

ENVIRONMENTAL MANAGEMENT PROGRAMME

**UPGRADING OF THE SANDILE WATER TREATMENT WORKS:
CIVIL CONTRACT 1**

Prepared for:

aurecon

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June 2014

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1 DETAILS OF THE ENVIRONMENTAL ASSESSMENT TEAM

According to regulation 33 of GN R 543, an environmental management programme must include:

- (a) details of –
 - (i) the person who prepared the environmental management programme; and
 - (ii) the expertise of that person to prepare an environmental management

Environmental Consulting Company:

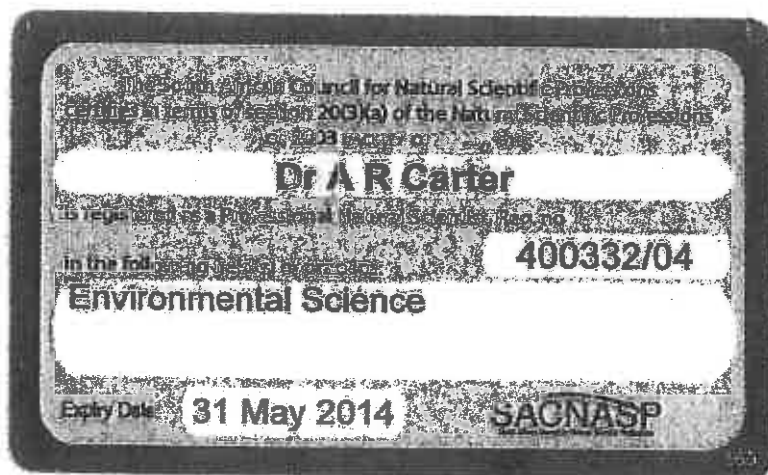
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Project Team:

- Dr Alan Carter
- Dr Cherie-Lynn Mack

Coastal & Environmental Services (CES) was established in 1990, and is a specialist environmental consulting company.

Dr Alan Carter, Director of the East London office, has extensive training and experience in both financial accounting and environmental science disciplines with international accounting firms in South Africa and the USA. He is a member of the American Institute of Certified Public Accountants and holds a PhD in Plant Sciences, focusing on marine algae. He is also a certified ISO14001 EMS auditor with the American National Standards Institute and the British Standards Institute. Alan is registered with SACNASP as a Professional Natural Scientist and with Environmental Assessment Practitioners of South Africa (EAPSA) as an environmental practitioner. Alan has participated in the development of the Coastal Management Act and has extensive knowledge and experience with projects on the Wild Coast. Alan will be responsible for the review of all report writing.



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The Interim Certification Board
for
Environmental Assessment Practitioners
of
South Africa

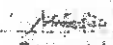
Alan Robert Carter

was certified as an

**ENVIRONMENTAL ASSESSMENT
PRACTITIONER**

on this 1st day of March 2012


Chairperson


Secretary

Dr Cherie-Lynn Mack, Principal Environmental Consultant, holds a PhD and MSc (with distinction) degrees in Environmental Biotechnology, with a BSc degree in Microbiology and Biochemistry. She has postgraduate research experience in industrial and domestic wastewater treatment technologies, with particular emphasis on the coal and platinum mining industries. Her interests lie in the water sector, with experience in ecological reserve determination and water quality monitoring and analysis. She has experience in water quality analysis and industrial wastewater treatment research.

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2 INTRODUCTION

2.1 Objectives of an EMPr

The EMPr has been compiled to provide recommendations and guidelines according to which compliance monitoring can be done during the construction of the water treatment works (WTW) and associated infrastructure, as well as to ensure that all relevant factors are considered to ensure for environmentally responsible development. The purpose of the EMPr is to provide specifications for "good environmental practice" for application during construction.

This EMPr informs all relevant parties, which are in this case, the Project Coordinator, the Contractor, the Environmental Control Officer (ECO) and all other staff employed by Contractor at the site as to their duties in the fulfilment of the legal requirements for the construction and operation of the water supply scheme with particular reference to the prevention and mitigation of anticipated potential environmental impacts.

All parties should note that obligations imposed by the EMPr are legally binding in terms of the environmental authorisation granted by the relevant environmental permitting authority.

The objectives of an EMPr are to:

- Ensure compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international;
- Ensure that there is sufficient allocation of resources on the project budget so that the scale of EMPr-related activities is consistent with the significance of project impacts;
- Verify environmental performance through information on impacts as they occur;
- Respond to unforeseen events;
- Provide feedback for continual improvement in environmental performance;
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Identify measures that could optimize beneficial impacts;
- Create management structures that addresses the concerns and complaints of I&APs with regards to the development;
- Establish a method of monitoring and auditing environmental management practices during all phases of the activity;
- Ensure that safety recommendations are complied with;
- Specify time periods within which the measures contemplated in the final environmental management programme must be implemented, where appropriate;

2.2 Structure and Function of an EMPr

An EMPr is focused on sound environmental management practices, which will be undertaken to minimise adverse impacts on the environment through the lifetime of a development. In addition, an EMPr identifies what measures will be in place or will be actioned to manage any incidents and emergencies that may occur during operation of the facility.

As such the EMPr provides specifications that must be adhered to, in order to minimise adverse environmental impacts associated with the operations of the WTW and associated reticulation. The content of the EMPr is consistent with the requirements as set out in Regulation 33 of the EIA regulations stated below, for the construction and operation phases.

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According to regulation 33 of GN R 543, an environmental management programme must include:

- (a) details of –
 - (i) the person who prepared the environmental management programme, and
 - (ii) the expertise of that person to prepare an environmental management programme;
- (b) information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of –
 - (i) planning and design;
 - (ii) pre-construction and construction activities;
 - (iii) operation or undertaking of the activity;
 - (iv) rehabilitation of the environment; and
 - (v) closure, where relevant;
- (c) A detailed description of the aspects of the activity that are covered by the draft environmental management programme;
- (d) An identification of the persons who will be responsible for the implementation of the measures contemplated in paragraph (b);
- (e) Proposed mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon;
- (f) As far as reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally acceptable principle of sustainable development, including, where appropriate, concurrent or progressive or progressive rehabilitation measures;
- (g) A description of the manner in which it intends to –
 - (i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
 - (ii) remedy the cause of pollution or degradation and migration of pollutants;
 - (iii) comply with any prescribed environmental management standards or practices;
 - (iv) comply with any applicable provisions of the Act regarding closure where applicable;
 - (v) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;
- (h) Time periods within which the measures contemplated in the draft environmental management programme must be implemented;
- (i) The process for managing any environmental damage, pollution and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity;
- (j) An environmental awareness plan describing the manner in which –
 - (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and
 - (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment;

(k) Where appropriate, closure plans, including closure objectives

2.3 Legal requirements

Construction must be according to the best industry practices, as identified in the project documents. This EMPr, which forms an integral part of the contract documents, informs the Contractor as to his/her 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 approved EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

The Contractor shall identify and comply with all South African national and provincial environmental legislation, including associated regulations and all local by-laws relevant to the project. Key legislation currently applicable to the construction and implementation phases of the project must be complied with. The list of applicable legislation provided below is intended to serve as a guideline only and is not exhaustive:-

- Constitution Act (No. 108 of 1996)
- Environmental Conservation Act (No. 73 of 1989)
- EIA Regulations (2010)
- National Environment Management Act (No. 107 of 1998)
- National Environmental Management: Biodiversity Act (No. 10 of 2004)
- National Water Act (No. 36 of 1998)
- National Environmental Management: Waste Management Act (No. 59 of 2008)
- National Heritage Resource Act (No. 25 of 1999)
- Informal Land Rights Act (No. 109 of 1996)

2.4 Environmental Authorisation

The activities proposed in the current contract, Civil Contract 1, do not require authorisation from any branch of the Department of Environmental Affairs.

