PLEASE NOTE AMENDMENTS ARE INDICATED IN RED

Standard SANRAL Environmental Management Plan (EMPI) for Road Construction Activities (Section C1001 to C1011)

and

Project Specific Environmental Management Programme (EMPr) for the Upgrading of the Gwaing Bridge on National Route 2, Section 7 (km 16 to km 18.5) within the George Local and Eden District Municipalities in the Western Cape (Section C1012)

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STRUCTURE OF THE DOCUMENT

This document is structured in accordance with Appendix 4 of Government Notice R 982, dated 4 December 2014, in terms of the National Environmental Management Act (NEMA). The regulatory requirements are tabled below (left column) and details of how these components are covered in the document are also provided (right column).

Section C1001 to C1011 represents SANRAL's standard Environmental Management Plan (EMPl) with environmental management measures that typically apply to all road construction projects, while Section C1012 represents the project specific Environmental Management Programme (EMPr). The project specific Environmental Management Programme (EMPr) focuses on environmental management measures unique to the specific project and environment in which the project is undertaken.

Section of Appendix 4 of the EIA Regulations	Description of the Section	Associated section within the EMPr
1a	Details of the EAP and CV	C1012 Project Specific Conditions (e).
1b	Detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description	C1012 Project Specific Conditions: Project Description
1c	Map indicating the proposed development and sensitive environments	C1012 Project Specific Conditions (c).
1d	Impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated	C1012 Project Specific Conditions (b) Impact management objectives and statements are provided for project specific aspects for each aspect Impacts and risks for each aspect and the project phases these aspects relate to are also listed.
1e	A description and identification of impact management outcomes	Impact management outcomes are provided for project specific aspects for each aspect listed in Section C1012 (b).

1f	A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes are met	Standard SANRAL impact management actions are provided in C1006 (a) to (g) and C1007 (a) to (h) Project specific impact management actions provided in Section C1012 (b) for project specific aspects that require management actions over and above those standard management actions in Section C1001 to C1011.
1g	Method of monitoring the implementation of the impact management actions	Method of monitoring the implementation of impact management actions is included in C1012 (b), under the heading, “Monitoring” for each described aspect.
1h	The frequency of monitoring the implementation of the impact management actions	The frequency of monitoring the implementation of the impact management actions is included in C1012 (b), under the heading, “Frequency” for each described aspect.
1i	An indication of the persons who will be responsible for the implementation of the impact management actions	Roles and responsibilities are outlined in Section C1004: ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS.
1j	The time periods within which the impact management actions must be implemented	The time periods within which the impact management actions must be implemented is included in C1012 (b), under the heading, “Time period” for each described aspect.
1k	The mechanism for monitoring compliance with the impact management actions	Monitoring mechanisms are listed in Section C1010 MONITORING AND RECORD KEEPING and Section C1012 (b), under individual headings, “Mechanism”.
1l	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Reporting programme outlined in Section C1010: MONITORING AND RECORD KEEPING.
1m	An environmental awareness plan	Details and environmental awareness and training provided in Section C1005: TRAINING AND ENVIRONMENTAL AWARENESS PLAN and Appendix 3 of the Project Specific EMPr.
1n	Any specific information that may be required by	None identified.

	the competent authority.	

C1001 SCOPE

The South African National Roads Agency SOC Limited (SANRAL) recognises environmental management as a key component of road infrastructure development and as part of its environmental policy has developed this Environmental Management Plan (EMPl) as a tool for continual improvement in environmental performance.

This EMPl prescribes the methods by which proper environmental controls are to be implemented by the contractor. The duration over which the contractor's controls shall be in place cover the construction period of the project as well as the limited time after contract completion defined by the Conditions of Contract for Construction for Building and Engineering Works Designed by the SANRAL (1999 edition) published by the Federation Internationale des Ingenieurs-Conseils (FIDIC) as the Defects Notification Period (maintenance period).

The provisions of this EMPl are binding on the contractor during the life of the contract. They are to be read in conjunction with all the documents that comprise the suite of documents for this contract, particularly the conditions of any environmental authorisation and associated Environmental Management Programme (EMPr). In the event that any conflict occurs between the terms of the EMPl and the project specifications or environmental authorisation, the terms herein shall be subordinate.

The EMPl is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specification. Any changes to the EMPl and/or environmental authorisation cannot occur without being submitted to the SANRAL who will manage the process of amending the EMPl.

The EMPl identifies the following:
- Relevant parties and their responsibilities;
- Construction activities that will impact on the environment;
- Specifications with which the contractor shall comply in order to protect the environment from the identified impacts; and
- Actions that shall be taken in the event of non-compliance.

C1002 DEFINITIONS

Alien Vegetation: undesirable plant growth which includes, but is not limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA), 1983 regulations. Other vegetation deemed to be alien are those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable.

Construction Activity: any action taken by the contractor, his sub-contractors, suppliers or personnel during the construction process as defined in the contract documents.

Environment: the surroundings within which the contract exists and comprises land, water, atmosphere, micro-organisms, plant and animal life (including humans) in any part or combination

thereof as well as any physical, chemical, aesthetic or cultural inter-relationship among and between them..

Environmental Aspect: any component of a contractor's construction activity that is likely to interact with the environment.

Environmental authorisation: a written statement from the National Department of Environmental Affairs, (DEA), with the general and specific conditions and the EMPr recording its approval of an application for a planned undertaking that triggers listed activities in the Environmental Impact Assessment (EIA) regulations of the National Environmental Management Act (NEMA).

Environmental Impact: any change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

Environmental Impact Assessment (EIA): a systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and scoping and environmental impact reporting.

Environmental Management Programme (EMPr)*:* the embodiment of this EMPl to ensure that undue or reasonably avoidable adverse impacts of a development are prevented, and to ensure that positive impacts are enhanced. It thus addresses the how, when, who, where and what of integrating environmental mitigation and monitoring measures through identified projects.

Road Reserve: a corridor of land, defined by co-ordinates and/or proclamation, within which the road, including access intersections or interchanges, is situated. A road reserve may, or may not, be bounded by a fence.

Site: the site is defined in the FIDIC Conditions of Contract and in the scope of works. It is bound by the limits of construction as shown in the drawings or the title of the project and extends to also include the following:

- Areas outside the construction zones where accommodation of traffic is placed;
- All borrowpits defined in the applications approved by the relevant Department of Mineral Resources (DMR);
- All haul roads constructed by the contractor for purposes of access;
- Any non-adjacent sites specified in the contract documentation;
- The contractor's and his subcontractors' camp sites;

for the purposes of this EMPl includes areas outside of, but adjacent to, the road reserve that may be affected by construction activities;

Spoil material: is material unsuitable for construction of the road pavement and for which no other useful purpose can be found in additional works on the project (e.g. for the provision of protection berms). Such material is considered as waste material that requires spoiling at convenient areas to be identified by the engineer and/or contractor within the Site. Spoil material does not require removal to a designated landfill site unless it contains identifiable hazardous contaminants.

Watercourse: means (a) a river or spring; (b) a natural channel in which water flows regularly or intermittently; (c) a wetland, lake or dam into which, or from which, water flows; and (d) any collection of water declared as a watercourse by the Minister, by notice in the Gazette, declare to be a watercourse. A reference to a watercourse includes, where relevant, its bed and banks. For the purpose of alteration of the bed banks, course or characteristics of a watercourse, the extend of a watercourse is defined as the area limited by either the outer edge of the riparian habitat or the 1:100 year flood line, whichever is the greatest.

Wetland: means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

C1003 LEGAL REQUIREMENTS

(a) General

Construction shall be according to the best industry practices, as identified in the project documents. This EMPl, which forms an integral part of the contract documents, informs the contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The contractor should note that obligations imposed by the EMPl are legally binding in terms of this contract. In the event that any rights and obligations contained in this EMPl contradict those specified in the standard or project specifications then the latter shall prevail.

(b) Statutory and other applicable legislation

The contractor is deemed to have made himself conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract.

Major environmental legislation, as amended from time to time, includes but is not limited to the following:

(i) Conservation of Agricultural Resources Act (Act No. 43 of 1983)

This act provides for control over the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of soil, water sources and vegetation, as well as combating weeds and invader plants.

(ii) The Constitution (Act 6 of 1996)

The Constitution states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected through reasonable legislative and other measures to prevent pollution and ecological degradation; promote conservation and ensure ecologically sustainable development and use of natural resources.

(iii) Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)

This act makes provision for equitable access to, and sustainable development of, minerals and petroleum resources.

(iv) National Environmental Management Act (NEMA), (Act No. 107 of 1998)

This act supports the Bill of Rights within the Constitution and highlights principles of sustainable development including preservation of ecosystems and biological diversity and avoidance, minimisation and remediation of pollution and environmental degradation. It also sets the stage for the EIA Regulations.

(v) National Environmental Management: Air Quality Act (Act No. 39 of 2004)

This act provides reasonable measures for the prevention of pollution and ecological degradation; and provides for specific air quality measures; for national norms and standards regulating air quality monitoring, management and control by all spheres of government.

(vi) National Environmental Management: Biodiversity Act (Act No. 10 of 2004)

This act makes provisions to accomplish the objectives of the United Nations' Convention on Biological Diversity. SANRAL may be required to apply for permits to conduct certain listed activities which, together with the listed threatened or protected species, may be identified by the Minister.

Section 73 (3) of this act empowers a competent authority to direct a person to take steps to remedy any harm to biodiversity resulting from the actions of that person or as a result of occurrence of listed invasive species occurring on land on which that person is the owner. Thus SANRAL may be directed to remedy harm caused by listed invasive species.

(vii) National Environmental Management: Protected Areas Act (Act No. 57 of 2003)

This act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes. (viii) National Environmental Management: Waste Act (Act No. 59 of 2008)

(viii) National Environmental Management: Waste Act (No. 59 of 2008) (NEMWA)

This act aims to regulate waste management practices through provision of national norms and standards, specific waste measures, licensing and control of waste activities, remediation of contaminated land as well as providing for compliance and law enforcement.

(ix) National Forests Act (Act No. 84 of 1998)

This act makes provision for promoting the sustainable management and development of forests, and for the protection of certain forests and trees for environmental, economic, educational, recreational, cultural, health and spiritual purposes.

(x) National Heritage Resources Act (Act No. 25 of 1999)

This act provides for an integrated and interactive system for identification, assessment and management of South Africa's heritage resources, and empowers civil society to nurture and conserve their heritage resources.

(xi) National Water Act (Act No. 36 of 1998)

This act makes provision for the protection of surface water and groundwater and their sustainable management for the prevention and remediation of the effects of pollution, as well as for the management of emergency situations.

C1004 ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS

Copies of this EMPl shall be kept at the site office and must be distributed to all senior contract personnel who shall familiarise themselves with its contents.

Implementation of this EMPl requires the involvement of several stakeholders, each fulfilling a different but vital role as outlined herein, to ensure sound environmental management during the construction phase of a project.

(a) SANRAL

SANRAL and anyone acting on SANRAL's behalf is accountable for the potential environmental impacts of any activities that are undertaken and is responsible for managing these impacts.

(b) The Engineer

The engineer has been appointed by, and acts for, SANRAL as its on-site implementing agent and carries the responsibility to ensure that the contractor undertakes its construction activities in such a way that SANRAL's environmental responsibilities are not compromised.

The engineer will, within seven days of receiving a contractor's request for approval of a nominated Designated Environmental Officer (DEO), approve, reject or call for more information on the nomination. The engineer will be responsible for issuing instructions to the DEO where environmental considerations call for action to be taken.

If in the opinion of the engineer the DEO is not fulfilling his/her duties in terms of this EMPl, the engineer may, after discussion and agreement with SANRAL, exercise his powers under FIDIC general condition of contract and instruct replacement of the DEO in writing and with stated reasons.

(c) The Contractor

The contractor is responsible for project delivery in accordance with the prescribed specifications, among which this EMPl shall be included.

The contractor shall receive and implement any instruction issued by the engineer relating to compliance with the EMPl including the removal of personnel or equipment.

Compliance with the provisions contained herein or any condition imposed by the environmental approvals shall become the responsibility of the contractor through an approved Designated Environmental Officer (DEO). The contractor shall nominate a person from among his site personnel to fulfil this function and submit to the engineer for his approval the *curriculum vitae* of the proposed DEO. This request for approval shall be given, in writing, at least fourteen days before the commencement of any construction activity clearly setting out reasons for the nomination, and with sufficient detail to enable the engineer to make a decision.

(d) The Designated/Dedicated Environmental Officer (DEO)

Once a nominated representative of the contractor has been approved he/she shall become the DEO and shall be the responsible person for ensuring that the provisions of this EMPl are complied with during the life of the contract. The DEO shall submit regular written reports to the engineer, but not less frequently than once a month.

The DEO may undertake other construction duties unless the Appendix to Tender prescribes this position as 'dedicated' as opposed to the standard position being 'designated'. However, the DEO's environmental duties shall hold primacy over other contractual duties and the engineer has the authority to instruct the contractor to reduce the DEO's other duties or to replace the DEO if, in the engineer's opinion, he/she is not fulfilling his/her duties in terms of the requirements of this EMPl. Such instruction will be in writing clearly setting out the reasons why a replacement is required.

As a minimum the DEO shall have an accredited diploma qualification in environmental or natural sciences or equivalent. Alternatively, the DEO shall have a minimum of 2 years' experience in a similar role in construction or other environmental regulatory field.

In addition to the compliance duties relating to EMPl the DEO shall also provide full cooperation whenever the contractor is subjected to regular environmental audits.

(e) Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) is an independent environmental specialist appointed by the engineer to objectively and regularly monitor the contractor's compliance with the conditions of the authorisations issued for the project and the approved EMPr (that is this EMPl augmented with specifics of the project). These are external audits and the regularity is determined by the environmental authorisations. KSEMS Environmental Consulting has been appointed as the ECO to monitor compliance. The contact details of the ECO are:

Mr Nishkar Maharaj
Tel 031 769 1578
Cell 082 885 6024
Email nishkar@ksems.co.za

C1005 TRAINING

(a) Qualifications

The (DEO) shall have the minimum qualifications as prescribed above, and must be conversant with all legislation pertaining to the environment applicable to the contract. He/she must be appropriately trained in environmental management and possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

The contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees.

(b) Content

Apart from induction environmental training should, as a minimum, include the course content below and no induction or course should be given until the engineer has been afforded the opportunity to appraise it and provide comment.

(i) The importance of conformance with all environmental policies and the consequences of departure from standard operating procedures;

(ii) Environmental impacts, actual or potential, caused by work activities, prevention measures to avoid them and mitigation measures when they occur;

(iii) Work force roles and responsibilities in achieving conformance with the environmental policy and procedures, including emergency preparedness and response requirements; and

(iv) The environmental benefits of improved personnel performance.

(c) Induction

In the case of permanent staff the contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the contractor shall inform the engineer when and how he intends concluding his environmental training obligations.

C1006 ACTIVITIES/ASPECTS CAUSING IMPACTS

Typical environmental aspects and impacts associated with road construction are listed in Table 1: *Aspects and Impacts Associated with Road Construction*. Actual impacts will differ from project to project and, therefore, so may the mitigation measures employed. The commonest aspects and impacts are addressed separately and typical avoidance and/or mitigation measures described. The list and descriptions are not by any means exhaustive and they shall be used for guideline purposes only.

