifer, with the Bokkeveld Group as a consolidated layer at the base. If a spillage or leakage occurs or losses are experienced over time, the product could reach the water table. There are no known groundwater users that could be affected, but in the longer term, if contamination is not detected and/ or remediated, the potential exists for it to reach the groundwater, the Kariega River and also the sea where other water users and biota could be affected.

The final significance rating for this impact is MEDIUM (-ve) if no mitigation is implemented. However, should the important mitigation measures below be complied with, the significance of the impact could be reduced to LOW (-ve).

The management objective for this impact is:

- Prevent pollution of soil & groundwater.

- Surface and Stormwater:

The construction of roads, parking areas and roofing structures will increase the impermeable surface area on the site, leading to reduced ground absorption of stormwater and increased surface water runoff. This will result in an increase in the quantity and velocity of stormwater leaving the site which, in turn, has the potential to transport contaminants away from the site into natural environments and create soil erosion in vulnerable areas. It is therefore essential to ensure that stormwater from the site is controlled.

Surface and stormwater could also be contaminated as a result of minor spillages during the tanker refuelling of above and underground storage tanks, fuel dispensing to vehicles on the forecourt of the service station and washing of these areas. Should these contaminants not be trapped on site, it could end up in downstream watercourses with associated impacts on water users and biota.

The final significance rating for this impact is MEDIUM (-ve) if no mitigation is implemented. However, should the important mitigation measures below be complied with, the significance of the impact could be reduced to VERY LOW (-ve).

The management objective for this impact is:

- Prevent pollution of surface and stormwater.

- Air Quality:

The major sources of air pollution during this phase will be the exhaust fumes from motor vehicles and trucks and the emissions from the tank vent pipes. Due to the highway (N2) situated adjacent to the site, the current level of vehicle emissions is already relatively high. The proposed development should not contribute significantly to the existing level of air pollution. These emissions have not been quantified, but it is the view of the Environmental Assessment Practitioner that these levels are unlikely to exceed limits set in terms of the National Environmental Management Act (Air Quality Act). New standards for dust levels listed as the National Ambient Air Quality Standards for Particulate Matter (PM10) are set at 50 µg/m³. However, the proposed activity is unlikely to generate additional dust during the operational phase.

The final significance rating for this impact is LOW (-ve) without mitigation. If appropriate mitigation is implemented, the impact could be reduced to be VERY LOW.

The management objective for this impact is:

- Minimise air pollution.

- Noise Disturbance:

Traffic volumes on the N2 national road/ R72, and the associated noise, is not expected to increase significantly relative to the current noise levels. The increased activity on the site such as customers frequenting the facilities, vehicles and trucks idling and revving, staff shouting and music and radio broadcasts over the shop and forecourt speakers will most likely result in an increased amount of noise in the immediate vicinity of the fuel service station. However, due to the location of the site on the intersection with the N2 and the entrance to Kenton-on-Sea, the proposed activities should not contribute significantly as a nuisance in the area. Across the road from the site are municipal facilities.

The final significance rating for this impact is MEDIUM (-ve) but can be reduced to LOW should mitigation measures be implemented.

The management objective for this impact is:

- Minimize noise disturbance.

- Visual Impact

The development of the proposed site will alter the visual characteristics of the immediate undeveloped site and the general impression of the surroundings. The buildings, advertising signs and general lighting of the site may be visually intrusive. However, due to the location of the site on the intersection with the N2 and the entrance to Kenton-on-Sea, the proposed activities should not contribute significantly to the existing level of nuisance due to lights from traffic on the N2. If littering and illegal dumping on the site are not controlled, this may increase the visual impact of the proposed development.

The final significance rating for this impact is LOW (-ve) without mitigation. If appropriate mitigation is implemented, the impact could be reduced to be VERY LOW

The management objectives for this impact are:

- Minimise the visual impacts.

- Traffic flow and safety impacts

Access to the proposed site will be off the R72 provincial road as well as from the Kariega Road (MR464). A Traffic Impact Assessment (TIA) was conducted in 2005 and a new TIA has been commissioned to consider new aspects of the development and to update all traffic information. The TIA will address all aspects related to access and road upgrades (if applicable) and will ensure that the proposed development do not create a traffic flow or safety hazard for any road users, including pedestrians.

It is mentioned in the TIA (2005) (see Appendix D) that a trip generation rate for a service station is 4% of the volume of traffic on the adjacent roads. Therefore the majority of trip attracted by the proposed development will come from existing traffic on adjacent roads. Approximately 16% of this generated 4% of the road traffic are considered new trips and therefore account for a very small percentage of trips. According to the TIA, the proposed service station will generate a total of 76 vehicle trips in the weekday PM peak hour, based on the Department of Transport's recommended trip rates.