3 PROPOSED ACTIVITY

According to regulation 33 of GN R 543, an environmental management programme must include:

(c) A detailed description of the aspects of the activity that are covered by the draft environmental management programme.

3.1 Description of proposed activity

The contract will involve the following main components:

On-site activities (Appendix 1, Figure 1):

1. Construction of new filters
2. Refurbishment of old filter
3. Maintenance activities within the sludge lagoons, i.e. dredging and disposal of sludge.

Off-site activities (Appendix 1, Figure 2 and 3):

4. Construction of two 16Ml reservoirs; one at Burnshill and one at British Ridge (as indicated in Figure 2 and 3).

Burnshill Reservoir

The site for the new Burnshill reservoir is approximately 400m upslope of a watercourse. Care must be taken to ensure that building rubble, including spoil from cutting activities (if required) does not impact the on the watercourse. This should be achieved by maintaining a buffer of a minimum of 100m between any construction activities and the riparian edge of the watercourse (Figure 1, proposed buffer area in red).

British Ridge Reservoir

Similar to the Burnshill site, the British Ridge site is upslope from a drainage line. As discussed in the section above relating to the Burnshill site, a buffer of a minimum size of 100 m must be maintained for all construction activities, including temporary storage of spoil, etc.

At both sites, care must be taken to minimize the loss of soil (topsoil and subsoil) into the drainage lines as a result of surface water runoff.

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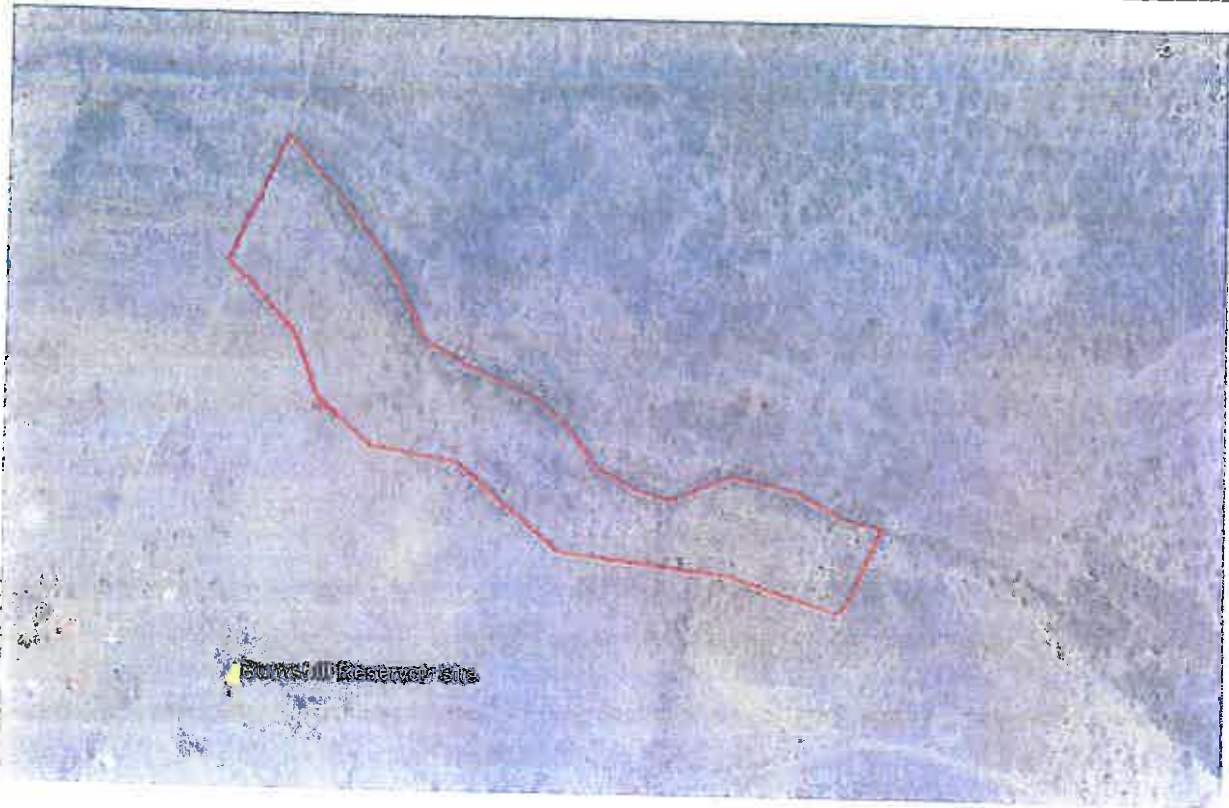


Figure 1. Burnshill reservoir site in relation to a downstream watercourse. Buffer (100 m) indicated in red.

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4 SCOPE OF THE EMPR

In order to ensure a holistic approach to the management of environmental impacts during the construction and operation of the proposed WTW, this EMPr sets out the methods by which proper environmental controls are to be implemented by the Contractor and all other parties involved.

The EMPr is a dynamic document subject to influences and changes as are wrought by variations to the provisions of the project specification.

4.1 Layout of the EMPr

The EMPr is divided into three phases of development. Each phase has specific issues unique to that period of the construction and operation of the WTW and associated infrastructure. The impacts are identified and given a brief description. The three phases of the development are then identified as below:

4.1.1 Planning and Design Phase

This section of the EMPr provides management principles for the planning and design phase of the project. Environmental actions, procedures and responsibilities as required from Contractor during the planning and design phase are specified. These specifications will form part of the contract documentation and therefore the Contractor will be required to comply with these specifications to the satisfactory of the Project Coordinator and ECO.

4.1.2 Construction Phase

This section of the EMPr provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required during the construction phase are specified. These specifications will form part of the contract documentation and therefore the Contractor will be required to comply with these specifications to the satisfactory of the Project Coordinator and ECO.