Table 1: Aspects and Impacts Associated with Road Construction

Aspect	Impact
Waste generation/storage	Water pollution; nuisance; visual impact
Water use and stormwater discharge	Change in flow regime and/or reduction in downstream availability; soil erosion: water pollution
Vehicle use and maintenance	Air pollution; noise
Chemical/fuel storage	Water/air/soil pollution; health impacts; accidents e.g. slips, fire
Site clearing; earthworks; layer-works; seal works	Change in landform; impact on heritage resources; noise; soil erosion; air pollution
River bridges; installing drainage structures	Water pollution; impact on river flows; noise
Land acquisition	Loss of land &/or livelihood; change in landuse;
Acquisition of building material from borrow pits	Change in landform and use

(a) General approach

The role of the DEO cannot be underestimated and once approved he/she shall be on the site at all times, and before the contractor begins each construction activity he/she shall give to the engineer a written statement setting out the following:

Table 1: Aspects and Impacts Associated with Road Construction

(i) The type of construction activity about to be started. (ii)

Locality where the activity will take place.

(iii) Identification of the environmental aspects and impacts that might result from the activity.

(iv) The methodology of impact prevention for each activity or aspect.

(v) The methodology of impact containment for each activity or aspect.

(vi) Identification of the emergency/disaster potential for each activity (if any) and the reaction procedures necessary to mitigate impact severity.

(vii) Treatment and continued maintenance of impacted environment.

The contractor shall programme his work in such a way that each cause and effect of a construction activity is also identified and the activity planned so as to prevent any impact from happening and shall demonstrate that he is capable of carrying out any repair and reinstatement of the damaged environment. These requirements shall be concurrent with the time constraints to produce method statements for each construction activity in compliance with the provisions of these project specifications.

The contractor shall provide such information in advance of any or all construction activities provided that new submissions shall be given to the engineer whenever there is a change or variation to the original.

The engineer may provide comment on the methodology and procedures proposed by the DEO, but he shall not be responsible for the contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

(b) Spillages

Streams, rivers and dams shall be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products. In the event of a spillage, the contractor shall be liable to arrange for professional service providers to clear the affected area.

Responsibility for spill containment and treatment (whether hazardous or not) lies with the contractor. The individual causing a spill, or who discovers a spill, must report the incident to his/her DEO or to the engineer. The DEO will assess the situation in consultation with the engineer and act as required. In all cases, the immediate response shall be to contain the spill. The exact treatment of polluted soil / water shall be determined by the contractor in consultation with the DEO and the engineer. Areas cleared of hazardous waste shall be re- vegetated according to the engineer's instructions.

Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the engineer. The costs of containment and rehabilitation shall be for the contractor's account, including the costs of specialist input as well as the sampling and testing of the water quality upstream and downstream of the spill. Water quality sampling and testing, and further treatment shall continue until upstream and downstream results correspond with each other.

(c) Water use and control

The contractor's use of water shall take into consideration that it is a scarce commodity, and shall be optimised. Authorisation shall be obtained from the Department of Water and Sanitation (DWS) before water is drawn from streams or new boreholes developed. The Engineer has confirmed that no water will be abstracted from the Gwaing River for construction activities. As such, only a Section 21 (c) and 21 (i) water use has been applied for. The contractor shall also ensure that any stream deviations or diversions are undertaken in such a manner that the impact on the environment is minimised.

Method statements shall be submitted to the engineer for comment, detailing how the work will be undertaken, what risks are foreseen and what measures will be employed to minimise such risks. Notwithstanding any comments by the engineer, no work on stream deviations or diversions can commence without written approval from DWA, unless General Authorisation is applicable and notification to DWS is submitted. The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all construction activities. Before a site is developed or expanded, it shall be established how this development or expansion will affect the drainage pattern. Recognised water users / receivers shall not be adversely affected by the expansion or re-development. No water source shall be polluted in any way due to proposed changes.

Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion and from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products.

The contractor shall submit to the engineer his proposals for prevention, containment and rehabilitation measures against environmental damage of the identified water and drainage systems that occur on the site. Consideration shall be given to the placement of sedimentation ponds or barriers where the soils are of a dispersive nature or where toxic fluids are used in the construction process. The sedimentation ponds must be large enough to contain runoff so that they function properly under heavy rain conditions up to 1:5 year severity. The contractor shall submit to the engineer the results of the baseline water quality test taken above and below the site of the proposed activity; and thereafter monthly testing results or at the frequency as may be specified by the Water Use Licence where applicable. No taking-over can be authorised until the water quality is shown to be at pre-construction levels or better.

(d) Vegetation management

The contractor shall be responsible for the management of vegetation by protection of indigenous vegetation, especially identified protected species, and the prevention of alien vegetation germinating in areas disturbed by road construction activities within and outside the road reserve. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for or from road construction has been stored temporarily. This responsibility shall continue for the duration of the defects notification period. The project specification may instruct the removal of CARA-listed category 1 and 2 alien species and planting of specified indigenous species.

(e) Dust control

Dust caused by construction activities shall be controlled by means such as water spray vehicles and applied at sufficient frequency so as not to cause nuisance to adjacent habitation or affect farming activities or natural vegetation. Vegetation cover should also be kept for as long as possible to reduce the area of exposed surfaces. Dust emissions from batching and screening plants shall be subject to the relevant legislation and shall be the subject of inspection by the relevant authorities.

(f) Noise control

The contractor shall endeavour to keep noise generating activities to a minimum. Noises that could cause a major disturbance, for instance blasting and crushing activities, should only be carried out during the hours prescribed by the conditions of contract (i.e. normal hours). Should such noise generating activities have to occur at any time outside normal hours the people in the vicinity of the noise-generating activity shall be warned about the noise well in advance and the activities kept to a minimum.

Relevant legislation shall also be taken into consideration, and any practical mitigation measures adopted. No noise generating activity outside of normal hours, regardless of its proximity to residences, can take place without application to the engineer for approval. The application shall be accompanied by the noise containment measures proposed.

(g) Energy consumption

The contractor shall take into consideration the impacts of high energy consumption, both from a cost and emissions point of view. Energy use shall be minimised, and where possible, alternative energy sources such as solar utilised.

Furthermore, the contractor shall undertake a study of the consumption of carbon units his chosen method of construction produces in the execution of his programme. In conjunction with the engineer who will provide complete cooperation in this study, a month by month output shall be compiled and efforts made to see how these outputs can be curtailed and reduced.

C1007 ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES

The contractor shall undertake “good housekeeping” practices during construction as stated in the COLTO Standard Specifications for Roads and Bridges and the FIDIC conditions of contract. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

The construction activities addressed below shall become part of the contractor’s obligations regarding his programme of work and incorporated into the required method statements for workmanship and quality control.

a) Site establishment

i) Site Plan

The site refers to an area with defined limits on which the project is located. The contractor shall establish his construction camps, offices, workshops, staff accommodation and testing facilities on the site in a manner that does not adversely affect the environment. However, before any site establishment can begin, the contractor shall submit to the the ECO for his/her comments and to the engineer for his approval, plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the contractor proposes to put in place.

The plans shall detail the locality as well as the layout of the waste management facilities for litter, kitchen refuse, sewage and workshop-derived effluents. The site offices should not be sited in close proximity to steep areas, as this will increase soil erosion. Preferred locations would be flat areas along the route. If the route traverses water courses, streams and rivers, it is recommended that the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles are located as far away as possible from any water course. No camp establishment, including satellite camps, can be placed within 150 metres of an identified wetland unless the contractor has applied to DWS and received authorisation to do so. Regardless of the chosen site, the contractor’s intended mitigation measures shall be indicated on the plan. The site plan shall have been submitted and approved before establishment commences.

Detailed, electronic colour photographs shall be taken of the proposed site before any clearing may commence. These records are to be kept by the ECO and the engineer for consultation during rehabilitation of the site in order that rehabilitation is, as a minimum, done to a standard similar to pre-construction activities.

ii) Vegetation

The contractor has a responsibility to inform his staff of the need to be vigilant against any practice that will have a harmful effect on vegetation.

The natural vegetation encountered on the site is to be conserved and left as intact as possible. Vegetation planted at the site shall be indigenous and in accordance with instructions issued by the engineer. Only trees and shrubs directly affected by the works, and such others as may be indicated by the engineer in writing, may be felled or cleared. In wooded areas where natural vegetation has been cleared out of necessity, the same species of indigenous trees as were occurring shall be re-established. Protected trees may not be removed without a permit from the Department of Agriculture, Forestry and Fisheries.

Contravention of a notice of listed protected tree species under the National Forests Act, 1998 is regarded as a first category offence that may result in a fine or imprisonment for a period up to three years, or to both a fine and imprisonment. The DEO must be conversant with the latest gazette of declared protected trees.
Rehabilitation shall be undertaken using only indigenous tree, shrub and grass species. Special attention shall be given to any search and rescue operation identified during the environmental assessment process, and any removal to an on-site nursery for continuous nurturing and protection and later replanting.

Any proclaimed weed or alien species that propagates during the contract period shall be cleared by hand before seeding.

Fires shall only be allowed in facilities or equipment specially constructed for this purpose. The need for a firebreak shall be determined in consultation with the Engineer and the relevant authorities, and if required a firebreak shall be cleared and maintained around the perimeter of the camp and office sites.

iii) Water management

Water for human consumption shall be available at the site offices and at other convenient locations on site. All effluent water from the camp / office sites shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, pans, dams etc). Only domestic type wastewater shall be allowed to enter this system.

iv) Heating and cooking fuel

The contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes.

b) Sewage management

Particular reference in the site establishment plan shall be given to the treatment of sewage generated at the site offices, site laboratory and staff accommodation and at all localities on the site where there will be a concentration of labour. Sanitary arrangements should be to the satisfaction of the engineer, the local authorities and legal requirements.

Safe and effective sewage treatment will require one of the following sewage handling methods: septic tanks and soak-aways, dry-composting toilets such as “enviro loos”, or the use of chemical toilets which are supplied and maintained by a specialist service provider. The type of sewage management will depend on the geology of the area selected, the duration of the contract and proximity (availability) of providers of chemical toilets. Should a soak-away system be used, it shall not be closer than 800 metres from any natural water course or water retention system. The waste material generated from these facilities shall be serviced on a regular basis. The positioning of the chemical toilets shall be done in consultation with the engineer. Toilets and latrines shall be easily accessible and shall be positioned within walking distance from wherever employees are employed on the works. Use of the veld for this purpose shall not, under any circumstances, be allowed.

Outside toilets shall be provided with locks and doors and shall be secured to prevent them from blowing over. The toilets shall also be placed outside areas susceptible to flooding. The contractor shall arrange for regular emptying of toilets and shall be entirely responsible for enforcing their use and for maintaining such latrines in a clean, orderly and sanitary condition to the satisfaction of the Engineer.

c) Waste management

The contractor’s intended methods for waste management shall be outlined and implemented at the outset of the contract, and shall be to the satisfaction of the engineer. Opportunities for avoiding, reducing, reusing and recycling of materials should be identified upfront, as should constraints for their implementation. All personnel shall be instructed to dispose of all waste in the proper manner.

i) Solid waste

Solid waste shall be stored in an appointed area in covered, tip-proof metal drums or similar container for collection and disposal. Disposal of solid waste shall be at a licensed landfill site or at a site approved by the relevant authority in the event that an existing operating landfill site is not within reasonable distance from the project area. No waste shall be burned or buried at or near the project area.

ii) Litter

No littering by construction workers shall be allowed and particular emphasis on litter control measures shall apply at stop/go facilities. During the construction period, the various contractor’s facilities shall be maintained in a neat and tidy condition and the site shall be kept free of litter. At all places of work the contractor shall provide litter collection facilities for later safe disposal at approved sites.

iii) Hazardous waste

Hazardous waste such as oils shall be disposed of at an approved landfill site. Special care shall be taken to avoid spillage of bitumen products such as binders or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating surface water.

Under no circumstances shall the spoiling of bituminous products on the site, over embankments, in borrow pits or any burying, be allowed. Unused or rejected bituminous products shall be returned to the supplier’s production plant. Any spillage of bituminous products shall be attended to immediately and affected areas shall be promptly reinstated to the satisfaction of the engineer.

iv) Construction and demolition waste

The opportunity for recycling and reuse of construction and demolition waste as fill for road embankments, land reclamation and drainage control must first be explored and take priority before the option of declaring these materials a 'waste'.

The contractor is encouraged to actively engage with authorities and landowners adjacent to the site and identify where such 'waste' materials can be usefully deployed to repair existing environmentally damaged areas such as erosion dongas.

d) Control at the workshop

The contractor's management and maintenance of his plant and machinery will be monitored according to the criteria given below:

i) Hazardous Material Storage

Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials such as bitumen binders shall be stored in a secured, appointed area that is suitably fenced, bunded and has restricted entry. Storage of bituminous products shall only take place using suitable containers to the approval of the ECO and the engineer.

The contractor shall provide proof to the engineer that relevant authorisation to store such substances has been obtained from the relevant authority. In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Before containment or storage facilities can be erected the contractor shall furnish the engineer with details of the preventative measures he proposes to install in order to mitigate pollution of the surrounding environment from leaks or spillage. The preferred method shall be a concrete floor that is bunded. Any deviation from the method will require proof from the relevant authority that the alternative method proposed is acceptable to that authority. The proposals shall also indicate the emergency procedures in the event of misuse or spillage that will negatively affect an individual or the environment.

ii) Fuel and gas storage

The contractor shall take cognisance of the limits set by legislation for the storage of fuels and acquire the necessary authorisation for storage capacity beyond these. An adequate bund wall, 110% of volume, shall be provided for fuel and diesel areas to accommodate any leakage spillage or overflow of these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil. Any leakage, spillage or overflow of fuel shall be attended to without delay.

Gas welding cylinders and LPG cylinders shall be stored chained in a secure, well-ventilated area exterior to any building wall.

iv) Oil and lubricant waste

Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and sent back to the supplier. Water and oil should be separated in an oil trap. Oils collected in this manner, shall be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit shall be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company.

All used filter materials shall be stored in a secure bin for disposal off site. Any contaminated soil shall be removed and replaced. Soils contaminated by oils and lubricants shall be collected and disposed of at a facility designated by the local authority to accept contaminated materials.

e) Clearing the site

In all areas where the Contractor intends to, or is required to clear the natural vegetation and soil, either within the road reserve, or at designated or instructed areas outside the road reserve, a plan of action shall first be submitted to the Engineer for his approval. Working areas shall be clearly defined and demarcated on site to minimise the construction footprint.
'No-go- areas' and other sensitive areas shall also be clearly demarcated on site, and staff must be made aware of them.

The plan of action shall contain a photographic record and chainage/land reference of the areas to be disturbed. This shall be submitted to the engineer for his records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during inspections.

f) Soil management

i) Topsoil

Topsoil shall be removed from all areas where physical disturbance of the surface will occur and shall be stored and adequately protected. The contract will provide for the stripping and stockpiling of topsoil from the site for later re-use. Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter. Depth may vary at each site. The areas to be cleared of topsoil shall include all storage areas. All topsoil stockpiles and windrows shall be maintained throughout the contract period in a weed-free condition. Weeds appearing on the stockpiled or windrowed topsoil shall be removed by hand. Soils contaminated by hazardous substances shall be disposed of at an approved waste disposal site. The topsoil stockpiles shall be stored, shaped and sited in such a way that they do not interfere with the flow of water to cause damming or erosion, or itself be eroded by the action of water.