The SIDRA analysis (2009) for stop control on the Kenton-on-Sea Road access shows that there is an average delay of less than 30 seconds per vehicle during peak hour. It was therefore recommended that the intersection be a stop controlled intersection, as the SIDRA analysis shows it will operate efficiently as such in the future.

This impact was rated as having a MEDIUM (-ve) significance which can be reduced to LOW should mitigation measures be implemented.

The management objectives for this impact are:

- Minimise impacts to traffic on existing roads; and
- Ensure traffic safety at the proposed site and at the entrance to Kenton-on-Sea.

- Safety and Security

A fire and explosion risk exists due to the storage, handling and transportation of fuel, and is potentially dangerous to humans and adjacent properties. However, the relevant components of the development will be designed and constructed according to the relevant SANS Standards (e.g. SANS 10089-3 & SANS 1020).

Potential safety issues were raised by Interested and Affected Parties during the public participation process for example prostitution, increase in vagrants and crime, child abuse, etc. As the proposed site is currently undeveloped with definite signs of vagrants staying on the site, the proposed development with associated lighting should not contribute to unsafe conditions, but rather improve the level of safety.

This impact was rated as LOW (-ve) and can be reduced to be VERY LOW if the recommended mitigation measures are applied.

The management objectives for this impact are:

- To prevent any fires or explosions at the proposed development.
- Social and Economic Impact:

The location of the site is suitable in terms of supplying the traffic from the R72 Road, the Kenton on Sea Road and the surrounding areas with fuel and associated facilities. The resultant sales of fuel and other business on the property will contribute to the local economy as well as creating additional employment opportunities in the local area. This will also involve transfer of skills and the improvement of the quality of life for families of individuals employed. Furthermore the fuel service station will improve the levels of convenience to residents of areas that are in close proximity to the site.

Vagrants that currently occupy the site, and that have caused the transformation of the natural habitat of the site and surrounds and contributed to littering, will also be removed which should create a safer environment.

The significance rating for this impact is MEDIUM (+ve) without mitigation or enhancement measures.

The management objective for this impact is:

- Maximise use of local labour.

Table 1: Mitigation and management measures for the construction phase

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
Construction activities are proposed to the south of a drainage line flowing into the Kariega River. In addition, a small wetland was identified 300 m northwest of the site. This system will not be directly impacted on by the development as it is located upstream of the site (aquatic resources and soils impact).	<p>The storage and handling of environmentally hazardous materials during the construction phase (e.g. cement, oils and fuels) has the potential to impact on surface and/ or groundwater resources if not correctly managed. This could lead to pollution of downstream watercourses (e.g. Kariega River).</p> <p>This potential impact has been rated to be of LOW (-ve) significance without mitigation. If appropriate mitigation is implemented, the impact could be reduced to be INSIGNIFICANT.</p>	<ul style="list-style-type: none"> • Locate the construction site camp further than 50 m from the drainage line or any watercourse and preferably further away if possible; • The proper storage and handling of hazardous substances (hydrocarbons and chemicals) needs to be administered; • No storage or maintenance of machinery within 50 m of a watercourse; • Appropriate solid waste management facilities must be provided on-site during construction and adequate signage be provided; • Spillages should be cleaned up immediately and any contaminated soil from the construction site must be removed and disposed of at a permitted waste disposal facility; • No wash water from washing of mechanical plant or equipment to be discharged to any water course; • No mixing of cement within 50 m of a watercourse and mixing should be conducted on an impermeable surface; • No stockpiles of excavated or spoil material or topsoil to be within 50 m of a watercourse; and • Proper stormwater control measures to be implemented during the construction phase to prevent sediment, from cleared areas, flowing into watercourses downstream. 	Duration of construction	Contractor Monthly monitoring by ECO
Clearing of vegetation. A few protected plant species occur on the site.	Since this is a relatively small site (<1 ha), it is unlikely that the clearing of the vegetation, which is classified as least threatened according to Mucina and Rutherford (2006), will have	<ul style="list-style-type: none"> • Locate the construction site camp further than 50 m from the drainage line or any watercourse and preferably further away if possible; • The proper storage and handling of hazardous substances (hydrocarbons and chemicals) needs to be 	Duration of construction	Contractor Monthly monitoring by ECO