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		H&I	Upgrading of Main Road 542 as well as the regravelling of Divisional Roads 2183 & 2189	Contracts Manager	Upgrading 25km of existing gravel road to surfaced standard as well as regravelling 16km of existing gravel roads. Drilling and blasting for earthworks, layerworks formation, drill, blast and crushing of materials, surfacing consisting of a 13.2/6.7mm double seal, stone pitched side drains, trimming and final rehabilitation of road reserve and quarry areas. Value R68,000,000.04Million
8/2006	1/2008	H&I	Periodic maintenance (overlay and reseal) of National Route N1 section 4 from Touwsriver to Laingsburg – Touwsriver Jointventure	Contracts Manager	Earthworks, Blasting, Crushing Layer work, Drainage, btumen Rubber Double Seal, Bitumen Rubber Asphalt Surfacing Overlay (BRASO), Traffic Accommodation, Fencing, Erosion protection, Concrete Drains and all road furniture. Value R98,549,364.31Million
1/2004	8/2006	H & I	Construction of Main Road 118 section 1 between Rosh Pinah and Grens – HIR Joint Venture	Site Agent	Earthworks, Blasting, Crushing, Layer work, Drainage, Surfacing, Traffic Accommodation, Fencing, Erosion protection, Concrete Drains and road furniture. Value R213,152,875.00Million
1/2002	12/2003	H & I	Upgrading of National Route 10 section 2 Jaskraal (KM3.0) to Great Fish River (KM24.1)	Site Agent	Earthworks, Blasting, Crushing, Layer work, Drainage, Surfacing, Traffic Accommodation, Fencing, Erosion protection, Concrete Drains and road furniture. Value R98Million
4/2001	1/2002	H & I	Repair and reseal of N6 section 4 – Bailey to Jamestown	Site Agent	Earthworks, Blasting, Crushing, Layer work, Drainage, Surfacing, Traffic Accommodation, Fencing, Erosion protection, Concrete Drains and road furniture. Value R35Million
1999	2001	H & I	Rehabilitation of National Route 1 Morgenwaght to Colesberg	Site Agent	Earthworks, Blasting, Crushing, Layer work, Drainage, Surfacing, Traffic Accommodation, Fencing, Erosion protection, Concrete Drains and road furniture. Value R35Million
1998	1999	H & I	Rehabilitation of National Route 6 Section 1 Macleantown to Smiling Valley	Site Agent	Earthworks, Blasting, Crushing, Layer work, Drainage, Surfacing, Traffic Accommodation, Fencing, Erosion protection, Concrete Drains and road furniture.

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1997	1998	H & I	Resurfacing of N10 Olifantskop Pass to Middleton	Site Agent	Layer work, Drainage, Surfacing, Traffic Accommodation, Fencing, Erosion protection and all road furniture. Value R25Million
1995	1997	H & I	Rehabilitation of Roads – Qamata to Braamneck – Transkei	Site Agent	Earthworks, Layer work, Drainage, Surfacing, Traffic Accommodation, Fencing, Erosion Protection, Concrete Drains and all road furniture. Value R30Million
1994	1995	H & I	Construction of Shell Ultra City at Leeu-Gamka	Site Agent	Earthworks, Blasting, Layer work, Drainage, Surfacing, Traffic Accommodation, Fencing, Erosion protection, Concrete drains and all road furniture, Installation of fuel tanks and related activities. Value R5Million
1993	1994	H & I	Upgrading of National Route 1 Nelspoort to Three Sisters	Site Agent	Crushing, Layer work, Drainage, Surfacing, Traffic Accommodation, Fencing, Erosion protection, Concrete Drains and all road furniture. Value R30Million
1991	1993	H & I	Upgrading of road – Norekei Pan to Kalahari Gemsbok Park	Site Agent	Crushing, Layer work, Drainage, Surfacing, Traffic Accommodation, Fencing, Erosion protection, Concrete Drains and all road furniture. Value R28Million
1989	1991	H & I	Construction of special road from Port-Nolloth to Alexander Bay	G/F	Earthworks, Blasting, Layer work, Drainage, Surfacing, Traffic Accommodation, Fencing, Erosion protection, Concrete drains and all road furniture. Value R32Million

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5 ROLES AND RESPONSIBILITIES

5.1 PROJECT COORDINATOR

The Project Coordinator is responsible for overall management of project and EMPr implementation. The following tasks will fall within his / her responsibilities:

- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures.
- Monitor site activities on a daily basis for compliance.
- Conduct internal audits of the construction site against the EMPr.
- Confine the construction site to the demarcated area.
- Rectify transgressions through the implementation of corrective action.

5.2 Environmental Control Officer (ECO)

For the purposes of implementing the conditions contained herein, The Developer shall appoint an ECO for the contract. The ECO shall be the responsible person for ensuring that the provisions of the EMPr as well as the environmental authorisation are complied with during the construction period. The ECO's duties in this regard will include, inter alia, the following:

- Conduct three site visits to be able to report on and respond to any environmental issues;
- Report compliance and non-compliance issues to the municipal representative and authorities as applicable;
- Advise the Contractor on environmental issues within the defined work areas;
- Review access and incident records that may pertain to the environment and reconcile the entries with the observations made during site inspection, monitoring and auditing;
- Recommend corrective action when required for aspects of non-compliance with the EMPr;
- Take immediate action on site where clearly defined and agreed "no-go" areas are violated or in danger of being violated and to inform a representative of the Developer of the occurrence immediately and to take action;
- Be contactable by the public regarding matters of environmental concern as they relate to the operation of the works; and
- Take immediate action on site when prescriptive conditions are violated, or in danger of being violated and to inform the representative of the Developer of the occurrence and action taken.

5.3 Contractor

The contractor is responsible for the overall execution of the activities envisioned in the construction phase including the implementation and compliance with recommendations and conditions of the EMPr. The Contractor must therefore ensure compliance with the EMPr at all times during construction activities and maintain an environmental register which keeps a record of all environmental incidents which occur on the site during construction of the WTW and associated infrastructure. These incidents may include:

- Public involvement / complaints
- Health and safety incidents
- Incidents involving Hazardous materials stored on site
- Non compliance incidents

The Contractor is also responsible for the implementation of corrective actions issued by the ECO and Project Coordinator within a reasonable or agreed period of time.

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6 ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURES

According to regulation 33 of GN R 543, an environmental management programme must include:

- (b) Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of –
- (i) planning and design;
 - (ii) pre-operations and operations activities;
 - (iii) operation or undertaking of the activity;
 - (iv) rehabilitation of the environment; and
 - (v) closure, where relevant.
- (f) As far as reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally acceptable principle of sustainable development, including, where appropriate, concurrent or progressive or progressive rehabilitation measures.
- (g) A description of the manner in which it intends to –
- (i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
 - (ii) remedy the cause of pollution or degradation and migration of pollutants;
 - (iii) comply with any prescribed environmental management standards or practices;
 - (iv) comply with any applicable provisions of the Act regarding closure where applicable;
 - (v) comply with any provisions of the Act regarding financial provisions for rehabilitation where applicable.