The Contractor shall ensure that no topsoil is lost due to erosion – either by wind or water. Areas to be top-soiled and grassed shall be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns. The Contractor's programme shall clearly show the proposed rate of progress of the application of topsoil and grassing. The Contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the progress plan approved by the Engineer. The Contractor's responsibility shall also extend to the clearing of drainage or water systems within and beyond the boundaries of the road reserve that may have been affected by such negligence.

ii) Subsoil

The subsoil is the layer of soil immediately beneath the topsoil. It shall be removed, to a depth instructed by the engineer, and if not used for road building it shall be stored and maintained separately from the topsoil so that neither stockpile is contaminated by the other. This soil shall be used for rehabilitation purposes by first spreading it over the excavated slopes without interfering with or contaminating the stockpiled topsoil. Whilst in stockpile it shall be maintained free from erosion and weed infestation in the same way as for topsoil stockpile maintenance.

g) Earthworks and layerworks

This section includes all construction activities that involve the mining of all materials, and their subsequent placement, stockpile, spoil, treatment or batching, for use in the permanent works, or temporary works in the case of deviations. Before any stripping prior to the commencement of construction, the Contractor shall have complied with the requirements of of this EMPl. In addition, the Contractor shall take cognisance of the requirements set out below.

i) Quarries and borrow pits

The Contractor's attention is drawn to the requirement of the Department of Mineral Resources, that before entry into any quarry or borrow pit, an Environmental Authorisation for the establishment, operation and closure of the quarry or borrow pit shall have been approved by the Department. It is the responsibility of the Contractor to ensure that he is in possession of the authorisation prior to entry into the quarry or borrow pit. The conditions imposed by the relevant authorisation are legally binding on the Contractor and may be more extensive and explicit than the requirements of this specification. In the event of any conflict occurring between the requirements of the specific authorisation and this EMPl the former shall apply.

ii) Excavation, hauling and placement

The Contractor shall provide the ECO and the Engineer with detailed plans of his intended construction processes prior to starting any cut or fill or layer. The plans shall detail measures by which the impacts of pollution (noise, dust, litter, fuel, oil and sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. Particular attention shall also be given to the impact that such activities will have on the adjacent built environment. The Contractor shall demonstrate his "good housekeeping", particularly with respect to closure at the end of every day so that the site is left in a safe condition.

iii) Spoil sites

The Contractor shall be responsible for the safe siting, operation, maintenance and closure of any spoil site he uses during the contract period, including the defects notification period. This shall include existing spoil sites that are being re-entered. Before spoil sites may be used proposals for their locality, intended method of operation, maintenance and rehabilitation shall be given to the ECO for his/her comments and to the Engineer for his approval. The location of these spoil sites shall have signed approval from the affected landowner before submission to the ECO and the Engineer. No spoil site shall be located within 500m of any watercourse. A photographic record shall be kept of all spoil sites for monitoring purposes. This includes before the site is used and after re-vegetation.

The use of approved spoil sites for the disposal of any waste shall be prohibited. Spoil sites will be shaped to fit the natural topography. Depending on availability, these sites shall receive a minimum of 75mm topsoil and be grassed with the recommended seed mixture. Appropriate grassing measures to minimise soil erosion shall be undertaken by the Contractor. This may include both strip and full sodding. The Contractor may motivate to the Engineer for other acceptable stabilising methods. The engineer may only approve a completed spoil site at the end of the defects notification period upon receipt from the Contractor of a landowner's clearance notice. .

iv) Stockpiles

The contractor shall plan his activities so that materials excavated from borrow pits and cuttings, in so far as possible, can be transported direct to and placed at the point where it is to be used. However, should temporary stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the Engineer for his approval, together with the contractor's proposed measures for prevention of environmental damage, containment and subsequent rehabilitation.

The areas chosen shall have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care shall be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the Contractor shall at all times ensure that they are positioned and sloped to create the least visual impact, constructed and maintained so as to avoid erosion of the material and contamination of surrounding environment and kept free from all alien/undesirable vegetation.

After the stockpiled material has been removed, the site shall be re-instated to its original condition. No foreign material generated / deposited during construction shall remain on site. Areas affected by stockpiling shall be landscaped, top soiled, grassed and maintained at the Contractor's cost until clearance from the Engineer and land owner is received.

Material milled from the existing road surface that is temporarily stockpiled in areas approved by the Engineer within the road reserve, shall be subject to the same condition as other stockpiled materials. Excess materials from windrows, in situ milling or any leftover material from road construction activities may not be swept off the road and left unless specifically instructed to do so in the contract documentation or under instruction from the Engineer.

The ECO shall comment on and the engineer shall approve the areas for stockpiling and disposal of construction rubble before any operation commences and shall approve their closure only when they have been satisfactorily rehabilitated.

v) Blasting activities

Wherever blasting activity is required on the site (including quarries and/or borrow pits) the Contractor shall rigorously adhere to the relevant statutes and regulations that control the use of explosives.

h) On site plant

i) Crusher, screening plants and concrete batching plants

Crushing plants and concrete batching plants, whether sited inside or outside of defined quarry or borrow pit areas, shall be subject to the requirements of the applicable industrial legislation that governs gas and dust emissions into the atmosphere. Such sites will be the subject of regular inspections by the relative authorities during the life of the project. In addition, the selection, entry onto, operation, maintenance, closure and rehabilitation of such sites shall be the same as for those under section C1007(g)(i) of this EMPl, with the exception that the Contractor shall provide additional measures to prevent, contain and rehabilitate against environmental damage from toxic/hazardous substances. In this regard the Contractor shall provide plans that take into account such additional measures as concrete floors, bunded storage facilities, linings to drainage channels and settlement dams. Ultimate approval of these measures shall be from the relevant authority, as shall approval of closure. The Engineer will assist the Contractor in his applications to the relevant authority.

Screening activities shall be undertaken so that dust and noise is minimised. This can be done by carefully choosing the site for the activity, and by using slightly damp material.

Effluent from concrete batch plants and crusher plants shall be reused where possible or treated in a suitable designated sedimentation dam to the legally required standards to prevent surface and groundwater pollution. The designs of such a facility should be submitted to the engineer for approval.

ii) Asphalt Plant

Asphalt plants shall be subject to the applicable legislation that governs establishment and operation of batching plants. The Contractor shall be responsible to obtain the necessary permit from the relevant authority. Operation of the plant shall conform to the same requirements as for a crushing plant or concrete batching plant under C1007 (h) (i) above.

C1008 AREAS OF SPECIFIC IMPORTANCE

It is crucial from an environmental impact management perspective that the Contractor remain within the project footprint, which has been illustrated with a 100m buffer in C1012 (c).

Any area, as determined and identified within the project documents as sensitive or of special interest within the site shall be treated according to the express instructions contained in these specifications or the specific environmental authorisation as well as the approved EMPr. The Contractor may offer alternative solutions to the Engineer in writing should he consider that construction will be affected in any way by the hindrance of the designated sensitive area or feature. However, the overriding principle is that such defined areas requiring protection should not be changed. Every effort to identify such areas within the site will have been made prior to the project going out to tender. The discovery of other sites with archaeological or historical interest that have not been identified shall receive ad hoc treatment.

a) Archaeological sites

Following a site visit from a SAHRA registered archaeological consultant, and engagement with Heritage Western Cape, it was determined that no archaeological artefacts are present within the development footprint (refer to Basic Assessment Report). No sensitive archaeological sites have thus been identified.

If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The Contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the engineer of such discovery. The South African Heritage Resource Agency (SAHRA) is to be contacted, and a SAHRA-registered archaeological consultant may undertake the necessary work involved in confirming the find and advising on how it should be preserved or removed. Work may only resume once clearance is given in writing by the archaeologist. (Read with FIDIC condition of contract clause 4.24 as).

If a grave or midden is uncovered on site, or, then all work in the immediate vicinity of the graves/middens shall be stopped and the engineer informed of the discovery. The South African Heritage Resource Agency and the South African Police Services (SAPS) should be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial. The undertaker will, together with SAHRA, be responsible for attempts to contact family of the deceased and for the place where the exhumed remains can be re-interred.

C1009 REHABILITATION

The Contractor shall be responsible for the re-establishment of grass within the road reserve boundaries for all areas disturbed during construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for, or from, construction has to be stored temporarily, and designated or instructed areas outside the road reserve. It also includes the area where site offices were erected which may require rehabilitation at the end of the contract. All construction material, including concrete slabs and barbecue (braai) areas shall be removed from the site on completion of the contract unless written approval from the relevant landowner demonstrates it is to be left in place.

Responsibility for re-establishment of vegetation shall extend until expiry of the defects notification period. However, SANRAL reserves the right to continue holding retention monies (or not releasing guarantees in lieu of retention) depending upon the state of cover at the end of the defects notification period. Such extension may continue until closure of the relevant quarry or borrow pit has been secured,

Rehabilitation of affected areas should be undertaken as early as possible when the relevant activities are done in order to reduce further environmental damage. All re-vegetation should be undertaken using indigenous vegetation. The standard of rehabilitation should be to the satisfaction of the Engineer and the relevant authorities. The Department of Minerals Resources will only issue closure certificates for borrow pits and quarries when they are satisfied with the rehabilitation undertaken. It should also be noted that in some cases there is a requirement for a final environmental audit covering the extent of the project.

C1010 RECORD KEEPING

The Engineer and the DEO will continuously monitor the contractor's adherence to the approved impact prevention procedures and the DEO shall submit regular written reports to the ECO and to the Engineer, at least once a month. The DEO will report the environmental compliance performance of the project at regular site meetings. The Engineer shall issue to the Contractor a notice of non-compliance whenever transgressions are observed. The DEO shall document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the engineer in the monthly report.

Copies of all authorisations shall be kept on site and made available for inspection by visiting officials from t SANRAL, relevant authorities or internal/external auditors.

C1011 COMPLIANCE AND PENALTIES

The Contractor shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and an oral report given at the monthly site meetings.

Any non-compliance with the procedures in this EMPl, environmental authorisations and approved EMPr constitute a breach of the Conditions of Contract.

C1012 PROJECT SPECIFIC CONDITIONS

Project Description:

SANRAL propose to upgrade the existing Gwaing Bridge and the associated N2 National Route Section 7 (km 16 to km 18.5) located near the George Airport within the George Local and Eden District Municipalities in the Western Cape.

The project entails the design and construction of a new bridge structure, adjacent to the existing structure, the realignment of the carriageways to tie into the new bridge structure, geotechnical drilling during design and possible piling during construction in the river course, and the widening of existing cuts to accommodate the new alignment.

The following three possible alternatives have been conceptualised, with only Alternative 3 falling outside of the existing road reserve:

Preferred Alternative (34°0'31.32"S & 22°23'56.27"E) – Realign the existing N2 and build a new 16m wide bridge upstream and 15m offset from the existing structure;

Alternative 2 (34°0'32.14"S & 22°23'56.59"E) – Refurbish the existing bridge and columns to increase the width of the N2;

Alternative 3 (34°0'32.71"S 22°23'56.13"E) – Realign the existing N2 and build a new 16m wide bridge downstream and 15m away from the existing structure. (*Please note that Western Cape DEADP is not in favour of this alternative, as it has the highest aquatic impact.)*

The Preferred Alternative measures 28m in height, 182m in length and 18m in width. The proposed widening of the existing road is 10.9 m and entails the following:

- 1m fast shoulder width (for future lane)
- 2 x 3.7m lanes
- 2.5m slow shoulder

The new upstream bridge will contain three 3700mm width lanes, with two shoulders of widths of 2500mm and 1000mm respectively.

The project triggers the following listed activities in terms of NEMA Listing Notices GN 983, 984 and 985 as amended:

Listed activity as described in GN 983, 984 and 985	Description of project activity
GN R.983 Activity 19: The infilling or depositing of any material of more than 5 m3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from - i. a watercourse;	The construction of the piers and abutments of the new bridge will result in the removal/moving of soil of more than 5m3 from the Gwaing River.

GN R.983 Activity 56: The widening of a road by more than 6m, or the lengthening of a road by more than 1km i. where the existing reserve is wider than 13,5m	The realignment and widening of the N2 road will be greater than 6m, as the carriageways will tie in with both the existing and new bridges. This remains in the existing road reserve, which is wider than 13,5m. The proposed widening of the existing road is 10.9 m and entails the following: 1 m fast shoulder width (for future lane) 2 x 3.7m lanes 2.5 m slow shoulder The new upstream bridge will contain three 3700mm width lanes, with two shoulders of widths of 2500mm and 1000mm respectively.
GN R.985 Activity 12: The clearance of an area of 300m2 or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (a) In Western Cape: i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004.	The realignment of the N2 road will result in the clearance of some indigenous vegetation (Cape Lowland Alluvial Vegetation) on either approach to tie into the new bridge, and on the banks of the Gwaing River. Cape Lowland Alluvial Vegetation is classified as endangered, according to section 52 of the NEMBA. However, the site has been transformed due to the existing Gwaing bridge and N2 National Route and is dominated by alien vegetation. Furthermore, the Preferred Alternative will remain in the existing road reserve.
GN R.985 Activity 14: The development of - iii. bridges exceeding 10 square metres in size; xii. infrastructure or structures with a physical footprint of 10 square meters or more. (f) In Western Cape i. outside urban areas, in:	The construction of the upstream bridge, measuring 28 m in height, 182 m in length and 18 m in width. The project site is located within Critical Biodiversity Area (CBA) and Environmentally Sensitive Area (ESA) region. However, the site has been transformed due to the existing Gwaing bridge and N2 National Route and is dominated by alien vegetation. Furthermore, the Preferred Alternative will remain in the existing road reserve.

ff. Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	
GN R.985 Activity 18: The widening of a road by more than 4 metres, or the lengthening of a road by more than 1km. (f) In Western Cape: i. all areas outside urban areas: ff. Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	The realignment and widening of the N2 road will be greater than 6m, as the carriageways will tie in with both the existing and new bridges. The proposed widening of the existing road is 10.9 m and entails the following: 1.0 m fast shoulder width (for future lane) 2 x 3.7m lanes 2.5 m slow shoulder The project site is located within Critical Biodiversity Area (CBA) and Environmentally Sensitive Area (ESA) region. However, the site has been transformed due to the existing Gwaing bridge and N2 National Route and is dominated by alien vegetation. Furthermore, the Preferred Alternative will remain in the existing road reserve.

(a) Activities, Aspects and Project Phases to be Managed

i) Planning and Design Phase

Not applicable. This is an existing road and bridge, and the planning and design phase has been completed as per SANRAL's Technical Specifications.

ii) Pre-Construction Phase

Surveying and test work has been completed. As per Conditions 13 and 14 of the environmental authorisation (DEA Reference 14/12/16/3/3/1/1729), the EMPr has been amended to reflect the findings of the environmental audit report. The content of the environmental audit report is related to Condition 30 of the environmental authorisation, which required a pre-construction walk through of the site by a botanist. The environmental audit report has been included in Appendix 9.

iii) Construction Phase

- Establishment on site;
- Clearing and grubbing;
- Provision of traffic accommodation facilities;
- Access to all properties to be catered for throughout the construction;
- Build access roads down to the river bed;
- Approve concrete aggregate and concrete mix designs;

- Set up a concrete batch plant (if the Contractor does not utilise a commercial ready mix concrete supplier);
- Sourcing of construction aggregate
- Diversion of the river in order to construct footings;
- Installation of footings;
- Construction of concrete footings capping slabs, abutments, footings, columns, earwalls, crossbeams and pier heads;
- Establishment of pre-cast concrete and pre-stressed beam yard on site;
- Placing of pre-stressed concrete beams;
- Casting of the concrete bridge deck and balustrades;
- Construction of the approach fills;
- Importation of layer work materials;
- Construction of 150 mm selected sub-grade;
- Construction of 150 mm sub-base;
- Construction of 150 mm base;
- Prime and surface the road;
- Installation of new stormwater drainage and modifications to the existing stormwater drainage system;
- Installation of subsoil drains in cuttings;
- Cut widening as and where required;
- The implementation of slope stabilisation and rock fall mitigation measures if required;
- Construction of a earth retaining structures at abutments and associated works;
- Road marking of the newly constructed road surfaces;
- Finishing off the road and road reserve;
- De-establishment of site camp after all construction activities are complete; and
- Maintain the road/bridge for the 12 month defects liability period.

iv) Rehabilitation Phase

Re-vegetation and rehabilitation of areas disturbed during construction.

v) Operational Phase

Not applicable. SANRAL operational management practices for the N2 would apply.