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
	<p>a significant impact on the ecology of the larger area. Also, as the entire site will consist of built-up area, alien plants will not have an opportunity to establish on the site.</p> <p>The final significance rating for this impact is MEDIUM (-ve) without mitigation. If appropriate mitigation is implemented, the impact could be reduced to be LOW.</p>	<p>administered;</p> <ul style="list-style-type: none"> No storage or maintenance of machinery within 50 m of a watercourse; Obtain permits to remove protected plant species from the Department of Economic Development, Environmental Affairs and Tourism; Clear vegetation in a phased manner to allow fauna to move off-site (if any); and Walk through the site ahead of clearing to remove any small fauna that may be unable to escape (e.g. tortoises) and place these safely in adjacent undisturbed areas. If necessary, a professional should be contracted (e.g. for removal and relocation of snakes). 		
Windblown dust from material stockpiles and excavated or cleared areas, and vehicle entrainment on dirt access roads (air quality impact).	<p>Dust, smoke and exhaust emissions resulting from construction activities (removal of vegetation, earthworks, increased vehicular traffic, topsoil stockpiles, etc.) is expected to have a nuisance impact on nearby residents, settlements and offices during this phase.</p> <p>The final significance rating for this impact is VERY LOW (-ve) with or without mitigation.</p>	<ul style="list-style-type: none"> Clearing of vegetation should be kept to the minimum and must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once); Dust suppression techniques, such as wetting or covering potential dust sources, should be implemented to minimise the dust impact. The regular application of water or a biodegradable soil stabilisation agent can be used; Topsoil/ sand stockpiles are to be covered with appropriate material (e.g. hessian, shade cloth or plastic); In open areas that are exposed to wind, wind screens should be used to reduce wind and also dust at the site; No burning of refuse or vegetation shall be permitted; and Limit vehicle speeds on the site for all vehicles. 	Duration of construction	Contractor Monthly monitoring by ECO
Noise from construction activities.	Noise from plant, machinery, vehicles and possible blasting of the rock where the UST's will be installed will be of a	<ul style="list-style-type: none"> Construction activities should be kept to normal working hours (i.e. 6:00 to 18:00, Monday to Saturday) according to the Noise Control Regulations in terms of the Environmental Conservation Act (Act 73 of 1989) to 	Duration of construction	Contractor

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
	temporary nature and will only occur during working hours. The final significance rating for this impact is VERY LOW (-ve) with or without mitigation.	<p>reduce the noise impact to an acceptable level;</p> <ul style="list-style-type: none"> Activities that may disrupt neighbours (e.g. delivery trucks, blasting and other excessively noisy activities) must be preceded by notice being given to the affected neighbours at least 24 hours in advance; No sound amplification equipment such as sirens, loud hailers or hooters are to be used on site except in emergencies and no amplified music is to be permitted on site; and Equipment that is fitted with noise reduction facilities (e.g. side flaps, silencers, etc.) must be used as per operating instructions and maintained properly during site operations. 		
General construction waste generated during the construction period (waste management impact).	Lack of proper management of the waste on the site may lead to dumping and wind-blown litter creating a negative visual impact as well as impacting on the surrounding natural ecosystems. The final significance rating for this impact is LOW (-ve) without mitigation. If appropriate mitigation and management are implemented, the impact could be reduced to be VERY LOW.	<ul style="list-style-type: none"> All waste generated on site shall be collected and appropriately disposed of at a registered municipal landfill site; Hazardous waste (if applicable) should be disposed of at a registered hazardous landfill facility and proof of correct disposal should be obtained; All staff shall be trained on correct waste management; and <p>Records of disposal of all waste generated on site shall be maintained for auditing purposes.</p>	Duration of construction	Contractor Monthly monitoring by ECO
Construction vehicles frequenting the site (traffic flow and safety impact).	The proposed site is located at the entrance to Kenton-on-Sea. Traffic congestion could possibly occur at this intersection as a result of construction vehicles moving	<ul style="list-style-type: none"> High visibility information boards indicating “heavy vehicles turning” is to be erected at an appropriate distance from the site during the construction phase; and All signage and road markings at the proposed site should be in accordance with the South African Road Traffic Signs Manual. 	Duration of construction	Contractor Monthly monitoring by ECO

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
	<p>onto and from the site during construction.</p> <p>This impact was rated as VERY LOW (-ve) and remains as such even after mitigation measures have been applied.</p>			
Excavation activities during construction (palaeontological impact).	<p>Although the site is of low paleontological significance, the greatest likelihood of fossil material being impacted would be in the form of large mammal bone deposits within the unconsolidated sands. It is also likely that calcareous deposits of the Alexandria Formation will be disturbed during excavation for fuel tanks, associated piping and foundations.</p> <p>The final significance rating for this impact is VERY LOW (-ve) with or without mitigation.</p>	<ul style="list-style-type: none"> All workers on site should be informed of the types of paleontological resources that may be found and the correct procedure to follow should any paleontological resources be found; Should fossil remains be discovered during construction, these should be safeguarded (preferably in situ) and the environmental control officer (ECO) should alert the Eastern Cape Provincial Heritage Resources Authority (ECPHRA. Contact details: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; Email: smokhanya@ecphra.org.zaso) so that appropriate mitigation (e.g. recording, sampling or collection) can be taken by a professional palaeontologist; Disturbance of any large mammal bones within the sandy surface deposits should immediately be reported to a qualified palaeontologist/ ECPHRA; Calcareous material excavated during the project should be regularly inspected by the ECO or site manager and should marine invertebrates (sea shells) or other fossils be seen a qualified palaeontologist should be contacted to take samples thereof; and If any impressions of sea shells or plant stems are noticed in mudstones and quartzites of the Bokkeveld these should be reported to a qualified palaeontologist/ ECPHRA. 	Duration of construction	Contractor Monthly monitoring by ECO
Excavation activities during	The proposed area for	<ul style="list-style-type: none"> If concentrations of archaeological and/ or historical 	Duration of	Contractor