6.1 Planning and Design Phase

6.1.1 Project Specific Management targets

RISK	MITIGATION MEASURE
Socio-Economic	<ul style="list-style-type: none"> If opportunities arise that could feasibly result in the creation of employment for the local communities, these should be implemented.
Geology	<ul style="list-style-type: none"> Ensure that as far as possible, the new reservoirs avoid areas of inappropriate geological or soil structure. The recommendations of the geotechnical specialist MUST be adhered to.
Consideration of Environmental Constraints	<ul style="list-style-type: none"> Appoint an independent Environmental Control Officer (ECO) for the duration of the construction to monitor construction activities. Micro-siting of the final reservoir positions must be approved by the ECO.
Risks associated with infrastructure	<ul style="list-style-type: none"> A planning and maintenance schedule should be drawn up right from the start for periodic inspections of the system (i.e. by who, how often etc.).

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6.2 Construction Phase

6.2.1 General Management targets

ACTIVITY	COMPLIANCE SPECIFICATION
Site Establishment	<ul style="list-style-type: none"> • The contractor shall establish his construction camps, offices, workshops and any other infrastructure in previously impacted areas and in a manner that does not adversely affect the environment. • The contractor shall submit a method statement for site clearance for approval by the Project Coordinator in consultation with the ECO. • The Construction camp shall have the necessary ablution facilities with chemical toilets at commencement of construction activities to the satisfaction of the Project Coordinator. Ablution facilities shall be within 100m from workplaces but not closer than 100m from any natural water bodies or boreholes. There should be enough toilets available to accommodate the workforce. • Safe drinking water for human consumption shall be available at the site offices and at other convenient locations on site. • No fires will be allowed outside of the construction camp. Activities which may pose a risk of fire must be identified and suitable measures must be put in place to prevent any possible damage by fire. Fire fighting equipment shall be supplied by the Contractor at suitable locations. • The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at a municipal registered landfill. Under no circumstances may solid waste be burnt on site.
Site Clearing	<ul style="list-style-type: none"> • The area to be cleared must be clearly demarcated and this footprint strictly maintained. • Soil that is removed from the site must be removed to an approved soil site or municipal licensed landfill site. • Erosion control measures must be implemented in areas where these risks are more prevalent. These include wetlands and steep areas. • Topsoil from the Right of Way must be neatly stockpiled adjacent to the excavations ready for backfill when required. • The Contractor shall ensure that all work is undertaken in a manner which minimises the impact on vegetation outside the immediate area of the Works.
Environmental training	<ul style="list-style-type: none"> • Ensure that all site personnel have a basic level of environmental awareness training. Topics covered should include; <ul style="list-style-type: none"> ○ What is meant by "Environment" ○ Why the environment needs to be protected and conserved ○ How construction activities can impact on the environment ○ What can be done to mitigate against such impacts ○ Awareness of emergency and spills response provisions ○ Social responsibility during construction of the water treatment works and the installation of the reticulation system e.g. being considerate to local residents • The need for a "clean site" policy also needs to be explained to the workers.
Soil Impacts	Topsoil <ul style="list-style-type: none"> • The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major

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ACTIVITY	COMPLIANCE SPECIFICATION
	<p>earthworks. This should include the building footprint, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas.</p> <ul style="list-style-type: none"> • Care must be taken not to mix topsoil and subsoil during stripping. • Polluted topsoil must be disposed of at a licensed landfill site. <p>Soil Stripping</p> <ul style="list-style-type: none"> • No soil stripping must take place on areas within the site that the contractor does not require for construction works, or on areas of retained vegetation. • Subsoil and overburden should, in all construction and lay down areas, be stockpiled separately to be returned for backfilling in the correct soil horizon order. • Construction vehicles must only be allowed existing tracks to utilise or pre-planned access routes. <p>Stockpiles</p> <ul style="list-style-type: none"> • Stockpiles should not be situated such that they obstruct natural water pathways and drainage channels. • Stockpiles should not exceed 2m in height. • If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or cloth. <p>Fuel storage</p> <ul style="list-style-type: none"> • Topsoil and subsoil should be protected from contamination. • Cement, concrete and chemicals must be mixed on an impermeable surface and provisions should be made to contain spillages or overflows into the soil. Mixed cement/concrete must not be allowed to get into the storm water system or any rivers, streams, wetlands or existing erosion channels / dongas. • Any storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material. • Contaminated soil must be contained and disposed of offsite at an approved landfill site.
Erosion	<ul style="list-style-type: none"> • Wind screening and stormwater control should be undertaken to prevent soil loss from the site. • All erosion control mechanisms need to be regularly maintained. • Retention of vegetation where possible to avoid soil erosion. • Re-vegetation of disturbed surfaces should occur immediately after the construction activities are completed.
Air Quality	<p>Dust control</p> <ul style="list-style-type: none"> • Damping down of un-surfaced and un-vegetated areas during dusty periods is required. • Retention of vegetation where possible will reduce dust travel. • Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas. • The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the residents of Nkamasana or neighbouring communities.

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ACTIVITY	COMPLIANCE SPECIFICATION
	<ul style="list-style-type: none"> • A speed limit of 30km/h must not be exceeded on dirt roads (if any). • Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor. <p>Emissions control</p> <ul style="list-style-type: none"> • Regular servicing of vehicles in order to limit gaseous emissions (to be done offsite). • Regular servicing of on-site toilets to avoid potential odours. • Allocated cooking areas must be provided. <p>Fire prevention</p> <ul style="list-style-type: none"> • All cooking shall be done in demarcated areas that are safe in terms of runaway or uncontrolled fires. • The Contractor shall have operational fire-fighting equipment available on site at all times. The level of fire fighting equipment must be assessed and evaluated thorough a typical risk assessment process. It may be required to increase the level of protection, especially during the winter months.
<p>Water Quality</p>	<p>Sanitation</p> <ul style="list-style-type: none"> • Adequate sanitary and ablutions facilities must be provided for construction workers. • The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution. <p>Hazardous materials</p> <ul style="list-style-type: none"> • Use and/or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled in a manner that prevents such occurrences. • All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. • The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential high runoff stormwater events. • Any hazardous substances must be stored at least 100m from any of the water bodies on site. • Contaminated wastewater must be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp shall be collected and removed from the site for appropriate disposal at a licensed commercial facility. <p>Water resources</p> <ul style="list-style-type: none"> • Site staff shall not be permitted to use any other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction related activities. • Municipal water (or another source approved by the ECO) should be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc. • Compaction of backfilled material must attain low soil permeability. • Site design and operation must that surface/storm water is diverted away from excavation trenches.