(b) Project Specific Aspects to be Managed

SANRAL's standard EMPl, as presented in above in Section C1001 to C1011, represents environmental management measures typical to all road construction projects.

This section of the document contains environmental management measures specific to the upgrading of the existing Gwaing Bridge on the National Route 2, section 7 (km 16 to km 18.5) within the George Local and Eden District Municipalities, Western Cape, and thus represents the EMPr for the project.

The following aspects have relevance to the project:

i) Aspect 1: Designated Environmental Officer (DEO)

Aspect Description:

Appointment of an individual responsible to ensure that the provisions of the EMPl and EMPr are complied with during the life of the project.

The environmental sensitivity of the project dictates whether the approved DEO should be able to assume other construction duties, or should be a dedicated officer with no other encumbrances.

- In the case of a construction project in a particularly sensitive environment, a Dedicated Environmental Officer may be required, with no other work responsibilities.
- In the case of maintenance, repair or construction in a less sensitive environment, a Designated Environmental Officer may be required, who may also assume other duties.

Impacts and Risks to be Managed:

Unnecessary environmental degradation and/or pollution and due to non-compliance with the EMP and EMPr as a result of a lack of understanding and/or delegation of responsibilities.

Management Objectives:

Clearly defined organisational and administrative arrangements for EMP implementation and monitoring of compliance.

Impact Actions: Management Statement

This is addressed in the SANRAL Standard EMPl, as per C1004 (d).

Project Specific EMPr

The Project Specific EMPr requires a Designated Environmental Officer. The Designated Environmental Officer's duties shall hold primacy over other contractual duties.

The Engineer has the authority to instruct the contractor to reduce the DEO's other duties or to replace the DEO if, in the Engineer's opinion, he/she is not fulfilling his/her duties in terms of the requirements of the EMPl and EMPr. Such instruction will be in writing clearly setting out the reasons why a replacement is required.

Time Period:

On-going.

Project Phases:

Construction and rehabilitation.

Management Outcomes:

- Nomination of a DEO completed
- Curriculum vitae approved by Engineer
- The responsibilities of the DEO are understood.
- Monthly EO reports completed and submitted.

Monitoring:

Method	Verify appointment and curriculum vitae of DEO
Mechanism	Document review
Frequency	Whenever there is a change in personnel or a new DEO appointment

ii) Aspect 2: Site Establishment and Work Areas

Aspect Description:

The presence of construction camps, offices, laydown of equipment and materials, workshops, staff accommodation and testing facilities on the site in order to facilitate construction. These areas are typically associated with the clearance of an area and vegetation removal, grading, storage and use of hydrocarbons and other chemicals, ablution facilities and the generation of waste.

Impacts and Risks to be Managed:

Damage to sensitive vegetation, nuisances to neighbours, and water pollution due to incorrect siting and management of work areas.

Management Objectives:

Correct siting and management of work areas.

Impact Actions: Management Statement

This is addressed in the SANRAL Standard EMPl, as per C1007 (a) Site Establishment and C1007 (e) Clearing the Site.

<u>Project Specific EMPr</u>

Before any site establishment can begin, the Contractor shall submit to the ECO for comments and to the Engineer for approval, site plans of the exact location, extent and detail of his activities. The site plan will address the locality and layout as well as the impact mitigation measures the Contractor proposes to put in place for:

- Construction camps
- Satellite camps
- Site offices
- Workshops
- Staff accommodation
- Testing facilities
- Stockpile areas
- Spoil stockpiles and areas where spoil material will be applied / reused.
- Ablution facilities
- Refuelling areas
- Concrete batching and handling of waste concrete and water containing cement
- Bitumen storage and handling and management of waste bitumen
- Storage of chemicals and hazardous materials and equipment on the site
- Storage of materials and equipment

Preference to be given to flat areas along the route that are as far away as possible to watercourses and sensitive areas. The following will be given due consideration:

- Avoid areas within 500 metres from wetlands unless formal approval is obtained from the DWS.
- Avoid within the 1 in 100 year flood line and riparian zone along watercourses unless formal approval is obtained from the DWS.
- Avoid where possible areas within category 1 Critical Biodiversity Areas (CBA 1).
- Minimise where possible areas within category 2 Critical Biodiversity Areas (CBA 2).
- Avoid damage to or removal of protected species unless the necessary permits are in place.
- Avoid privately owned land unless there is a written agreement in place with the landowner.

- Minimise areas where indigenous trees have to be damaged or chopped down.

Time Period:

At the commencement of construction, and when new work areas are established.

Project Phases:

Construction.

Management Outcomes:

Site layout plan approved before establishment of work areas. Impacts on water courses and sensitive areas minimised and avoided where possible.

Monitoring:

Method	ECO to verify location of work areas.
Mechanism	Verify works areas on site against site establishment plan. Comparison of before and after photographs
Frequency	At start of construction and before new work areas are developed

iii) Aspect 3: Spill prevention and management

Aspect Description:

Diesel and various chemicals used during road construction and potentially hazardous wastes are produced. This includes: cement, concrete, sewage, chemicals, fuels, oils and lubricants, paints, solvents, aggregate, tailings, wash water, organic materials and bituminous products.

Impacts and Risks to be Managed:

Inappropriate storage and handling of hazardous substances could result in the release of hazardous substances into the receiving environment, resulting in air, soil and water pollution and it may affect the health and well-being of people, plants and animals.

Management Objectives:

- Avoid soil, air and water pollution
- Avoid impacts on the health and well-being of people, plants and animals

Impact Actions: Management Statement

This is addressed in the SANRAL Standard EMPl, as per C1006 (b) Spillages, C1007 (d) Control at Workshops and C1009 Rehabilitation.

<u>Project Specific EMPr</u>

DEO to maintain a photographic record of clean-up and remediation activities after a spill, to be submitted to the engineer as part of the DEO's monthly report.

Time Period:

On-going.

Project Phases:

Construction and rehabilitation.

Management Outcomes:

- Correct storage and handling of hazardous substances
- Adequate containment systems area in place
- Early detection of spills or pollution containment system failures.
- Adequate rehabilitation measures implemented

Monitoring:

Method In case of a spill, water monitoring (Gwaing Tiver) as described in Standard EMPl C1006 (b) Spillages.

Mechanism Laboratory results of water samples must be taken. Compare sample results with applicable water quality standards.

Frequency Monthly until water quality criteria outlined in Standard EMPl C1006 (b) Spillages, are being met.

iv) Aspect 4: Work at Watercourses

Aspect Description:

The Gwaing Bridge crosses over the Gwaing River. As the N2 will be realigned, and the bridge upgraded to accommodate an additional bridge structure, work will be undertaken in areas prone to flooding. The National Water Act approvals that are applicable to work undertaken near watercourses, including wetlands must be obtained prior to the commencement of construction activities.

Impacts and Risks to be Managed:

Erosion and sedimentation of water courses due to the vegetation removal, presence of excavations and loose material in water courses. Inappropriate or unlawful use of water resources. The Engineer has confirmed that no water will be abstracted from the Gwaing River for construction purposes.

Management Objectives:

- Minimise impacts on watercourses
- All water uses to be lawful

Impact Actions: Management Statement

This is addressed in the SANRAL Standard EMPl, as per C1006 (c) Water Use and Control.

<u>Project Specific EMPr</u>

No construction work will be undertaken within 500 metres radius from the boundary of a wetland, within the 1:100 year flood line or within the riparian zone of the watercourse without the necessary authorisation from the Department of Water and Sanitation (DWS).

The Contractor shall ensure that any temporary or permanent alteration to the bed, banks, course or characteristics of watercourses (including wetlands) as well as the temporary permanent diversion or impedance of the flow of water in watercourses (including wetlands), typically associated with the construction of bridges, are undertaken in such a manner that the risks to the environment are minimised. The following risks will be considered and minimised.

- Erosion; and the presence of unstable structures and stockpiles in areas prone to flooding; and induced flooding.
- Potential, measurable or cumulative detrimental change in the stability of a watercourse; change in the physical structure of a watercourse; scouring, erosion or sedimentation of a watercourse; or decline in the diversity of communities and composition of the natural, endemic vegetation.
- Potential, measurable or cumulative detrimental change in the quantity, velocity, pattern, timing, water level and assurance of flow in a watercourse will be minimised.
- Potential, measurable or cumulative detrimental change in the water quality characteristics of the watercourse.
- Potential, measurable or cumulative detrimental change on the breeding, feeding and movement patterns of aquatic biota, including migratory species; level of composition and diversity of biotopes and communities of animals and microorganisms; or condition of the aquatic biota.
- Potential, measurable or cumulative detrimental impact on the characteristics of a watercourse.
- Detrimental impact on water users and other lawful water uses and land.
- Detrimental impacts to the health and safety of the public.

The Contactor to submit method statements for work to be undertaken within 500 metres radius from the boundary of a wetland, within the 1:100 year flood line or within the riparian zone, to the Engineer for comment. The method statements to detail how the work will be undertaken, where materials, equipment, aggregate, spoil material and waste will be stored, how stormwater will be managed, how the flow of water in watercourses will be accommodated, what risks to the environment are foreseen and what measures will be employed to minimise such risks.

The method statements to specifically detail how erosion, sedimentation and pollution of watercourses will be prevented, how hazardous liquids used in construction will be contained, and what measures for rehabilitation will be implemented.

Time Period:

On-going.

Project Phases:

Construction

Management Outcomes:

- Impacts are minimised
- Necessary approvals for work near watercourses are in place

Monitoring:

Method ECO EMPr compliance audits

Mechanism Audit checklist and audit report, contractor method statements and verification of records of approvals from DWS

Frequency Monthly

v) Aspect 5: Protected Plants

Aspect Description:

The following 11 protected plant species have been observed during the Vegetation Impact Assessment (refer to Basic Assessment Report):

- *Aloe arborecens*
- *Carpobrotus deliciousus*
- *Cynanchum ellpticum*
- *Erica canaliculata*
- *Erica discolour*
- *Erica formosa*
- *Erica hebecalyx*
- *Erica leucopelta*
- *Hypoxis sobolifera*
- *Secamone galpinii*
- *Watsonia aletoides*

Following a pre-construction environmental audit conducted in October 2017, it is recommended that the following red data/protected species be translocated:

No	Vegetation type	Area (ha)	Species present	Estimated No.	Lat (N - S)	Long (W - E)
1	Succulents & Geophytes	0.17	*Mesembryanthemum spp* *Albuca cooperi* *Watsonia knysnana* *Boophone disticha*	30 3 2	30° 00' 29.28'' – 30° 00' 31.25''	22° 23' 50.65'' – 22° 23' 54.72''
2	Roadside shrubs 1	0.32	*Aloe arborescens* *Erica spp.*	20	34° 00' 29.66'' – 34° 00' 33.49''	22° 23' 43.60'' – 22° 23' 22.56''
3	Roadside shrubs 2	0.78	*Aloe arborescens* *Erica spp.*	20	34° 00' 32.51'' – 34° 00' 34.27''	22° 24' 06.11'' – 22° 24' 28.84''
4	Partially disturbed areas	0.23	*Hypoxis sobolifera* *Mesembryanthemum spp* *Romulea toximontana* *Spiloxene spp*	5 1 10 5	34° 00' 29.77'' – 34° 00' 30.73''	22° 23' 44.74'' – 22° 23' 50.82''

In addition, the following measures are to be undertaken:

- *Search and rescue plans are required for all species of conservation concern areas such as the bulb, succulent and geophyte area, the partially disturbed areas, and the wetland/riparian vegetation areas must be conducted by the ECO upon site establishment and commencement of construction,*

- *Translocation permits required for any protected species found during this search and rescue*

Impacts and Risks to be Managed:

Unnecessary environmental degradation and eradication of protected plant species along the route, due to non-compliance with the EMP as a result of a lack of understanding and/or delegation of responsibilities.

Management Objectives:

- Permit to be in place before removal of protected plants

Impact Actions: Management Statement

This is addressed in the SANRAL Standard EMPl, as per C1006 (d) Vegetation Management and C1007 (a) (ii) Vegetation.

Project Specific EMPr

Contractor to verify that a permit is place before protected plants are relocated or destroyed. DEO to undertake search and rescue in accordance with permit requirements. ECO to develop a method statement for relocation and protection of plants based on the outcome of the search and rescue.

Time Period:

Prior to commencing with construction in an area.

Project Phases:

Construction.

Management Outcomes:

- Permit to be in place before removal of protected plants
- Protected plants to be relocated in accordance with permits

Monitoring:

Method DEO to record accurately the removal of protected plants by taking a photograph. ECO compliance audits.

Mechanism Inspection checklist, as well as added to report to Engineer. Visual inspection of site. Verify that before and after photographs are taken.

Frequency Monthly

vi) Aspect 6: Alien Species

Aspect Description:

The following alien species have been observed during the Vegetation Impact Assessment (refer to Basic Assessment Report):

- *Acacia cyclops*
- *Acacia mearnsii*
- *Acacia longifolia*
- *Sesbania punicea*
- *Pinus*
- *Eucalyptus*
- *Sonchus oleraceus*
- *Solanum pseudo-capsicum*
- *Solanium maurtianum*
- *Penniesetum clandestinum*

Impacts and Risks to be Managed:

Prevent the spread of other alien plants as listed above.

Management Objectives:

- Prevent spread of alien vegetation
- Re-vegetate where possible

Impact Actions: Management Statement

This is addressed in the SANRAL Standard EMPl, as per C1006 (d) Vegetation Management and C1007 (a) (ii) Vegetation.

Project Specific EMPr

None required. The ECO will ensure that alien vegetation management is implemented.

Time Period:

On-going.

Project Phases:

Construction and rehabilitation.

Management Outcomes:

- Reduce invasion of alien vegetation

Monitoring:

Method ECO compliance audits

Mechanism Inspection checklist, as well as added to report to Engineer. Visual inspection of site. Verify that before and after photographs are taken.

Frequency Monthly.

vii) Aspect 7: Accommodation of Traffic

Aspect Description:

Traffic control measures are required during construction, as the N2 is a main link between Mossel Bay and Herold's Bay. During construction, the second lane George bound will be closed to allow for the movement of construction vehicles and plant access.

Impacts and Risks to be Managed:

Unsafe conditions for motorists during construction and excessive dust generation.

Management Objectives:

- Ensure safe thoroughfare for motorists along the project footprint.

Impact Actions: Management Statement

This is addressed in the SANRAL Standard EMPl, as per C1006 (e) Dust Control

Project Specific EMPr

Contractor to ensure that appropriate signage and flagmen are in place during construction activities. Dust suppression measures should be utilised during surfacing of the N2 realignment.

Time Period:

On-going.