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
construction (archaeological impact).	<p>development is of low archaeological cultural sensitivity. No archaeological heritage sites, features, or remains were documented during the survey, although it is possible that archaeological heritage material may occur below the surface. If any archaeological or heritage material were to be discovered it is very unlikely that it would be in situ. However, there is always a possibility that human remains or other archaeological and historical material may be uncovered during the development.</p> <p>The final significance rating for this impact is VERY LOW (-ve) with or without mitigation.</p>	<p>heritage material, marine shells, and/ or human remains are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/ or ECPHRA (043 745 0888) so that systematic and professional investigation/ excavation can be undertaken;</p> <ul style="list-style-type: none"> The ECO as well as the construction managers/ foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites; and The onus is on the developer to ensure that this agreement is honoured in accordance with the National Heritage Act (Act No. 25 of 1999). 	construction	Monthly monitoring by ECO
The development will result in the creation of temporary job opportunities for the local labour force (socio-economic impact).	<p>This will also involve transfer of skills and the improvement of the quality of life for families of individuals employed. Indirect job opportunities (industries that provide construction materials and services for the project) is also expected as a result of the construction of the proposed development.</p> <p>The significance rating for this impact is VERY LOW (+ve) but can be increased to LOW (+ve)</p>	<ul style="list-style-type: none"> Local contractors and labour should be considered for the construction phase. 	Duration of construction	Contractor

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
	if mitigation measures are implemented.			

Table 2: Mitigation and management measures for the operational phase

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
Hydrocarbon spills or leakages on the surface or subsurface could contaminate groundwater (soil and groundwater impacts).	<p>. If a spillage or leakage occurs or losses are experienced over time, the product could reach the water table. There are no known groundwater users that could be affected, but in the longer term, if contamination is not detected and/ or remediated, the potential exists for it to reach the groundwater, the Kariega River and also the sea where other water users and biota could be affected.</p> <p>The final significance rating for this impact is MEDIUM (-ve) if no mitigation is implemented. However, should the important mitigation measures below be complied with, the significance of the impact could be reduced to LOW (-ve).</p>	<ul style="list-style-type: none"> • The forecourt will be concrete paved to prevent infiltration of fuel into the subsurface soils with surface runoff designed to flow towards a centralised collection point which is connected to an on-site oil/ water separator (trap); • Tanks shall be fitted with an overfill protection system or device. The critical level shall be such that a space remains in the tank to accommodate the delivery hose volume; • As per SABS standards, monitoring wells (piezometers) must be installed around the UST's for early detection of leaks. These should be checked on a regular (quarterly) basis for the presence of hydrocarbons using a hydrocarbon interface probe; • The installation of the UST's must follow SANS specifications. Some of the relevant standards are: <ul style="list-style-type: none"> ○ SANS 10089 (Dangerous Goods installation, storage & distribution); ○ SANS 10108 (Hazardous locations & apparatus); and ○ SANS 10400 (Building Regulations); • An HDPE sheet must be installed in the excavation under the tank, to direct any flow from a leak, towards the monitoring wells; 	Duration of operation	Developer