ACTIVITY	COMPLIANCE SPECIFICATION
	<ul style="list-style-type: none"> • Backfilling of trenches must be done in such a way that water ponding and erosion of the backfilled trench are avoided. <p>Stormwater</p> <ul style="list-style-type: none"> • The site must be managed in a manner that prevents pollution of drains, downstream watercourses or groundwater, due to suspended solids, silt or chemical pollutants. • Temporary cut-off drains and berms may be required to capture stormwater and promote infiltration. • Hazardous substances must be stored at least 100m away from any water bodies on site to avoid pollution.
Noise	<ul style="list-style-type: none"> • Construction site yards, workshops, and other noisy fixed facilities should be located well away from noise sensitive areas. • Heavy vehicle traffic should be routed away from noise sensitive areas, where possible. • Blasting operations (if required) are to be strictly controlled with regard to the size of explosive charge in order to minimise noise and air blast, and timings of explosions. The number of blasts per day should be limited, blasting should be undertaken at the same times each day and no blasting may be allowed at night. • Noisy activities should take place during allocated construction hours only as per section 25 of the Noise Control Regulations of the Environment Conservation Act, 1989 (No. 73 of 1989). • The contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance.
Biodiversity	<ul style="list-style-type: none"> • During construction activities wherever possible work should be restricted to one area at a time. This will give smaller birds, mammals, reptiles and amphibians an opportunity to move into undisturbed areas close to their natural habitat. The contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase. • No further vegetation clearance except for the removal of alien invasive species. • Vehicle access to the servitude of the sanitation system must as far as possible be limited to existing roads.
Waste Management	<p>Construction rubble</p> <ul style="list-style-type: none"> • Construction rubble shall be disposed of in demarcated spoil dumps that have been approved by the Municipality. • Sufficient waste bins must be provided at the construction site for different types of waste disposal and for recycling purposes. • Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site. • Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite. • All waste must be removed from the site and transported to a landfill site. <p>Hazardous waste</p> <ul style="list-style-type: none"> • All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of offsite at a licensed landfill site. • Machinery must be properly maintained to keep oil leaks in check.

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ACTIVITY	COMPLIANCE SPECIFICATION
	<p>Remedial actions</p> <ul style="list-style-type: none"> • Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated onsite. • The ECO must determine the precise method of treatment of polluted soil. • This could involve the application of soil absorbent materials or oil-digestive powders to the contaminated soil. • If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent materials. • Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.
Security	<ul style="list-style-type: none"> • No person shall enter the site unless authorised to do so by the contractor, Project Coordinator and ECO. • The site must be secured in order to reduce the opportunity for criminal activity in the locality of the construction site.
Social Environment	<ul style="list-style-type: none"> • A complaints register should be kept on site. Details of complaints should be incorporated into the audits as part of the monitoring process. This register is to be tabled during monthly site meetings. • Where possible unskilled job opportunities should be afforded to local community members.
Cultural and Heritage Artefacts	<ul style="list-style-type: none"> • South African Heritage Resource Agency (SAHRA) should be informed if any archaeological or cultural heritage resources, including human remains / graves are uncovered in the affected area and mitigation measures recommended by SAHRA should be followed. • The contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken. • Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. • Permits shall be obtained from the SAHRA.
Rehabilitation	<ul style="list-style-type: none"> • Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately after the installation of the new towers to prevent further soil erosion. • Re-seeding shall be done on disturbed areas as directed by the ECO. • Existing access roads should be left 'as is' for future use during maintenance operations; • Final inspection in order to ensure adherence to EMPr guidelines, completion of localised/ remaining areas of impact, monitoring of rehabilitation success, etc.
Storm Water Management at reservoir sites	<ul style="list-style-type: none"> • The site must be managed in a manner that prevents pollution of drains, downstream watercourses or groundwater, due to suspended solids, silt or chemical pollutants. • Temporary cut-off drains and berms may be required to capture storm water and promote infiltration. • The area must be monitored by an ECO on a regular basis as described in the EMPr. • Recommendations of the storm water management plan must be implemented to avoid soil erosion and siltation of drainage line.

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ACTIVITY	COMPLIANCE SPECIFICATION
Socio-Economic	<ul style="list-style-type: none"> • Labourers must be sourced from local communities.
Soil Erosion	<ul style="list-style-type: none"> • Ensure that construction sites are stabilised and soil is prevented from unnecessary exposure. • Implement vegetation re-establishment as part of a detailed Rehabilitation Plan • Ensure that current road infrastructure is used to access remote areas of the pipeline layout.
Desludging of the sludge lagoons	<ul style="list-style-type: none"> • No activity is to take place on the edge of the sludge lagoons closest to the river. • No sludge may be disposed of in or near the river. • Desludging should take place in the summer months, when drying potential will be at a maximum.
Disposal of sludge from the sludge lagoons	<ul style="list-style-type: none"> • Excavated sludge should be spread and allowed to dry prior to any disposal. • Spreading should take place a minimum of 100m from the edge of the river. • Suitable berms should be provided around the spread sludge to ensure that stormwater runoff does not mobilize potential contaminants and potentially pollute nearby atercourses. • If disposal to a landfill site is proposed, a suitably licensed landfill site must be identified for this disposal. • If disposal to farmers as fertilizer is proposed, sludge must still be dried properly.
Disposal of liquid effluent from the sludge lagoons	<ul style="list-style-type: none"> • If the sludge lagoons require draining prior to excavation, this liquid should be returned to the head of the water treatment works to be treated appropriately.

7 ENVIRONMENTAL MONITORING

A monitoring programme will be implemented for the duration of the construction activities involved in the contract. This programme will include:

- Pre-construction site visit: Establishing a baseline of pre-construction site conditions validated with photographic evidence.
- Mid-construction site visit: A single audit of the construction activities during the construction phase. This audit will be conducted randomly and does not require prior arrangement with the Project Coordinator.
- Post-construction site visit: Compilation of a final audit report with a rating of compliance with the EMP.

The ECO shall keep a photographic record of the demarcated site and construction area. The Contractor shall be held liable for all unnecessary damage to the environment. A register shall be kept of all complaints from the community. All complaints / claims shall be handled immediately to ensure timeous rectification / payment by the responsible party.

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8 ENVIRONMENTAL AWARENESS

According to regulation 33 of GN R 543, an environmental management programme must include:

- (j) An environmental awareness plan describing the manner in which:
 - (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and
 - (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment.

Contractors shall ensure that its employees and any third party who carries out all or part of the Contractor's obligations are adequately trained with regard to the implementation of the EMPr, as well as regarding environmental legal requirements and obligations.

Environment and health awareness training programmes should be targeted at three distinct levels of employment, i.e. the executive, middle management and labour. Environmental awareness training programmes shall contain the following information:

- The names, positions and responsibilities of personnel to be trained.
- The framework for appropriate training plans.
- The summarised content of each training course.
- A schedule for the presentation of the training courses.

The site manager shall ensure that records of all training interventions are kept in accordance with the record keeping and documentation control requirements as set out in this EMPr. The training records shall verify each of the targeted personnel's training experience. These records should be made available to the ECO for the purposes of the audit.

The Developer shall ensure that adequate environmental training takes place. All employees shall be given an induction presentation on environmental awareness and the content of the EMPr. The presentation needs to be conducted in the language of the employees to ensure it is understood. The environmental training shall, as a minimum, include the following:

- The importance of conformance with all environmental policies.
- The environmental impacts, actual or potential, of their work activities.
- The environmental benefits of improved personal performance.
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Agency's environmental management systems, including emergency preparedness and response requirements.
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities.
- Environmental legal requirements and obligations.
- Details regarding floral/faunal species of special concern and protected species, and the procedures to be followed should these be encountered during the construction of approach roads or construction camps.
- The importance of not littering.
- The importance of using supplied toilet facilities.
- The need to use water sparingly.
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible.
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.