Project Phases:

Construction.

Management Outcomes:

- Minimum traffic impact and dust control.

Monitoring:

Method ECO compliance audits.

Mechanism Inspection checklist, as well as added to report to Engineer. Visual inspection of site. Verify that before and after photographs are taken.

Frequency Monthly.

viii) **Aspect 8: Managing Concerns and Requests Raised by I & APs**

Aspect Description:

I & APs must have a vehicle to register issues and complaints in regards to the upgrade of the Gwaing Bridge and N2 realignment.

Impacts and Risks to be Managed:

I & APs take legal action against SANRAL.

Management Objectives:

- Deal effectively with I & APs concerns

Impact Actions: Management Statement

Project Specific EMPr

Contractor to establish an IAP issues and responses register and to provide email address for I & APs to lodge issues in respect of the project.The DEO contact number should be provided to I & APs.

All project specific issues to be submitted in writing to Contractor by I & APs, and DEO/Engineer to respond to I & APs queries within 30 days.

Time Period:

On-going.

Project Phases:

Construction.

Management Outcomes:

- Resolve I & APs queries issues timeously.

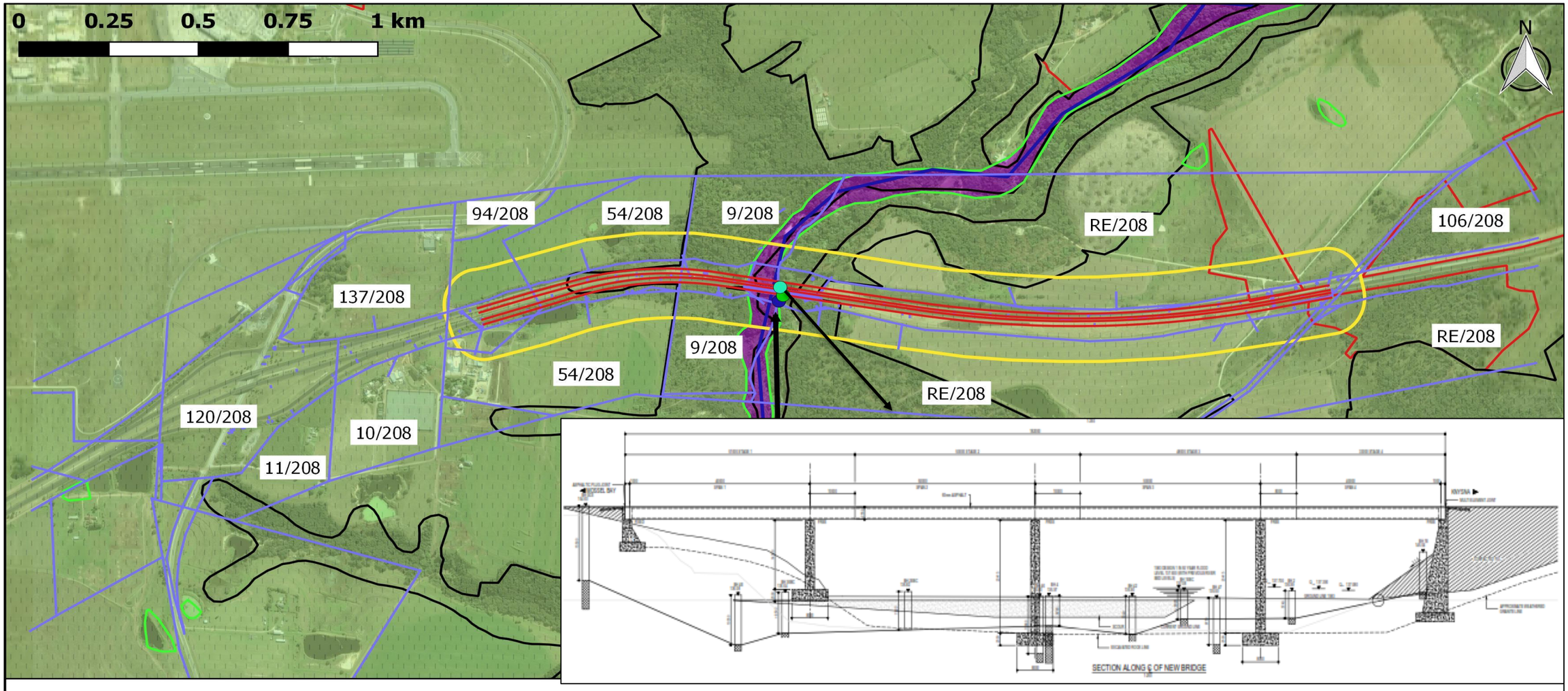
Monitoring:

Method ECO compliance audits.

Mechanism Query register.

Frequency Monthly.

(c) **Sensitivity Map of the Upgrade of the Gwaing Bridge and N2 Realignment**



Legend

- N2 Realignment
- Adjacent Property Boundaries
- Preferred Alternative
- Alternative 1
- Alternative 2

Buffer Zone

- 100 m Buffer Zone

National Freshwater Ecosystem Priority Areas (NFEPA)

- Gwaing River
- NFEPA Wetlands

Mucina and Rutherford Vegetation, 2006

- Cape Lowland Alluvial Vegetation (Critically Endangered)
- Garden Route Granite Fynbos (Endangered)

Garden Route Critical Biodiversity Areas

- Critical Biodiversity Areas
- Ecological Support Areas

Google Satellite

Figure 1: Map of the Upgrade of the Gwaing Bridge and N2 Realignment

(d) Common Alien Invasive Tree Species On-Site

Figure 2: *Acacia mearnsii* (Black Wattle)

Figure 3: *Eucalyptus* (Gum tree)

Figure 4: *Solanium maurtianum*

Figure 5: *Acacia cyclops*

(e) Details of the EAP

Kerry Stanton BSc (Hons) MSc EAPSA certified ***Lead Environmental Consultant and Director***

Certifications:	Certified by the Environmental Assessment Practitioners of South Africa (EAPSA) Certified by the Global Carbon Exchange Programme – Carbon Footprint Analyst Certified Professional Natural Scientist (400167/12)
Tertiary Education:	University of Natal, Durban BSc (Hons) - Estuarine Ecology (Major), Urban Biogeography (Ecology) (Major) MSc *awarded cum laude* Environmental Management and Open Space Planning Thesis *"Developing an Open Space System for the Queensburgh Municipal Area"*
Work Experience:	1993-1994 Queensburgh Municipality - Unofficial Environmental Advisor for duration of MSc 1994-1995 IDEAS- Partner in Environmental Consultancy 1995-1998 Environment Branch, North and South Central Local Council- Professional Environmental Officer KSEMS Environmental Consulting cc.

Nishkar Maharaj BSc (Hons) Cand.Nat.Sci. ***Environmental Consultant***

Certifications:	Certified Candidate Natural Scientist (116421)
Tertiary Education:	University of KwaZulu-Natal, Westville Campus BSc Environmental Science BSc (Hons) Environmental Science Thesis: **Solar Energy: A Case Study in an Urban Setting*
Work Experience:	2015 – Environmental Trainee for Enaq Consulting 2015 – Environmental Auditor & Quality Officer for Astrum Energy/3Energy Renewables 2016 – Environmental Consultant for KSEMS Environmental Consulting

Patricia Nathaniel BSc (Hons) Environmental Management ***Technical Manager***

Tertiary Education:	University of KwaZulu-Natal, Durban BSc (Hons) – Geography and Environmental Management
Work Experience:	2010-2013 Junior Environmental Consultant for Environmental Resources Management (ERM) Southern Africa 2014 – 2017 Environmental Consultant for KSEMS Environmental Consulting cc. 2017 – Present – Technical Manager for KSEMS Environmental Consulting cc.

Curriculum Vitae – Kerry Stanton

PERSONAL PARTICULARS

PERSONAL PARTICULARS

Name:	Kerry Ann Stanton
Profession:	Environmental Consultant
Date of Birth:	8th November 1970
Nationality:	South African
Parent Firm:	KSEMS Environmental Consulting
Position in Firm:	Managing Director

Kerry has over 2 decades experience in the environmental management field. She is an Ecologist by training and has co-ordinated some of KZN's largest EIA's.

Academic Qualifications
Degree BSC (Hons) – Estuarine Ecology (Major), Urban Biography (Ecology) (Major)
MSc awarded cum laude

Regulation/Legislation Review and Training
Kerry has been involved in environmental legislation in South Africa since 1994. She currently retains a full database of regulations relevant to South African environment and mining legislation to ensure best practice. Kerry has trained various government office departments on implementation of the legislation.

Professional Qualifications
Integrated Environmental Management Theory and Practice – University of Cape Town
Dealing with the Public and Assertiveness Training – North and South Central Local Council
GCX Certified Carbon Footprint Analyst Level 1 – Global Carbon Exchange (2010)
Accredited Professional Course – Green Star SA – Green Building Council (2010)
EAPSA Certified
SACNASP certified Professional Natural Scientist – Registration Number: 400167/12

General Environmental Management Experience – 21 years
1999 – present: Managing Director of Kerry Seppings Environmental Management Specialists cc (KSEMS)
1995 – 1998: Professional Environmental Officer for the Environmental Branch, North & South Central Local Council
1994 – 1995: Partner in the Environmental Consultancy IDEAS

Contact Details
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Project Experience (examples since 2008 only – further details available upon request) (selected projects only. Kerry has been involved in over 1000 assessment projects since 1998)				
Description	***Type***	***Industry***	***Year***	***Client Details***
Kaylands Estate Ifafa, Remainder of Pierre D'Or 6517	EIR	Commercial	2008	
Sasol Gas Pipeline, Island View Durban	EIR	Electricity & gas	2008	Sasol 011 865 8500
Proposed hydrogenation of PCB Contaminated	EIR	Commercial	2008	FFS Refiners 031 459 5300
Salt Rock Beach Estate, Salt Rock Hotel	EIR	Commercial	2008	
Widening of the Durban Harbour Mouth	ECO	Commercial	2008	Group 5 031 569 0300
Upgrade of an Ageing 33/6.6kV Glenwood Substation	EIR	Electricity & gas	2009	
Sasol Gas Pipeline Senmen Sasolburg	EIR	Electricity & gas	2009	Sasol 011 865 8500
Sasol Gas Pipeline Isegen Pty (Ltd), Refinery Drive, Isipingo	EIR	Electricity & gas	2009	Sasol 011 865 8500
Sasol Gas Pipeline Frame Textiled, Mobeni	EIR	Electricity & gas	2009	Sasol 011 865 8500
Construction of new furnace at Nampak Wiegand Glass	EIR	Commercial	2009	Nampak Wiegand Glass, 011 519 7765
Proposed Argyle Road Stormwater Outfall Extension	EIR	Water & sanitation	2009	
Construction and Rehabilitation Monitoring of the Agrizone Development	ECO	Commercial	2010-2013	Dube Tradeport
Upgrade of existing 33/11kV – Jameson Park Substation	EIR	Electricity & gas	2010	Eskom 031 710 5528
Proposed Sasol Gas Pipeline at Pulp United, Alton Industrial Area, Richards Bay	EIR	Electricity & gas	2010	Sasol 011 865 8500
Construction of Petroleum Product Tank Storage Facility at FFS Refiners	EIR	Commercial	2010	FFS Refiners 031 459 5300
Waterfall Petrol Filling Station	EIR	Retail	2010	David Rowles 011 662 1569
Proposed construction of a Pressure Reducing Station (PFS) for Phoenix area gas supply	EIR	Electricity & gas	2010	Sasol 011 865 8500
New Mzintlava (Mt Ayliff) Substation	EIR	Electricity & gas	2010	
Installation of a 1200m3 Storage Tank at the existing FFS Tank Farm, Cape Town Harbour	EIR	Water & sanitation	2010	
Rietvallei in-situ upgrade (phase 16) – a low cost housing project	EIR	Housing	2010	
Burlington Extension Subsidy Housing Development	EIR	Housing	2010	
Rushbook Retail Centre	EIR	Retail	2010	
uShukela Highway Development	EIR / EMPr	Roads and Mining	2010	THD 031 560 1949
Iiaam heat treatment Germiston	EIR	Commercial	2010	Sasol 011 865 8500
Global Benchmarks Study, CER Airports Precincts	EIR	Commercial	2010	

Status Quo Report KSIA SEA	EIR	Commercial	2010	
Umdoni Roads	EMPr	Roads, mining	2010	Umdoni Municipality 039 976 1324
Construction of substation and powerline	ECO	Electricity & gas	2010-2012	Eskom 031 710 5528
Construction of substation and powerline	ECO	Electricity & gas	2011-2013	Eskom 031 710 5528
Proposal to continue mining of gravel by Stockville Quarries	EIR / EMPr	Mining	2011	Stockville Quarry CC 031 769 1419
KwaNovuka Bulk Water Supply Scheme	BAR (wetland riparian & Vegetation rehab plan)	Water & sanitation	2012	Aurecon 012 427 2000
Construction of a sewerage pipeline within Amawoti, Ethekwini Municipality	EIR	Water & sanitation	2012	Bosch Stemele 031 535 6000
Plascon Mobeni	Air Emissions Licence	Commercial	2012	Plascon 031 451 3342
Centre for Retail/Mixed Use Development	EIR	Retail	2012	THD 031 560 1949
Waterfall Conservancy Tanks	EIA; Waste License	Water & sanitation	2012	David Rowles 011 662 1569
Clairwood Logistics / Distribution Park	EIR	Commercial	2012-2015	Capital PropFund 011 612 6870
Transnet's new Straddle Containers in Durban Harbour	ECO	Commercial	2012-2015	Group 5 031 569 0300
Expansion of the Waterfall Shopping Centre and Pipeline Rehabilitation	ECO	Retail	2012-2015	David Rowles 011 662 1569
Construction of 3 Roads within Escourt	EIA / EMPr	Roads, mining	2013	Nankhoo & Ass 031 536 8310
Thukela Transmission Line	EIA	Electricity & gas	2013	Umgeni Water 031 268 7172
Roseneath Gardens Housing Development & Bulk Sewage reticulation and pump station	EIA	Water & Sanitation	2013	Ethekwini 031 311 4190
Shongweni Shopping Mall	EIA	Retail	2013	THD 031 560 1949
Ushukela Highway	EIR / EMPr	Roads, mining	2013	THD 031 560 1949
The construction of stormwater infrastructure within close proximity of a watercourse	ECO	Water & sanitation	2013	Design Technology
Sasol Gas Pipeline and customer metering station	ECO	Electricity & gas	2013	Sasol 011 865 8500
The installation of 132kV underground powerlines in the Durban South Area	ECO	Electricity & gas	2013	Ethekwini 031 311 4190
The construction of a high voltage powerplant / substation	ECO	Electricity & gas	2013	SAPREF
The construction of water and sewer reticulation pump stations and infrastructure	ECO	Water & sanitation	2013	Ethekwini 031 311 4190
Re-route of the ULP Pipeline at the Kliprivier Crossing	EAP, ECO	Water & sanitation	2013	Sasol 011 865 8500
UNFCCC CDM Carbon Credit Project Registration	Carbon Analysis	Commercial	2013	Energy Drive
Upgrading of provincial gravel roads to blacktop within the Ugu District: P732, P58, P728 and P73	ECO	Roads	2012 - 2013	Samani Consulting 031 266 2955