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
		<ul style="list-style-type: none"> Monthly visual inspections must be conducted of all above-ground fuel dispensing equipment on the site to check for wear or damage. Visual and olfactory checks for possible product leaks should also be carried out across the site; In the event of a fuel spillage or leaks that have the potential to impact on nearby water resources, the authorities should be informed and the fuel must be extracted and collected in a suitable container and disposed of at a licensed hazardous waste site. The general area should be treated with an absorbing agent; and Maintenance of dispensing pumps is essential to reduce the likelihood of spills. 		
<p>An increase in the impermeable surface area increases stormwater runoff from the site.</p> <p>Minor spillages during tanker refuelling of above and underground storage tanks, fuel dispensing to vehicles on the forecourt of the service station and washing of these areas (surface and stormwater impacts).</p>	<p>The construction of roads, parking areas and roofing structures will increase the impermeable surface area on the site, leading to reduced ground absorption of stormwater and increased surface water runoff. This will result in an increase in the quantity and velocity of stormwater leaving the site which, in turn, has the potential to transport contaminants away from the site into natural environments and create soil erosion in vulnerable areas. Surface and stormwater could also be contaminated as a result of minor spillages</p>	<ul style="list-style-type: none"> Landscaping of the site must be done as soon as possible after most construction activities were finalised, preferably with indigenous vegetation, so as to increase stormwater infiltration, and decrease stormwater runoff and erosion; The forecourt will be concrete paved to prevent infiltration of fuel into the subsurface soils with surface runoff designed to flow towards a centralised collection point which is connected to an on-site oil/ water separator (trap); All surface spillages must be contained on site through channels and trenches, these must be diverted to the oil/ water separator or sump of sufficient capacity; The oil / water separator should be regularly checked and kept clean to prevent blockage and overflow; All waste oils, greases, fuels, chemicals etc. will be collected and disposed of in an appropriate manner off site. The contents of oil separators/ traps or other waste oil, grease and/ or fuel disposal/ storage containers shall 	Design and duration of operation	Developer

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
	<p>during the tanker refuelling of above and underground storage tanks, fuel dispensing to vehicles on the forecourt of the service station and washing of these areas. Should these contaminants not be trapped on site, it could end up in downstream watercourses with associated impacts on water users and biota.</p> <p>The final significance rating for this impact is MEDIUM (-ve) if no mitigation is implemented. However, should the important mitigation measures below be complied with, the significance of the impact could be reduced to VERY LOW (-ve).</p>	<p>not be emptied and dumped to the surrounding area, but be removed by a private licensed contractor, with the applicable safe disposal certificate, and taken to an appropriately registered waste disposal site;</p> <ul style="list-style-type: none"> • Monthly visual inspections must be conducted of all above-ground fuel dispensing equipment on the site to check for wear or damage. Visual and olfactory checks for possible product leaks should also be carried out across the site; • In the event of a fuel spillage or leaks that have the potential to impact on nearby water resources, the authorities should be informed and the fuel must be extracted and collected in a suitable container and disposed of at a licensed hazardous waste site. The general area should be treated with an absorbing agent; and • Maintenance of dispensing pumps and other equipment is essential to reduce the likelihood of spills; and • Staff must be trained to prevent spillages during fuel dispensing and refuelling of UST's and strict procedures for the management of the site must be developed and adhered to. 		
Exhaust fumes from motor vehicles and trucks and the emissions from the tank vent pipes (air quality impact).	<p>Due to the highway (N2) situated adjacent to the site, the current level of vehicle emissions is already relatively high. The proposed development should not contribute significantly to the existing level of air pollution. These emissions have not been quantified, but it is the view of the Environmental Assessment</p>	<ul style="list-style-type: none"> • All UST ventilation points must be positioned away from any building ventilation inlet at the service station and pointed away from possible contact with residential or business areas; and • All tank breather pipes must be fitted with standard vents to minimise the loss of vapours. 	Duration of operation	Developer

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
	<p>Practitioner that these levels are unlikely to exceed limits set in terms of the National Environmental Management Act (Air Quality Act). New standards for dust levels listed as the National Ambient Air Quality Standards for Particulate Matter (PM10) are set at 50 µg/m³. However, the proposed activity is unlikely to generate additional dust during the operational phase.</p> <p>The final significance rating for this impact is LOW (-ve) without mitigation. If appropriate mitigation is implemented, the impact could be reduced to be VERY LOW.</p>			
<p>Increased activity on the site and minor increase in traffic (noise impact).</p>	<p>The increased activity on the site such as customers frequenting the facilities, vehicles and trucks idling and revving, staff shouting and music and radio broadcasts over the shop and forecourt speakers will most likely result in an increased amount of noise in the immediate vicinity of the fuel service station. However, due to the location of the site on the intersection with the N2 and the entrance to Kenton-on-Sea, the proposed activities should</p>	<ul style="list-style-type: none"> Noise levels shall be kept within acceptable limits, and all staff must abide by the relevant Noise Control Regulations in terms of the Environmental Conservation Act (Act 73 of 1989); Compressors, standby generators and air conditioner motors should be placed in a protected/ enclosed area and maintain regularly; and A noise control policy must be compiled and enforced to control the level of noise at the facility, paying particular attention to the nearest residential properties. 	<p>Duration of operation</p>	<p>Developer</p>