Recommended Environmental Education Material is provided in Appendix 1.

Monitoring of environmental training

The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed. If necessary, the ECO and / or a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear. Toolbox talks are recommended.

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9 COMPLIANCE WITH THE EMPR

According to regulation 33 of GN R 543, an environmental management programme must include:

- (e) Proposed mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon.
- (f) The process for managing any environmental damage, pollution and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.

A copy of the EMPr must be kept on site at all times during the construction period. The EMPr will be binding on all contractors operating on the site and must be included within the Contractual Clauses.

It should be noted that in terms of Section 28 of the National Environmental Management Act (No. 107 of 1998) those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventative measures to reduce or prevent further pollution and/or environmental damage (The 'polluter pays' principle).

9.1 Non-compliance

The contractors shall act immediately when notice of non-compliance is received and take corrective action. 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. The ECO should be made aware of any complaints.

Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as it deems fit.

The Contractor is deemed not to have complied with the EMPr if, *inter alia*:

- There is evidence of contravention of the EMPr specifications within the boundaries of the construction site, site extensions and roads;
- There is contravention of the EMPr specifications which relate to activities outside the boundaries of the construction site.
- Environmental damage ensues due to negligence;
- Construction activities take place outside the defined boundaries of the site; and/or
- The Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time period.

It is recommended that the engineers/contractors institute penalties for the following less serious violations and any others determined during the course of work, as detailed below:

- Littering on site.
- Lighting of illegal fires on site.
- Persistent or unrepaired fuel and oil leaks.
- Any persons, vehicles or equipment related to the Contractor's operations found within the designated "no-go" areas.
- Excess dust or excess noise emanating from site.
- Possession or use of intoxicating substances on site.
- Any vehicles being driven in excess of designated speed limits.
- Removal and/or damage to fauna, flora or cultural or heritage objects on site.

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- Urination and defecation anywhere except at designated facilities.

9.2 Emergency Preparedness

The Contractor shall compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to unexpected or accidental actions or incidents that will cause environmental impacts, throughout the construction period. Such activities may include, *inter alia*:

- Accidental waste water discharges to water and land.
- Accidental exposure of employees to hazardous substances, relating to the decommissioning of the old oxidation ponds.
- Accidental fires.
- Accidental spillage of hazardous substances.
- Specific environmental and ecosystem effects from accidental releases or incidents.

These plans shall include:

- Emergency organisation (manpower) and responsibilities, accountability and liability.
- A list of key personnel and contact details.
- Details of emergency services available (e.g. the fire department, spill clean-up services, etc.).
- Internal and external communication plans, including prescribed reporting procedures where required by legislation.
- Actions to be taken in the event of different types of emergencies.
- Incident recording, progress reporting and remediation measures required to be implemented.
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.
- Training plans, testing exercises and schedules for effectiveness.

The Contractor shall comply with the emergency preparedness and incident and accident-reporting requirements, as required by the Occupational Health and Safety Act (No. 85 of 1993), the NEMA (No. 107 of 1998) and the National Water Act (No. 36 of 1998) as amended and/or any other relevant legislation.

9.3 Incident Reporting and Remedy

If a leakage or spillage of hazardous substances occurs on site, the local emergency services must be immediately notified of the incident. The following information must be provided:

- the location;
- the nature of the load;
- the extent of the impact; and
- the status at the site of the accident itself (i.e. whether further leakage is still taking place, whether the vehicle or the load is on fire).

Written records must be kept on the corrective and remedial measures decided upon and the progress achieved therewith over time. Such progress reporting is important for monitoring and auditing purposes. The written reports may be used for training purposes in an effort to prevent similar future occurrences.

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9.4 Penalties

Where environmental damage is caused or a pollution incident, and/or failure to comply with any of the environmental specifications contained in the EMP, the developer and/or contractor shall be liable.

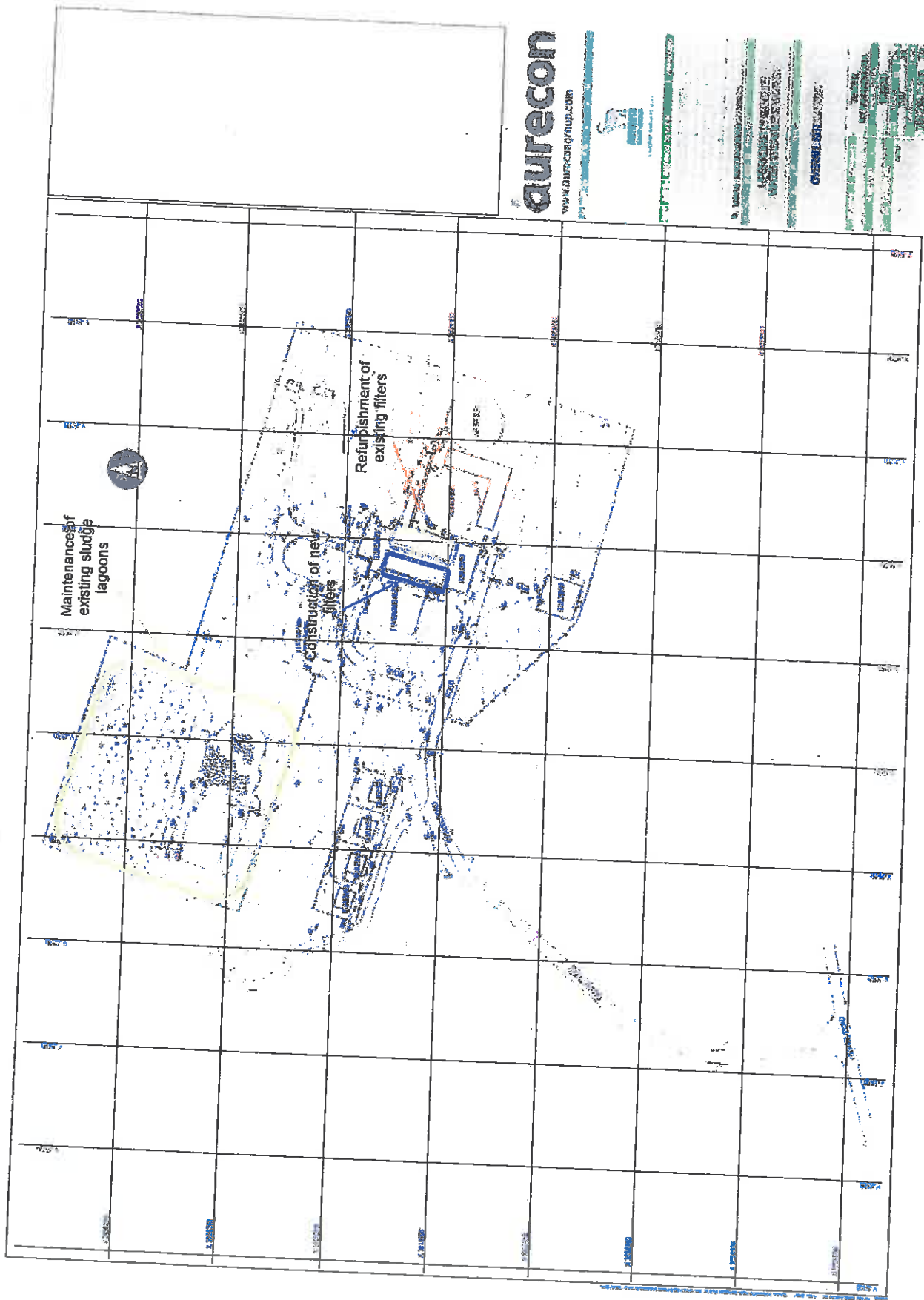
The following violations, and any others determined during the course of work, should be penalised:

- Hazardous chemical/oil spill and/or dumping in non-approved sites.
- Damage to sensitive environments.
- Damage to cultural and historical sites.
- Unauthorised removal/damage to indigenous trees and other vegetation, particularly in identified sensitive areas.
- Uncontrolled/unmanaged erosion.
- Unauthorised blasting activities (if applicable).
- Pollution of water sources.
- Unnecessary removal or damage to trees.

APPENDIX 1

Images of On-site and Off-site Activity Locations

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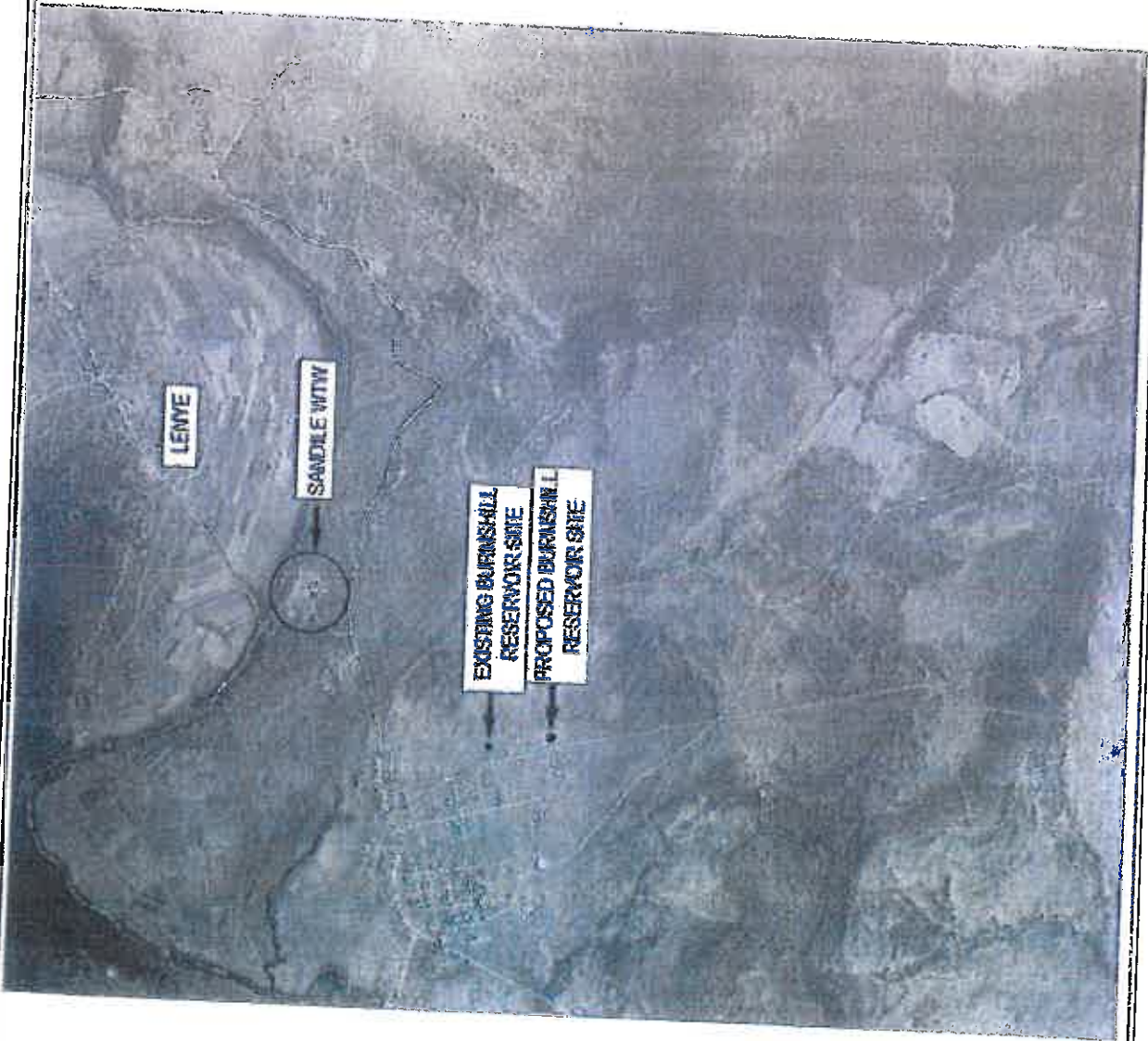
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Project Name: Upgrade of the Sandile Water Treatment Works: Civil Contract 1
Project Number: 14000000000000000000
Client: Department of Water and Environmental Affairs
Project Manager: Mr. [Name]
Project Engineer: Mr. [Name]
Project Designer: Mr. [Name]
Project Checker: Mr. [Name]
Project Approver: Mr. [Name]
Date: 15 June 2014
Scale: 1:10000
Drawing Title: Aerial Photograph of the Sandile Water Treatment Works Site

Back ~~to~~ home



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CONSULTANTS & ENGINEERS

Project: Sandile Water Treatment Works Upgrade

Client: SWSWATS

Reference: SWSWATS/000000000000000000

Date: 15/06/14

Scale: 1:500

Author: [Redacted]

Checked: [Redacted]

Approved: [Redacted]

Drawn: [Redacted]

Project Manager: [Redacted]