Construction of 2500m2 processing facility to remove contaminates from Waxy Oil	EIR	Commercial	2013	FFS Refiners 031 459 5300
Construction of the Weza Pedestrian and Mzimkulwana and Mzimayi Vehicular Bridges	ECO	Roads, mining	2012 – 2013	Samani Consulting 031 266 2955
Roseneath Gardens Housing Development and Bulk Sewage reticulation and pump station	EIA	Water & Sanitation	2013	Ethekwini Housing 031 311 4190
Construction of the Caltex Petrol Filling Station, Amanzimtoti	EIA, ECO	Retail	2012 - 2013	Vista Construction 031 566 5001
Langefontein Housing Development and onsite WWTW	EIR & Scoping	Housing	2013	Tyris Realty 072 227 4965
Umlazi J Station Communal Ablution Blocks (CABs)	24G Application	Water & Sanitation	2013	MMDPDNA 031 275 6900
Woody Glen Road Upgrade	EIA / EMPr	Roads, mining	2014	Gibb Engineering 031 267 8560
St James Leksand Powerline	EIA	Electricity & gas	2014	Eskom 031 710 5528
eThekwini Metropolitan Municipality Water & Sanitation: Bulk Sanitation Service Infrastructure	BAR & WULA	Water & Sanitation	2014	Ethekwini 031 311 4190
National Department of Water & Sanitation Rehabilitation of the Hammarsdale Dam & establishment of an extensive wetland	BAR, WULA	Water & Sanitation	2014	Naidu Consulting 031 265 6007
Tongaat Hulett Developments Carbon Footprint Analysis	Carbon Analysis	Commercial	2013 - 2014	THD 031 560 1949
SANRAL upgrade of National Route R22	EIA & WULA	Roads, mining	2014	Madan Singh 031 262 6950
Umlazi K & L Sanitation Project	BAR	Water and Sanitation	2014	MMDPDNA 031 275 6900
Umlazi P & Q Sanitation Project	BAR	Water and Sanitation	2014	MMDPDNA 031 275 6900
Umlazi G Sanitation Project	BAR	Water & Sanitation	2014	MMDPDNA 031 275 6900
Umlazi A, B, C, E, S and Malaba Hills Sanitation Project	BAR	Water & Sanitation	2014	MMDPDNA 031 275 6900
Unity Avenue Sanitation Project	BAR & WULA	Water & Sanitation	2014	MMDPDNA 031 275 6900
N4 informal settlement in Umlazi Sanitation Project	BAR	Water & Sanitation	2014	MMDPDNA 031 275 6900
Happy City informal settlement in Umlazi Sanitation Project	BAR	Water & Sanitation	2014	MMDPDNA 031 275 6900
Umdloti River Bridge	BAR & WULA	Roads, mining	2014 – 2015	Hatch Goba 031 536 9400
Okhombe Vehicle Culvert Bridge	BAR	Roads, mining	2014 – 2015	TPA Consulting 031 266 4168
Watercrest Shopping Centre Expansion	EIA	Retail	2014	David Rowles 031 763 4433
Upgrade of the SANRAL N6 National Route from Rouxville to Smithfield	BAR, WULA, EMPr, Borrow Pits, Carbon	Roads, mining	2015	Aurecon 051 468 9681
National Department of Water & Sanitation Rehabilitation of the Hammarsdale Dam and establishment of an extensive wetland	ECO	Water & Sanitation	2015	Naidu Consulting 031 265 6007
Reconstruction of a Railway Embankment, Amanzimtoti	EMPr	Roads, mining	2015	Madan Singh 031 262 6950

Upgrade of Provincial Road D985 to blacktop	EIA, EMPr, WULA	Roads, mining	2014 - 2015	Samani Consulting 031 266 2955
Upgrade of Provincial Roads P740 to blacktop	EIA, EMPr WULA	Roads, mining	2014 - 2015	Samani Consulting 031 266 2955
Development of a chemical packaging facility	Remediation Order, WULA & Scoping & EIR	Commercial	2015	Optic Star 031 313 6500
GJ Crookes Pedestrian Bridge	BAR	Roads, mining	2014 – 2015	Samani Consulting 031 266 2955
Main Road P77	BAR	Roads, mining	2014 – 2015	Naidu Consulting 031 265 6007
Upgrade of Main Road P75.3	BAR & WULA	Roads, mining	2014 – 2015	Samani Consulting 031 266 2955
Injisuthi & Mathamo Bridges	BAR & WULA	Roads, mining	2015	Ibhongo Consulting 031 264 2200
Ottos Bluff to Chase Valley Link Road	BAR & WULA	Roads, mining	2015	Samani Consulting 031 266 2955
Upgrade of Dambuza Road	WULA	Roads, mining	2014 – 2015	Madan Singh 031 262 6950
Upgrade of Phenyane to Obhazweni Road	WULA	Roads, mining	2015	Boston Ink 033 346 0354
Harewood Roads	WULA	Roads, mining	2015	Henwood & Nxumalo
Sinkwazi & Sikhumbuzo Ngwenya Roads	WULA	Roads, mining	2015	Henwood & Nxumalo
Mr Price Distribution Warehouse	ECO	Commercial	2015	Paton Taylor 031 313 1070
Mcathu Vehicle Bridge	ECO	Roads, mining	2015	TPA Consulting 031 266 4168
Oakford Priory housing development	ECO	Housing	2015	Ethekwini 031 311 4190
Spring Grove Power lines	ECO	Electricity & gas	2015	Eskom 031 710 5528
Decommissioning of Fuel recycling plant	ECO	Commercial	2015	FFS Refiners 031 459 5300
Transnet Locomotive Turntable	ECO	Commercial	2015	Transnet 011 308 3634
R22 Pedestrian Facilities	ECO, Carbon	Roads	2015	TLS Engineers 033 343 7069
Arbour Town	ECO	Retail	2014-2015	Arbour Grove 032 586 0301
Expansion of the Waterfall Shopping Centre & Pipeline Rehabilitation	ECO	Retail	2014-2015	David Rowles 011 662 1569
D732 Culvert	ECO	Roads, mining	2015	Samani Consulting 031 266 2955
D1608 Causeway	EIR, EMPr, WULA	Roads, mining	2014-2015	Samani Consulting 031 266 2955
L723, Phikelela Road L2842 & D991 Causeways	EIR, EMPr, WULA	Roads, mining	2015	Samani Consulting 031 266 2955
D732 Culvert	WULA	Roads, mining	2015	Samani Consulting 031 266 2955
Pambela Pedestrian Bridge	WULA	Roads	2015	Hatch Goba 031 536 9400
P732 Borrow Pit	EMPr	Mining	2015	Samani Consulting 031 266 2955

P73 Borrow Pit	EMPr	Mining	2015	Samani Consulting 031 266 2955
P58 Borrow Pit	EMPr	Mining	2015	Samani Consulting 031 266 2955
N2 Borrow Pit	EMPr	Mining	2015	Samani Consulting 031 266 2955
P740 & D985 Road Upgrade	WULA	Roads	2015	Samani Consulting 031 266 2955
Chicken Farm Residential Development	WULA	Commercial	2015	David Rowles 011 662 1569
Mathamo River	BAR, WULA	Roads	2015 – 2016	Ibhongo Consulting 031 324 2200
Injiuthu River	BAR, WULA	Roads	2015 – 2016	Ibhongo Consulting 031 324 2200
117 Wiltshire Road	WULA	Road	2015 – 2016	Springville Investments
N2 Borrow Pit WULA	WULA	Borrow Pit	2015 – 2016	Samani Consulting 031 266 2955
P73 WULA	WULA	Road	2015 – 2016	Samani Consulting 031 266 2955
Goedehoop Stene	WULA	Road	2015 – 2016	Enprocon
Bloem Ring Road N8	BAR, WULA	Road	2015 – 2016	Nyeleti Consulting
P400 WULA	WULA	Road	2016	Samani Consulting 031 266 2955
P77 WULA	WULA	Road	2016	Naidu Consulting 031 265 6007
Environmental Audit	ECO	Warehouse Development	2015	Payton Taylor/ Mr Price
Legal review of environmental remediation	Legal	Commercial	2015	Nampak Africa
Water Use License Application for Sinkwazi and Sikhumbuzo Roads	WULA	Commercial	2015	Msunduzi Municipality
Basic Assessment Report for two pedestrian bridges (Madakana and Kwaluhlaza Pedestrian Bridge).	WULA	Infrastructure Development	2016	Hibiscus Coast Municipality
Decommissioning of Fuel recycling plant	ECO	Commercial development	2015	FFS Refiners 031 459 5300
D1252 Triple Celled Culvert	BAR, WULA	Roads	2015	Ibhongo Consulting 031 324 2200

Curriculum Vitae – Nishkar Maharaj

PERSONAL PARTICULARS

Name:	Nishkar S Maharaj
Profession:	Environmental Consultant
Date of Birth:	14th August 1990
Nationality:	South African
Parent Firm:	KSEMS Environmental Consulting
Position in Firm:	Environmental Consultant

Academic Qualifications
BSc (Hons) – Environmental Science
BSc Environmental Science

Professional Qualifications
SACNASP Certified Candidate Natural Scientist – Registration Number 116421

General Environmental Management Experience – 2 years
2016-present – KSEMS Environmental Consulting
2015 – Astrum Energy/3Energy Renewables

Contact Details
Telephone: 031 769 1578 Fax: 086 535 5281 Cell: 082 885 6024 Email: nishkar@ksems.co.za

Project Experience				
Description	***Type***	***Industry***	***Year***	***Client Details***
Metrowind Van Stadens Wind Farm	Environmental Auditing	Renewables	2015	3Energy Renewables 031 301 6444
Tsitisikamma Wind Farm	Environmental Auditing	Renewables	2015	3Energy Renewables 031 301 6444
Kouga Wind Farm	Environmental Auditing	Renewables	2015	3Energy Renewables 031 301 6444
R22 Pedestrian Walkways	ECO	Service Development	2016	TLS Engineers 033 343 2069
FFS: Vissershok	EA AEL BAR	Refiners	2016	FFS: Vissershok 031 459 5300
Gwaing Bridge	EA WULA ECO	Transport	2016	Gibb Pty Ltd 021 469 9105
Clairwood Logistics Park	ECO	Logistics	2016	Capital Property Fund 011 612 6900
Waste to Energy Initiative	EIR	Renewables	2016	Ecovate 0207 558 8875 (UK)
KFC Tongaat	EA BAR WULA	Service Development	2016	True Blue Group 031 579 7300
P73 Borrow Pit	EA Mining Permit WULA	Service Development	2016	Samani Consulting 031 266 2955
Bank Stabilisation	EA WULA BAR	Maintenance	2016	CBR Investments 031 713 7777
Port Edward Borrow Pit	EA Mining Permit Scoping & EIR WULA	Transport	2017	Royal Haskoning DHV 033 328 1000

AEL Air Emissions Licence
BA Basic Assessment
EA Environmental Authorisation
ECO Environmental Control Officer
EIR Environmental Impact Report
WULA Water Use Licence Application

Curriculum Vitae – Patricia Nathaniel

PERSONAL PARTICULARS

Name:	Patricia Pearl Nathaniel
Profession:	Environmental Scientist
Date of Birth:	7th September 1988
Nationality:	South African
Parent Firm:	Kerry Seppings Environmental Management Specialists
Position in Firm:	Senior Environmental Consultant

Patricia is currently a consultant at KSEMS with four years of experience in the environmental field

Academic Qualifications
Degree BSC (Hons) – Environmental Management

General Environmental Management Experience – 4 years
2014 – present: Environmental Consultant at Kerry Seppings Environmental Management Specialists cc
2010 – 2013: Environmental Consultant at Environmental Resources Management (ERM)

Contact Details
Telephone: 031 769 1578 Fax: 086 535 5281 Cell: 0828856027 Email: patricia@ksems.co.za

Project Experience

Description	*Type*	*Industry*	*Year*	*Client Details*
Umlazi K & L Sanitation Project	BAR	Water and Sanitation	2014	MMDPDNA 031 275 6900
Umlazi P & Q Sanitation Project	BAR	Water and Sanitation	2014	MMDPDNA 031 275 6900
Umlazi G Sanitation Project	BAR	Water & Sanitation	2014	MMDPDNA 031 275 6900
Umlazi A, B, C, E, S and Malaba Hills Sanitation Project	BAR	Water & Sanitation	2014	MMDPDNA 031 275 6900
Unity Avenue Sanitation Project	BAR & WULA	Water & Sanitation	2014	MMDPDNA 031 275 6900
N4 informal settlement in Umlazi Sanitation Project	BAR	Water & Sanitation	2014	MMDPDNA 031 275 6900
Happy City informal settlement in Umlazi Sanitation Project	BAR	Water & Sanitation	2014	MMDPDNA 031 275 6900
Umdloti River Bridge	BAR & WULA	Roads	2014 – 2015	Hatch Goba 031 536 9400
Okhombe Vehicle Culvert Bridge	BAR	Roads	2014 – 2015	TPA Consulting 031 266 4168

Project Experience cont.				
Description	***Type***	***Industry***	***Year***	***Client Details***
Mbhava & Mpethu Extension Water Supply Scheme	EIA, ECO	Water	2014 – 2016	Bosch Stemele 031 535 6000
GJ Crookes Pedestrian Bridge	BAR	Roads	2014 – 2015	Samani Consulting 031 266 2955
Main Road P77	BAR	Roads	2014 – 2015	Naidu Consulting 031 265 6007
Upgrade of Main Road P75.3	BAR & WULA	Roads	2014 – 2015	Samani Consulting 031 266 2955
Injisuthi & Mathamo Bridges	BAR & WULA	Roads	2015	Ibhongo Consulting 031 264 2200
Ottos Bluff to Chase Valley Link Road	BAR & WULA	Roads	2015	Samani Consulting 031 266 2955
Upgrade of Dambuza Road	WULA	Roads	2014 – 2015	Madan Singh 031 262 6950
Upgrade of Phenyane to Obhazweni Road	WULA	Roads	2015	Boston Ink 033 346 0354
Mathamo River	BAR, WULA	Roads	2015 – 2016	Ibhongo Consulting 031 324 2200
Injiuthu River	BAR, WULA	Roads	2015 – 2016	Ibhongo Consulting 031 324 2200
117 Wiltshire Road	WULA	Road	2015 – 2016	Springville Investments
N2 Borrow Pit WULA	WULA	Borrow Pit	2015 – 2016	Samani Consulting 031 266 2955
P73 WULA	WULA	Road	2015 – 2016	Samani Consulting 031 266 2955
Goedehoop Stene	WULA	Road	2015 – 2016	Enprocon
Bloem Ring Road N8	BAR, WULA	Road	2015 – 2016	Nyeleti Consulting
P400 WULA	WULA	Road	2016	Samani Consulting 031 266 2955
P77 WULA	WULA	Road	2016	Naidu Consulting 031 265 6007
DUT Pietermaritzburg	ECO	Commercial	2015 - 2016	Aecom 011 481 0300
DUT Pietermaritzburg Block 7	ECO	Commercial	2015 - 2016	Aecom 011 481 0300

APPENDICES

APPENDIX 1: LETTER OF ACCEPTANCE OF EMPR

RE: Upgrade of the Gwaing River Bridge, George Local Municipality

To whom it may concern

This is to state that the undersigned have received a copy of the Environmental Management Programme (EMPr) developed for this site by SANRAL and *KSEMS Environmental Consulting (KSEMS*) dated 8 May 2017. The undersigned do hereby agree to abide by the strictures of the Environmental Management Programme (EMPr). Any contravention of the EMPr will be recorded and corrective action will be carried out.