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
	<p>not contribute significantly as a nuisance in the area. Across the road from the site are municipal facilities.</p> <p>The final significance rating for this impact is MEDIUM (-ve) but can be reduced to LOW should mitigation measures be implemented.</p>			
Transformation of the site from an undeveloped site to a fuel service station (visual impact)	<p>Due to the location of the site on the intersection with the N2 and the entrance to Kenton-on-Sea, the proposed activities should not contribute significantly to the existing level of nuisance due to lights from traffic on the N2. If littering and illegal dumping on the site are not controlled, this may increase the visual impact of the proposed development.</p> <p>The final significance rating for this impact is LOW (-ve) without mitigation. If appropriate mitigation is implemented, the impact could be reduced to be VERY LOW</p>	<ul style="list-style-type: none"> Lighting on site should be sufficient for safety and security purposes, but shall not be disturbing (a nuisance) to nearby residents or interfere with road traffic; Outside lights are to be inward and downward shining and with low wattage; Sufficient refuse bins must be provided on site and littering and illegal dumping must not be allowed; Buildings and other structures should not be visually intrusive and should be maintained on a regular basis; Landscaped areas must be maintained; and Signs must conform to the national and municipal standards of for outdoor advertising. 	Duration of operation	Developer
Traffic flow and safety impacts	<p>A trip generation rate for a service station is 4% of the volume of traffic on the adjacent roads. Therefore, the majority of trip attracted by the proposed development will come from</p>	<ul style="list-style-type: none"> According to the TIA, the R72 access should be 110 m away from the intersection, and the MR464 access should be 105 m away for safety purposes at the intersection; The TIA specifies that the R72 be widened by 3.5 m on its southern side, and the MR464 road will be widened by 3 m on its eastern side, to provide left turn deceleration 	Duration of operation	Developer

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
	<p>existing traffic on adjacent roads. Approximately 16% of this generated 4% of the road traffic are considered new trips and therefore account for a very small percentage of trips. According to the TIA, the proposed service station will generate a total of 76 vehicle trips in the weekday PM peak hour, based on the Department of Transport’s recommended trip rates.</p> <p>The SIDRA analysis (2009) for stop control on the Kenton-on-Sea Road access shows that there is an average delay of less than 30 seconds per vehicle during peak hour. It was therefore recommended that the intersection be a stop controlled intersection, as the SIDRA analysis shows it will operate efficiently as such in the future.</p> <p>This impact was rated as having a MEDIUM (-ve) significance which can be reduced to LOW should mitigation measures be implemented.</p>	<p>lanes;</p> <ul style="list-style-type: none"> • Mitigation measures proposed by the Department of Roads and Transport in response to the Traffic Impact Assessment conducted in 2005, includes: <ul style="list-style-type: none"> ○ The median island on the Trunk Road at the service station entrance must consist of barrier kerbing as painted barriers are not effective; ○ Road widening along the Trunk road must be adequate to accommodate usable surfaced shoulders (1.5 m) where the median barrier kerb is introduced; ○ Street lighting must be introduced along the Trunk Road for a distance of 300 m as measured from a point 100 m west of the intersection with Main Road 46; and ○ Adequate information signage as approved by the Department of Roads and Transport must be provided; • Road surfaces in the immediate vicinity of the site should be monitored and the relevant authority should be notified of any unsafe situation; • Access to the filling station and the other site activities should be clearly indicated; • A speed limit of not more than 5 km/h should be applied in the forecourt area of the filling station; and • The proposed development must provide adequate onsite parking, loading facilities and manoeuvring space for the light and heavy vehicles as well as trucks delivering to the shop. <p>Note that the comments in the BAR and the proposed mitigation is based on the TIA conducted in 2005. However,</p>		

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
		the TIA is currently being updated and should additional/ different measures be proposed, these will be implemented in the construction and operational phases of the proposed development.		
Storage, handling and transportation of dangerous goods on the site (safety and security impact).	<p>A fire and explosion risk exists due to the storage, handling and transportation of fuel, and is potentially dangerous to humans and adjacent properties. Potential safety issues were raised by Interested and Affected Parties during the public participation process for example prostitution, increase in vagrants and crime, child abuse, etc. As the proposed site is currently undeveloped with definite signs of vagrants staying on the site, the proposed development with associated lighting should not contribute to unsafe conditions, but rather improve the level of safety.</p> <p>This impact was rated as LOW (-ve) and can be reduced to be VERY LOW if the recommended mitigation measures are applied.</p>	<ul style="list-style-type: none"> The design and management of the fuel service station area must conform to the relevant fire safety standards and legislation; Ensure UST is certified to SANS/SABS codes; No smoking can be allowed in the vicinity of flammable substances and the relevant signage must be displayed; The condition of the UST's, pipes and dispensing pumps should be checked on an annual basis using approved methodologies and the required maintenance activities undertaken; A license to store petroleum or a flammable liquid should be obtained annually from the local Fire Department (Fire and Emergency Services) in compliance to the regulations for controlling and regulating the keeping, conveyance, storage and use of petroleum; The UST filling procedure must be monitored by an authorised employee to ensure that no procedural as well as health and safety requirements are neglected by the fuel supplier/ contractor; Firefighting equipment/ systems must be available at all times and serviced regularly (at least annually); All employees and sub-contractors on-site must be trained in the implementation of effective Health and Safety policies; and A system must be devised to record any incidents and/ or accidents. 	Duration of operation	Developer
Successful establishment of	The resultant sales of fuel and	<ul style="list-style-type: none"> Local labour should be considered for permanent 	Duration of	Developer