Any changes to the EMPr must be approved by the *Environmental Control Officer (ECO)*, the consultant *Kerry Seppings Environmental Management Specialists (KSEMS)* and the relevant authority. Such changes are to be made in writing and a record must be maintained.

As Agreed on this day _____ of _____(Month) _____(Year)

Environmental Control Officer (ECO)

Name _____

Signed _____

Contractor

Name _____

Company _____

Signed _____

Engineer

Name _____

Company _____

Signed _____

APPENDIX 2: COMPLAINTS REGISTER

This a register for recording all complaints received from neighbours i.e. Complaints about noise, odours, dust etc.

Date of complaint	Complainant's name	Contact Details (phone)	Nature of complaint	Corrective action taken	Date action completed

APPENDIX 3: NON-CONFORMANCE RECORD AND AUDIT TEMPLATE

This is record of non-compliances with the EMPr i.e. any action taken that is in violation of the EMPr must be recorded e.g. mixing concrete directly on soil, site staff using neighbouring properties as toilet facilities, dumping of material over fence etc.

Date of Non-conformance	Details of non-conformance	Party / ies responsible	Corrective action taken	Date action completed

1. AIM

1) The effective response to emergency incidents.
2) The control of emergency incidents.
3) Recording incidents and ensuring that where possible, all measures are taken to prevent them from re-occurring

2. DEFINITION OF AN "INCIDENT"

As defined by NEMA, section 30 "Control of emergency incidents"

(1) In this section—

(a) "incident" means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed;

(b) "responsible person" includes any person who—

(i) is responsible for the incident;

(ii) owns any hazardous substance involved in the incident; or

(iii) was in control of any hazardous substance involved in the incident at the time of the incident;

(c) "relevant authority" means—

(i) a municipality with jurisdiction over the area in which an incident occurs;

(ii) a provincial head of department or any other provincial official designated for that purpose by the MEC in a province in which an incident occurs;

(iii) the Director General;

(iv) any other Director General of a national department.

As defined by the National Water Act section 20 "Control of emergency incidents"

(1) In this section "incident" includes any incident or accident in which a substance -

(a) pollutes or has the potential to pollute a water resource; or

(b) has, or is likely to have, a detrimental effect on a water resource.

Definition of an Incident on Site

Spills, contamination of soil and or stormwater, fires, explosions.

3 CONTENTS OF REPORT TO AUTHORITIES

As taken from NEMA, Section 30 :Control of Emergency Incidents"

(3) The responsible person or, where the incident occurred in the course of that person´s employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available—

(a) the nature of the incident;

(b) any risks posed by the incident to public health, safety and property;

(c) the toxicity of substances or byproducts released by the incident; and

(d) any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to—

(i) the DirectorGeneral;

(ii) the South African Police Services and the relevant fire prevention service;

(iii) the relevant provincial head of department or municipality; and

(iv) all persons whose health may be affected by the incident.

(4) The responsible person or, where the incident occurred in the course of that person´s employment, his or her employer, must, as soon as reasonably practicable after knowledge of the incident—

(a) take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;

(b) undertake cleanup procedures;

(c) remedy the effects of the incident;

(d) assess the immediate and longterm effects of the incident on the environment and public health.

(5) The responsible person or, where the incident occurred in the course of that person´s employment, his or her employer, must, within 14 days of the incident, report to the DirectorGeneral, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including—

(a) the nature of the incident;

(b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;

(c) initial measures taken to minimise impacts;

(d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and

(e) measures taken and to be taken to avoid a recurrence of such incident.

(6) A relevant authority may direct the responsible person to undertake specific measures within a specific time to fulfil his or her obligations under subsections (4) and (5): Provided that the relevant authority must, when considering any such measure or time period, have regard to the following:

(a) the principles set out in section 2;

(b) the severity of any impact on the environment as a result of the incident and the costs of the measures being considered;

(c) any measures already taken or proposed by the person on whom measures are to be imposed, if applicable;

(d) the desirability of the State fulfilling its role as custodian holding the environment in public trust for the people;

(e) any other relevant factors.

(7) A verbal directive must be confirmed in writing at the earliest opportunity, which must be within seven days.

(8) Should—

(a) the responsible person fail to comply, or inadequately comply with a directive under subsection (6);

(b) there be uncertainty as to who the responsible person is; or

(c) there be an immediate risk of serious danger to the public or potentially serious detriment to the environment, a relevant authority may take the measures it considers necessary to—

(i) contain and minimise the effects of the incident;

(ii) undertake cleanup procedures; and

(iii) remedy the effects of the incident.

As taken from the National Water Act section 20 "Control of emergency incidents"

(2) In this section, ``responsible person'' includes any person who -

(a) is responsible for the incident;

(b) owns the substance involved in the incident; or

(c) was in control of the substance involved in the incident at the time of the incident.

(3) The responsible person, any other person involved in the incident or any other person with knowledge of the incident must, as soon as reasonably practicable after obtaining knowledge of the incident, report to -

(a) the Department;

(b) the South African Police Service or the relevant fire department; or

(c) the relevant catchment management agency.

(4) A responsible person must -

(a) take all reasonable measures to contain and minimise the effects of the incident;

(b) undertake clean-up procedures;

(c) remedy the effects of the incident; and

(d) take such measures as the catchment management agency may either verbally or in writing direct within the time

specified by such institution.

The following emergency procedures are guidelines only and should be used in conjunction with the emergency response plan provide by the contractor.

4. ON SITE EMERGENCY PROCEDURES

4.1 SPILL RESPONSE

4.1.1 RESPONSIBLE PERSON/S

- The spill is reported to the Foreman who must report to his superior who must report to the ECO.
- All employees should be made aware of the procedure in case of a spill.
- The ECO must report to relevant authorities if contamination occurs and if spill falls within the definition of a spill

4.1.2 PROCEDURE

- Identify nature and size of spill e.g. oil 20L. Consult MSDS for safety precautions
- Protect exposed stormwater drains, prevent entry of substance to stormwater drains and drainage line.
- For a small spill (less than a litre, locate spill kit, contain spill according to the training from the spill kit suppliers
- For large spill (unable to deal with on site), contact external spill control contractors
- Determine appropriate method for disposal of material based on information provided in MSDS
- Determine if any contamination has occurred i.e. entry to stormwater, soil contamination
- If contamination has occurred, consult with authorities on need for on-going monitoring and or rehabilitation requirements. Determine medium and long term effects. Stormwater incidents should be reported to Waste water
- If no contamination has occurred, determine if spill falls under definition of an "incident" and if so, report to relevant authorities.
- Record in Incidents register
    - Nature of incident
    - Cause of incident
    - Contamination if any
    - Measures taken to control spill and handle contamination
    - If spill falls under definition of an incident
    - Mitigation measures taken to prevent re-occurrence
- Record in non-compliance register and incident (if defined as incident)
- The ECO must review all spill reports
- Adjustments will be made, if necessary, to the operational and emergency procedures to prevent future occurrences

4.2 FIRE

4.2.1 RESPONSIBLE PERSON/S

- The spill is reported to the Foreman who must report to his superior who must report to the ECO.
- All employees should be made aware of the procedure in case of a spill.
- The ECO must report to relevant authorities if contamination occurs and if spill falls within the definition of a spill

4.2.2 PROCEDURE

- Identify source and nature of fire
- In case of small fire extinguish with material appropriate to the nature of the fire. Consult MSDS.
- Immediately contact the ECO. In case of a large fire contact Fire Department
- Seal off exposed stormwater drains to ensure spill does not cause any external contamination
- Determine whether any contamination has occurred

- If contamination has occurred, consult with authorities to determine appropriate rehabilitation and monitoring
- Record in incident register:
    - Nature of incident
    - Cause of incident
    - Clean up measures
    - Mitigation measures taken
- Record in non-compliance register and record as incident if applicable.
- The ECO must review all fire reports
- Adjustments will be made, if necessary, to the operational and emergency procedures.

APPENDIX 5: INCIDENT RECORD

This is record of incidents as defined in NEMA and the NWA. Incidents should be recorded and reported to the applicable authorities.

Date of incident	Details of incident	Party / ies responsible	Corrective action taken	Date action completed

APPENDIX 6: EXAMPLE OF AN EMERGENCY INCIDENT REPORT FORM (SOURCE: DEA WEBSITE)

environmental affairs Department: Environmental Affairs REPUBLIC OF SOUTH AFRICA	**Document Type:**	Emergency Incident Report	
	Title for the Incident:		
	Date of the incident:		
Reference:	[A reference that may be used in future correspondence]	**Initial Submission Date:**	[Date of initial submission of the report to the Department: Environmental Affair, Tourism]
Revision No.:	example	**Compiled by:**	[Full name and contact details of the person submitting the report]

This form provides a template for the emergency incident report required in terms of section 30(5) of the National Environmental Management Act (Act No. 107 of 1998) (hereinafter "NEMA") in which the responsible person or, where the incident occurred in the course of that person´s employment, his or her employer, must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including: (a) the nature of the incident; (b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects; (c) initial measures taken to minimise impacts; (d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and (e) measures taken and to be taken to avoid a recurrence of such incident.
In terms of section 30(1)(a) of NEMA, an "incident" means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.
In line with section 24 of the Constitution of the Republic of South Africa (Act No. 108 of 1996), "serious" is taken to be a measure of the impact of an incident where such an incident has had, could have had, is having, or will have a negative impact on human health or well-being.

1. RESPONSIBLE PERSON			
In terms of section 30(1)(b) of NEMA, the "responsible person" includes any person who: (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control of any hazardous substance involved in the incident at the time of the incident			
Name:	[Full name of person, company, etc.]	**Designation:**	[designation of responsible person (n/a for companies, etc.)]
Postal Address:	[Full postal address including postal code]	**Physical Address:**	[Full physical address]
Telephone (B/H)	[Business hours contact telephone number and area code]	**Telephone (A/H)**	[After hours contact telephone number and area code]
Fax:		**Email:**	
Nature of Business:	[Brief summary of the nature of the business]		

2. Emergency Incident Summary Information							
Mark the appropriate boxes							
2.1 Fire:		**2.2 Spill:**		**2.3 Explosion:**		**2.4 Gaseous Emission:**	

2. Emergency Incident Summary Information							
Mark the appropriate boxes							
2.5 Injuries		**2.6 Reportable injuries:**		**2.7 Hospitalisation:**		**2.8 Fatalities:**	
2.9 Open water impacts:		**2.10 Ground water impacts:**		**2.11 Atmospheric impacts:**		**2.12 Soil impacts:**	
2.13 Own emergency response involved		**2.14 Fire prevention services involved**		**2.15 Government hazardous materials emergency response involved**		**2.16 More than 1 governmental emergency response service involved**	
2.17 Emission of non-toxic substances at low concentrations		**2.18 Emission of non-toxic substances at high concentrations**		**2.19 Emission of toxic substances at low concentrations**		**2.20 Emission of toxic substances at high concentrations**	
2.21 No evacuation required		**2.22 Immediate area evacuated**		**2.23 Immediate surrounds evacuated**		**2.24 Evacuation of the general public**	
2.25 Others							

3. Initial Emergency Incident Report				
In terms of section 30(3) of NEMA, the responsible person or, where the incident occurred in the course of that person´s employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available: (a) the nature of the incident; (b) any risks posed by the incident to public health, safety and property; (c) the toxicity of substances or byproducts released by the incident; and (d) any steps that must be taken in order to avoid or minimise the effects of the incident on public health and the environment to: (i) the Director General; (ii) the South African Police Services and the relevant fire prevention service; (iii) the relevant provincial head of department or municipality; and (iv) all persons whose health may be affected by the incident.				
Description	**Date:**	**Time:**	**Medium:**	**Contact Details:**
Relevant fire prevention services: (in case of fire)	[submission date]	[submission time]	[Fax, phone, SMS, letter, etc.)	[who was the report made to?]
Local:				
Provincial: (Those deal with Environmental issues)				
Director General: (DEA)				
Any other Director General of National Department eg DWA				

4. Incident Details			
In terms of NEMA section 30(5)(a) and (d), the responsible person must report on the nature of the incident as well as the causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure			
4.1 Location of the incident	[Provide physical address of the location where the incident happened including the GPS co-ordinates]		
Incident start date and time:	[The exact time that the unexpected event started]	**Incident duration:**	[the duration of the unexpected event]
Duration of exposure:	[The duration of conditions that had a direct impact anyone's health or well-being]		
Incident description			

Background of the incident:

Operation:

Incident type:

Root Cause of the incident:

Contributing factors to the incident:

Conclusion:

Wind speed and direction	[The wind speed and direction at the point of the incident at the time of the incident]	**Ambient air temperature**	[ambient air temperature at the time of the incident]
Weather conditions	[Sunny, light rain, mist, heavy rain, etc.]	**Other relevant meteorological conditions**	[Temperature inversion, floods, etc]

5. POLLUTANTS RELEASED DURING INCIDENT

In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity.

List all the pollutants directly released during the incident (i.e. exclude those pollutants that resulted from mitigation measures, e.g. flaring, treatment, dilution etc.)

5.1 Substance or mixture of substances	**5.2 Reference Number**	**5.3 Phase**	**5.4 Total Quantity emitted**	**5.5 Unit**	**5.6 Nature of emission**
[The name recognised by any national or internationally recognised chemical referencing system]	[Reference to any national or internationally recognised chemical referencing system]	[solid, semi-solid, liquid or gas]	[the total measured or estimated quantity released into the environment]	[the unit of measure in respect to the quantity]	[emitted from truck, underground pipe, stack, etc.]

6. SECONDARY POLLUTANTS RESULTING FROM INCIDENT

In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity released.

List all the pollutants that resulted from mitigation measures, e.g. flaring, treatment, dilution etc.

6.1 Substance or mixture of substances	**6.2 Reference Number**	**5.3 Phase**	**5.4 Total Quantity emitted**	**5.5 Unit**	**5.6 Nature of emission**
[The name recognised by any national or internationally recognised chemical referencing system]	[Reference to any national or internationally recognised chemical referencing system]	[solid, semi-solid, liquid or gas]	[the total measured or estimated quantity released into the environment]	[the unit of measure in respect to the quantity]	[emitted from truck, underground pipe, stack, etc.]