Environmental Aspect	Potential Environmental Impact	Recommended Mitigation measures		
		Management and mitigation measure	Time-frame	Responsibility
the proposed fuel service station (social and economic impact)	<p>other business on the property will contribute to the local economy as well as creating additional employment opportunities in the local area. This will also involve transfer of skills and the improvement of the quality of life for families of individuals employed. Furthermore the fuel service station will improve the levels of convenience to residents of areas that are in close proximity to the site.</p> <p>Vagrants that currently occupy the site, and that have caused the transformation of the natural habitat of the site and surrounds and contributed to littering, will also be removed which should create a safer environment.</p> <p>The significance rating for this impact is MEDIUM (+ve) without mitigation or enhancement measures.</p>	employment during the operational phase, where possible.	operation	

3 Monitoring, Reporting and Auditing

Site inspections by an Environmental Control Officer (ECO) must be conducted on a monthly basis during construction to ensure continued compliance with the conditions of the environmental authorisation and the measures contained in the approved EMPr.

Monthly audit reports are to be prepared by the ECO and submitted to the developer, engineering representative, contractor, and competent authority.

Monitoring measures during the operational phase is as follows:

- As per SABS standards, monitoring wells (piezometers) must be installed around the UST's for early detection of leaks. These should be checked on a regular (quarterly) basis for the presence of hydrocarbons using a hydrocarbon interface probe; and
- Monthly visual inspections must be conducted of all above-ground fuel dispensing equipment on the site to check for wear or damage. Visual and olfactory checks for possible product leaks should also be carried out across the site.

4 Environmental Awareness Plan

On-site training must be provided for all contractors and personnel during both the construction and operational phases of the project. No personnel may be allowed onto site without having been instructed on the requirements of the approved EMPr and the Environmental Authorisation conditions.

The training must deal specifically with triggers that would require the implementation of mitigation measures contained in the EMPr. These include, but are not limited to:

- Identification and avoidance of environmentally sensitive features on/ near the site, specifically drainage lines and wetlands;
- Identification of threatened or protected species, both fauna and flora;
- Identification of potential heritage resources (see app for guidelines for the identification of archaeological and historical material); and
- Waste management practices.

It is incumbent upon the contractor to convey the sentiments of the EMPr to all personnel involved in the construction operations (including sub-contractors) and the specific provisions of the EMPr. This should be done via regular toolbox talks as well as more formal training sessions, and attendance registers maintained for auditing purposes.

5 Organisational Structure

The general roles and responsibilities of various parties are outlined below.

5.1 The Developer: Seriso 616 (Pty) Ltd.

Seriso 616 (Pty) Ltd. shall ultimately be responsible for the implementation of the EMPr and shall appoint a representative, the Responsible Person (RP), who shall:

- Ensure that the Contractor is duly informed of the EMPr and associated responsibilities and implications of this EMPr;
- Monitor the Contractor's activities with regard to the requirements outlined in the EMPr;
- Act as a point of contact for local residents and community members;
- Ensure that the Contractor remedies problems in a timely manner and to the satisfaction of the authorities; and

- Notify the authorities and the Environmental Control Officer (ECO) should problems arise that are not remedied effectively, or of any change in the development or changes in project specification that could significantly impact negatively on the environment.

5.2 The Contractor

The contractor will be responsible for:

- Ensuring all activities on the site are undertaken in accordance with the EMPr;
- Informing all employees and sub-contractors of their roles and responsibilities in terms of the EMPr;
- Ensuring that all employees and sub-contractors comply with this EMPr; and
- The Contractor has a duty to demonstrate respect and care for the environment in which they are operating. They will be responsible for the cost of rehabilitation, to the satisfaction of the ECO, of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation.

5.3 The Environmental Control Officer (ECO)

An Environmental Control Officer (ECO) who is a qualified environmental professional with the relevant environmental expertise, and independent of the RP, shall be appointed for the duration of the construction activities. The ECO's duties are as follows:

- Being familiar with the environmental management requirements contained in this EMPr. Undertaking the pre-construction and post-construction inspection, which may result in recommendations for additional clean-up and rehabilitation measures;
- Monitor the Contractor's activities with regard to the requirements outlined in the EMPr;
- Undertake monthly audits on the implementation of the EMPr and submit audit reports to SRK Consulting and the environmental authorities on request; and
- A post-construction Final Audit Report to fulfil the conditions of the post-construction recommendations.