7. POLLUTANT CONCENTRATIONS					
In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity released.					
List all the pollutants detailed above.					
7.1. Substance or mixture of substances	**7.2. Reference Number**	**7.3. Estimated pollutant concentration**			
		7.3.1. 10m	**7.3.2. 100m**	**7.3.3. 500m**	**7.3.4. >2000m**
[The name recognised by any national or internationally recognised chemical referencing system]	[Reference to any national or internationally recognised chemical referencing system]	[estimate the concentration of the pollutant in water, soil and/or air within a 10m radius of the epicentre of the incident] [provide the units used in a case of estimating concentrations eg ppm]	[estimate the concentration of the pollutant in water, soil and/or air within a 100m radius of the epicentre of the incident] [provide the units used in a case of estimating concentrations eg ppm]	[estimate the concentration of the pollutant in water, soil and/or air within a 500m radius of the epicentre of the incident] [provide the units used in a case of estimating concentrations eg ppm]	[estimate the concentration of the pollutant in water, soil and/or air within a >2000m radius of the epicentre of the incident][provide the units used in a case of estimating concentrations eg ppm]

8. INCIDENT IMPACT	
In terms of NEMA section 30(5)(b), the responsible person must report on possible acute effect on persons and the environment and data needed to assess these effects;	
8.1 Minor injuries	[Describe the number and types of any minor injuries that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.2 Reportable injuries	[Describe the number and types of any injuries requiring statutory reporting that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.3 Hospitalisation	[Describe the number and types of any injuries that required professional medical care that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.4 Fatalities	[Describe the number and cause of any fatalities that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.5 Biological impacts	[Describe any impacts on biological life, other than human life, e.g. fish kills, plant mortality, etc.]
8.6 Impact area	[Describe the area possibly affected by the incident or the impacts thereof including: (i) size of the area; (ii) socio-economic context; (iii) population density; (iv) sensitive environments (if any), etc.]
8.7 Data	Attach relevant impact reports, medical reports, death certificates, post mortem reports, environmental monitoring data, etc. as Annexes C1, C2,… to this report

9. EXISTING PREVENTION PROCEDURES AND/OR SYSTEMS	
9.1 Foresight	[Briefly describe whether the incident could have, or had, been foreseen, e.g. was it included in any environmental impact assessment, risk assessment, health and safety plan, etc.]
9.2 Procedures and/or systems	Attach any relevant safety, health and environmental plans (including any statutory planning requirements) that detail what actions must be taken in the event of the incident that is the subject of this report
9.3 Procedure and/or systems failures	[Describe any failures or shortfalls in procedures and/or systems that may have contributed to the incident]
9.4 Technical measures	[Describe any technical measures, equipment, 'fail-safe' devices, etc. that are in place to prevent the occurance of the incident]

9. EXISTING PREVENTION PROCEDURES AND/OR SYSTEMS	
9.5 Technical failure	[Describe any failures of technical measures, equipment, 'fail-safe' devices, etc. that are in place to prevent the occurance of the incident]

10. INITIAL INCIDENT MANAGEMENT	
In terms of NEMA section 30(5)(c), the responsible person must report on initial measures taken to minimise impacts.	
10.1 Evacuation	[Describe any evacuation activities including information on the number of people evacuated and whether these people were staff or otherwise]
10.2 Technical measures	[Describe all technical measures taken to address the incident]
10.3 Mitigation measures	[Describe all measures taken to minimise the impact]
10.4 Emergency Services	[Describe any governmental emergency services involvement]

11. CLEANUP AND/OR DECONTAMINATION			
In terms of NEMA section 30(5)(c), the responsible person must report on initial measures taken to minimise impacts.			
11.1 Cleanup and/or decontamination	[Provide a detailed description of all cleanup and/or decontamination activities and the environmental quality and impacts resulting from these activities as well as contact details for any contracted service providers in an annex.]		
11.2 Permissions and Instructions			
Provide details of any permissions and/or instructions received from any organ of state during initial incident management, cleanup and/or decontamination			
11.3 Type	**11.4 Statute**	**11.5 Issued By**	**11.6 Name and contact details**
[Describe the nature or type of permission or instruction]	[Provide a reference to the legal mandate for the permission or instruction]	[Provide contact details for the permitting or instructing authority]	[provide a summary of the activities carried out in terms of the permission or instruction]

12. MITIGATION MEASURES			
In terms of NEMA section 30(5)(e), the responsible person must report on measures taken and to be taken to avoid a recurrence of such incident.			
12.1 Measure	**12.2 Objective**	**12.3 Cost**	**12.4 Timing**
[Briefly describe each of the measures taken, and to be taken, to avoid a recurrence of such incident]	[Briefly describe the objective of the measure, i.e. the desired outcome of the measure]	[Estimate the cost of the measure in terms of capital costs and/or recurrent costs]	[Provide information on the timing for the full implementation of the measure]

13. AUTHORISATIONS			
Provide detail on all authorisations (including permits, licenses, certificates, etc.) in respect of the activity to which the incident relates.			
13.1 Type	**13.2 Statute**	**13.3 Issued By**	**13.4 Issue & Expiry Date**
[Describe the nature or type of authorisation, e.g. Registration Certificate]	[Provide the reference for the authorisation, e.g. section X of the National Environmental Management Act (Act No. 107 of 1989)]	[Provide contact details for the issuing authority]	[provide the date of issue and expiry]

14. History			
Provide details on any and every similar incident involving the responsible person in the last 24 months. Similar incidents include those that: (i) involved similar circumstances; (ii) involved similar emissions; (iii) involved similar personal; and/or (iv) involved similar impacts.			
14.1 Incident title	**14.2 Report reference**	**14.3 Date of incident**	**14.4 Summary of event**
[Provide the title used in the relevant emergency incident report]	[Provide the reference in respect of the relevant emergency incident report]	[Date of incident]	[Provide a summary of the event]

Signed by, or as a mandated signatory for, the responsible person:		Date:	

APPENDIX 1
List of affected people as results of the incident

NAME	ADDRESS	PHONE	FAULT	REMARKS

APPENDIX 2
Layout map of the area likely to be affected or affected as a result of the incident

Disclaimer: Any other information not covered in the reporting template must be included.

CAUTION: In terms of section 30 (11) of NEMA as amended, it is an offence not to report an incident and liable on conviction to a fine not exceeding R 1 million or imprisonment for a period not exceeding 1 year, or to both such a fine and such imprisonment.

SITE ENVIRONMENTAL RULES

TOOLBOX TALK 1:	Definitions, EMPr, and Site Environmental Rules.
ISSUE:	Do's and Don'ts of the Construction Site.
PRESENTER:	

What is the Environment?

Environment (NEMA, 1998) - means the surroundings within which humans exist and that are made up of:

- the land, water and atmosphere of the earth;
- microorganisms, plant and animal life;
- any part or combination of (i) and (ii) and the interrelationships among and between them; and
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing;

What is the Pollution?

Pollution (NEMA, 1998) - means any change in the environment caused by -

- substances;
- radioactive or other waves; or
- noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or wellbeing or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future;

What is an EMPr?

Environmental Management Programme – refers to a document that is used to investigate, assess and evaluate the impacts that a development is likely to have on the environment during the construction, operation and decommission phases.

Why should we protect the Environment?

- It is our right to live in a clean and healthy environment.
- To ensure that future generations live in a clean environment.
- To prevent the loss of species diversity.
- To prevent loss of ecological goods and services

Environmental Site Rules:

- *No urinating or defecating on site. Toilet facilities provided at the construction site must be used at all times*
- *Do not waste water*
- *No littering*
- *No washing of cars or other vehicles on site*
- *Do not use spill kits for disposal of waste*
- *Do not dispose of any waste / waste water in watercourses or D'MOSS areas.*

DISPENSING, STORAGE AND DISPOSAL OF HYDROCARBONS/MINERAL OILS

DISCUSSION:

What is a Hydrocarbon (mineral oil)?

Diesel/hydraulic oil etc. are hydrocarbons and therefore classified as hazardous substances. A hazardous substance is any material that poses an unreasonable risk to people, property and the environment. The environment is our surroundings, soil, air and water.

What is the risk?

- Regular dispensing and offloading of diesel increases the risk of a spillage occurring.
- Changing hydraulic lines/ greasing parts / basic maintenance of vehicles
- Leaks from vehicles and equipment

Hydrocarbons are toxic if swallowed by humans or animals. The presence of hydrocarbons in water can also prevent aquatic organisms from breathing and may result in aquatic kills depending on the extent of the spill. Hydrocarbons should therefore be prevented from contaminating ground or surface water.

Note:
Only 1 litre of oil can contaminate a soccer field size of water. It is therefore essential to prevent spillages as far as possible and to ensure that if they do occur that they are properly cleaned up and that the resulting material is disposed of correctly.

What is a spillage?

All situations involving the spilling of a hydrocarbon on to the floor or ground or water.

How do we manage this?

1 **Correct Storage:**
   a. Refer to issues around the bunded area.
   b. Should be contained in waterproof and leak proof containers. Any containers or points that are leaking to be addressed immediately.
   c. Should be stored in a dedicated area on site.

2 **Correct Dispensing:**
   a. Should check lines for leaks before starting with dispensing.
   b. Place drip tray so as to catch any drips. How would you and into what would you empty the drip tray?
   c. Ensure all residual diesel/oil is drained from pipe before disconnecting.

3 Maintenance of vehicles and equipment
   a. Check equipment and vehicles for leaks daily. Report leaks to supervisor immediately. Contain slow drips using a drip tray.
   b. Do not use excessive grease when greasing vehicle or equipment parts.

4 **Correct Spillage Handling and Disposal:**
   a. Clean all spillages immediately. This means treat and remove spillage.
   b. Dispose in hazardous waste drum or skip.
   c. Report spillage to supervisor.

DATE:	**TIME:**	**LOCATION:**
TOPIC:	Dispensing, storage and disposal of hydrocarbons/ mineral oils	
ISSUE:	Spillage	

USE AND MAINTENANCE OF DRIP TRAYS

What is a Drip Tray?

A drip tray is a plastic or metal container that can be used to contain a liquid. A container is suitable to be used as a drip tray, if

- It is heavy enough not to be blown away;
- Has no holes in the base or side from which a liquid could leak; and
- The sides are high enough that the liquid will not overflow.

The drip tray must be sized according to the amount of liquid that needs to be captured and contained.

What is the risk?

There is a risk of spillage of hydrocarbons or other chemicals under the following circumstance:

- Various equipment and vehicles may develop slow hydrocarbon leaks (oils);
- During maintenance of vehicles and equipment, there is a risk that hydrocarbons, grease, diesel/petrol may be spilt;
- Refueling of equipment and vehicles;
- During decanting of chemicals such as paint and curing compound etc, some of the chemicals may be spilt on the ground; and/or
- While applying paint or grease you need something to put the tin, paint brush or roller into.
- Temporary storage of chemicals at point of use

Under all these circumstances the correct use of a drip tray could prevent a spillage on to the ground or into water.

What is correct use of a drip tray?

Note that the use of a drip tray should be an additional precaution to other controls. For example:

- Decanting of chemicals should be done within a bunded area as far as possible. A funnel should be used when discharging liquids into a container with a small opening. Spillage of chemicals should always be avoided. A drip tray should be used only as a precaution in case there is a spill.
- Vehicles and equipment should be checked daily and maintained correctly to prevent leaks. Drip trays should be placed underneath equipment and vehicles when stationary as a precaution in case there is a leak.
- Temporary storage of chemicals at point of use. Chemicals should always be returned to chemical store at the end of the shift.
- When refueling vehicles or equipment a drip tray should be used to capture any excess or spillages from the nozzle of the hose. There should be no overfilling of vehicles and equipment.
- Drip trays may be used for the placing of paint brushes and rollers while applying curing compound.

Correct maintenance?

Drip trays should be maintained empty. Drip trays are to be checked daily, cleaned and emptied into the hazardous waste skip. Drip trays that are not being used should be stored under cover to prevent them filling with rain water.

TOPIC:	Use and maintenance of Drip trays
ISSUE:	Drips trays not being used when they should be
	Incorrect maintenance of drip trays resulting in spillages

What is a Hazardous Chemical?

These are substances that may be dangerous to humans and or the environment if not handled, stored and disposed of correctly. The definition of a hazardous chemical is based on the amount, concentration or inherent properties of the waste.

e.g. Consumption of Alcohol,

Amount – the effect of 1 glass versus 5 litres. It is the same with a chemical. One drop may not be harmful but continuous dripping over a period of a week could be very harmful

Concentration – Beer as opposed to wine, there is alcohol in both but there is more alcohol in the wine than in the beer. It is the same with some chemicals

Inherent properties – Methylated spirits versus Beer, one bottle of methylated spirits could kill you but one beer won't because of the type of alcohol in the beer versus that in methylated spirits. It is the same with some chemicals

What is the risk?

There is a risk of spillage of chemicals under the following circumstance:

- During decanting of chemicals such as paint and curing compound etc, some of the chemicals may be spilt on the ground; and/or
- While applying paint or grease you need something to put the tin, paint brush or roller into.
- Temporary storage of chemicals at point of use

What are the correct use, handling and storage of hazardous chemicals?

- Hazardous chemicals should be stored in a roofed, bunded area that is kept locked. Entry of rain water into the bunded area must be prevented.
- All chemicals or chemical contaminated items should be stored within the bunded area. NOT on the wall of the bunded area or outside the bunded area on a concrete slab.
- Empty chemical containers and drums should be stored in the bunded area until removed or smaller containers thrown in the hazardous waste skip e.g. paint tins, paint brushes or rollers.
- Decanting of chemicals should be done within a bunded area as far as possible. A funnel should be used when discharging liquids into a container with a small opening. Spillage of chemicals should always be avoided.
- All chemical containers should be labelled. No food related containers are to be used for the storage of chemicals e.g. cool drink bottles.
- Temporary storage of chemicals at point of use. Chemicals should always be returned to chemical store at the end of the shift.
- Drip trays may be used for the placing of paint brushes and rollers while applying curing compound or shutter oil.
- All these chemicals must have an MSDS (material safety data sheet). This information is required to ensure that all chemicals are stored, handled and disposed of in the best possible way to ensure the safety of staff and the environment.

Correct maintenance of bunded area

Any cracks in the walls or floors and holes in the roof are to be repaired as soon as possible. Bunded area is to be kept free of spillages. Any spillages are to be cleaned up and disposed of as hazardous waste.

TOPIC:	Use, handling and storage of hazardous chemicals
ISSUE:	Incorrect storage of chemicals
	Spillage of chemicals

WASTE SEGREGATION AND SEPARATION

What is waste separation?
This is the separation of hazardous and general waste

Some examples of hazardous wastes generated on site:
Used oils (hydrocarbons), contaminated spill absorbent or sand, paints, batteries (acid), and fluorescent tubes (mercury), concrete.

Some examples of general waste generated on site:
Cool drink bottles, chip packets, plastic, leftover food, paper etc.

Correct handling, storage and disposal

- General waste must be disposed of in the green wheelie bins or marked skips provided
- Hazardous waste to be thrown in marked skips provided or 210L marked drums provided in certain areas
- The two must not be mixed!
- If hazardous waste is found in general waste, all must be disposed of as hazardous waste.

Why?

- The two waste types are disposed of at different waste dumps. The general waste dump is built only to deal with general waste. Hazardous waste accidentally disposed of here, could pollute the water and harm the people in the area.
- Disposal of general waste at a hazardous waste site results in an unnecessary cost to the company, as it is a lot more expensive to dispose of hazardous waste than general waste.

What is an incident?

- Mixed waste in any of the skips or bins.

TOPIC:	Waste segregation
ISSUE:	Mixing of wastes
	Incorrect disposal of mixed wastes

WASTING DRINKING WATER

What are examples of wasting of drinking water?

- Not turning a tap off properly after use.
- Poor maintenance of water fittings resulting in continuous leaking or dripping.
- Overfilling and / or overflowing of water containers.

Why should we not waste drinking water?

- Good, clean water is scarce in South Africa and expensive to produce and must therefore be used sparingly. Remember anything we put into the water (river, lake or dam) has to be removed before we can drink the water. The more we pollute the water the more expensive it becomes to clean it.

Ways to save water:

- Don't drink directly from the tape, rather fill a glass with water, switch the tape off and drink from the glass.
- Report any maintenance issues with water fittings or lines, as soon as possible.

What is an incident?

- Dripping or leaking tapes or water connections.
- Overflowing of containers that contain water.

TOPIC:	Wasting drinking water
ISSUE:	Scarcity of drinking water
	Expense to produce drinking water

APPENDIX 8: TRAINING RECORD

This is record of training carried out on site.

Training Topic:_____ **Date:**_____

Training Topic Details

Training Attendance	
Name	**Signature**

Training Provider: _____

APPENDIX 9: ENVIRONMENTAL AUDIT REPORT