The Final Audit Report will be submitted to the Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) and SRK Consulting.

6 EMPr Procedure

The EMPr implementation procedure is outlined below:

- The ECO shall undertake an initial site visit in conjunction with the RP and the Contractor, during which sensitive areas that should be avoided will be identified, and environmental concerns discussed;
- Photographs should be taken of the construction area and area allocated for the construction camp from logged (co-ordinate) points by the ECO before construction commences and after construction has been completed;
- The contractor shall train his employees regarding the importance of the EMPr;
- The ECO shall undertake monthly audits of the construction activities and submit the reports to DEDEAT and the developer in order to ensure that the EMPr is being implemented; and
- The ECO shall undertake a final audit of the site on completion of the project and submit a Final Audit Report to DEDEAT and the developer.

Appendices

Appendix A: CV of Environmental Assessment Practitioner

Appendix B: Site Layout Diagram

Appendix C: Contractor Code of Conduct

Seriso 616 (Pty) Ltd.

ENVIRONMENTAL CODE OF CONDUCT FOR BUILDING CONTRACTORS

Contractors shall ensure that all sub-contractors, employees, suppliers, agents, etc., are fully aware of the environmental issues detailed in the Environmental Management Plan. Contractors must investigate and comply with all existing regulations and laws/ bylaws unless the Relevant Authority grants specific written authority waiving compliance with any legislation.

The following list represents the basic Do's and Don'ts towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid.

DO:

- Clear your work areas of litter and building rubbish at the end of each day – use the waste bins provided and ensure that litter will not blow away.
- Maintain waste removal system.
- Dispose of cigarettes and matches carefully. (These pose a fire risk and furthermore littering is an offence.)
- Use the toilet facilities provided and keep them clean.
- Report dirty or full toilet facilities.
- Prevent contamination or pollution of streams and water channels.
- Concrete batching areas should be appropriately placed and cement effluent from washing areas should be contained and evaporated and the remaining sludge disposed of at a registered disposal facility.
- Report injured animals.
- Report heritage remains immediately.
- Ensure that vehicles and machinery do not leak fuel or oils.
- Report all fuel or oil spills immediately & stop the spill continuing.
- Confine work and storage of equipment to within the immediate work area.
- Prevent excessive dust and noise.
- Use safety equipment and comply with all safety procedures.
- Ensure a working fire extinguisher is immediately at hand if any “hot work” is undertaken e.g. Welding, grinding, gas cutting etc.
- Drive on designated routes only.
- Respect existing services at all times.

DO NOT:

- Remove or damage vegetation without direct instruction.
- Injure, trap, feed or harm any animals – this includes birds, frogs, snakes, lizards etc.
- Remove any heritage remains.
- Make fires.
- Allow cement or cement bags to blow around.
- Litter or leave food lying around.
- Allow waste, litter, oils or foreign materials into streams.
- Enter any fenced off or marked area.
- Overnight on site.
- Speed or drive recklessly.

Appendix D: Guidelines for the identification of archaeological and historical material

Guidelines for the identification of archaeological and historical material

1. Human Skeletal material

Human remains, whether the complete remains of an individual buried during the past, or scattered human remains resulting from disturbance of the grave, should be reported. In general the remains are buried in a flexed position on their sides, but are also found buried in a sitting position with a flat stone capping and developers are requested to be on the alert for this.

2. Freshwater mussel middens

Freshwater mussels are found in the muddy banks of rivers and streams and were collected by people in the past as a food resource. Freshwater mussel shell middens are accumulations of mussel shell and are usually found close to rivers and streams. These shell middens frequently contain stone tools, pottery, bone, and occasionally human remains. Shell middens may be of various sizes and depths, but an accumulation which exceeds 1 m² in extent, should be reported to an archaeologist.

3. Stone artefacts

These are difficult for the layman to identify. However, large accumulations of flaked stones which do not appear to have been distributed naturally should be reported. If the stone tools are associated with bone remains, development should be halted immediately and archaeologists notified

4. Fossil bone

Fossil bones may be found embedded in geological deposits. Any concentrations of bones, whether fossilized or not, should be reported.

5. Large stone features

They come in different forms and sizes, but are easy to identify. The most common are roughly circular stone walls (mostly collapsed) and may represent stock enclosures, remains of wind breaks or cooking shelters. Others consist of large piles of stones of different sizes and heights and are known as isisivane. They are usually near river and mountain crossings. Their purpose and meaning is not fully understood, however, some are thought to represent burial cairns while others may have symbolic value.

6. Historical artefacts or features

These are easy to identify and include foundations of buildings or other construction features and items from domestic and military activities.

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