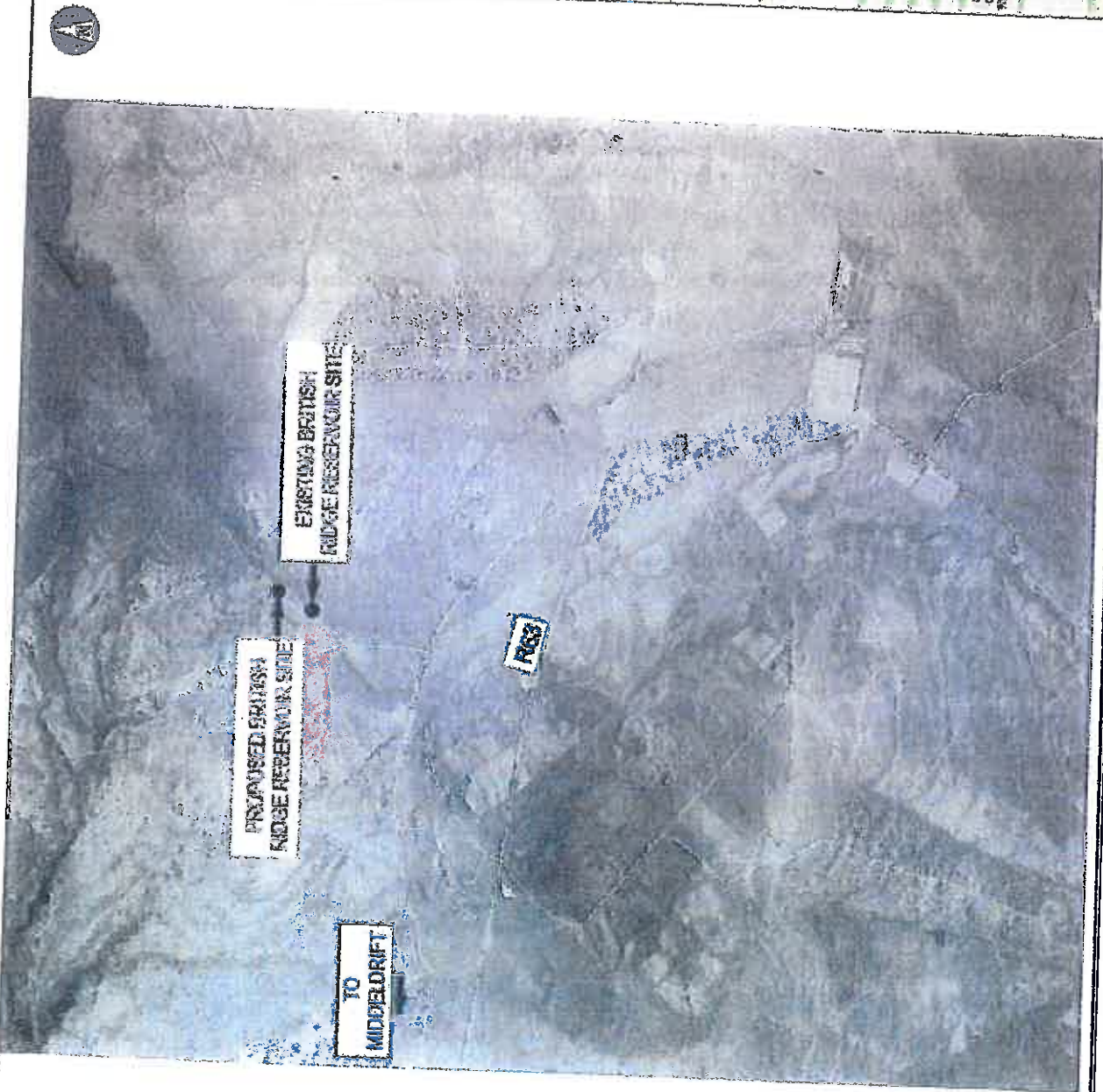
Project Engineer: [Redacted]

Project Officer: [Redacted]

Project Assistant: [Redacted]

Project Coordinator: [Redacted]

Project Support: [Redacted]



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APPENDIX 2
PROPOSED ENVIRONMENTAL EDUCATION COURSE

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ENVIRONMENTAL AWARENESS COURSE

WHAT IS THE ENVIRONMENT?

- Soil
- Water
- Plants
- People
- Animals
- Air we breathe
- Buildings, cars and houses



WHY MUST WE LOOK AFTER THE ENVIRONMENT?

- It affects us all as well as future generations
- We have a right to a healthy environment
- A contract has been signed
- Disciplinary action (e.g. construction could stop or fines issued)

HOW DO WE LOOK AFTER THE ENVIRONMENT?

- Report problems to your supervisor/ foreman
- Team work
- Follow the rules in the EMP



WORKING AREAS

Workers & equipment must stay inside the site boundaries at all times



RIVERS & STREAMS

- Do not swim in or drink from streams
- Do not throw oil, petrol, diesel, concrete or rubbish in the stream
- Do not work in the stream without direct instruction
- Do not damage the banks or vegetation of the stream



ANIMALS

- Do not injure or kill any animals on the site
- Ask your supervisor or Contract's Manager to remove animals found on site



TREES AND FLOWERS

- Do not damage or cut down any trees or plants without permission
- Do not pick flowers



SMOKING AND FIRE

- Put cigarette butts in a rubbish bin
- Do not smoke near gas, paints or petrol
- Do not light any fires without permission
- Know the positions of fire fighting equipment
- Report all fires
- Do not burn rubbish or vegetation without permission



PETROL, OIL AND DIESEL

- Work with petrol, oil & diesel in marked areas
- Report any petrol, oil & diesel leaks or spills to your supervisor
- Use a drip tray under vehicles & machinery
- Empty drip trays after rain & throw away where instructed



DUST

Try to avoid producing dust -
Use water to make ground &
soil wet



NOISE

- Do not make loud noises around the site, especially near schools and homes
- Report or repair noisy vehicles



TOILETS

- Use the toilets provided
- Report full or leaking toilets



EATING

- Only eat in demarcated eating areas
- Never eat near a river or stream
- Put packaging & leftover food into rubbish bins



RUBBISH

- Do not litter - put all rubbish (especially cement bags) into the bins provided
- Report full bins to your supervisor
- The responsible person should empty bins regularly



TRUCKS AND DRIVING

- Always keep to the speed limit
- Drivers - check & report leaks and vehicles that belch smoke
- Ensure loads are secure & do not spill



EMERGENCY PHONE NUMBERS

Know all the emergency phone numbers:

- Ambulance:

- Fire:

- Police:

Local Municipality:



FINES AND PENALTIES

- Spot fines of between

To be confirmed by Engineer

- Your company may be fined
- Removal from site
- Construction may be stopped



PROBLEMS - WHAT TO DO!

- Report any breaks, floods, fires, leaks and injuries to your supervisor
- Ask questions!



APPENDIX 2

PRO-FORMA: PROTECTION OF THE ENVIRONMENT

To be signed by Contractors

PRO FORMA

Employer _____
Contract No. _____
Contract title _____

PROTECTION OF THE ENVIRONMENT

The Contractor will not be given right of access to the site until this form has been signed.

I/ we _____ (Contractor) record as follows:

1. I/ we, the undersigned, do hereby declare that I/ we am/ are aware of the increasing requirement by society that construction activities shall be carried out with due regard to their impact on the environment.
2. In view of this requirement of society and a corresponding requirement by the Employer with regard to this Contract, I/ we will, in addition to complying with the letter of the terms of the Contract dealing with protection of the environment, also take into consideration the spirit of such requirements and will, in selecting appropriate employees, plant, materials and methods of construction, in so far as I/ we have the choice, include in the analysis not only the technical and economic (both financial and with regard to time) aspects but also the impact on the environment of the options. In this regard, I/ we recognise and accept the need to abide by the "precautionary principle" which aims to ensure the protection of the environment by the adoption of the most environmentally sensitive construction approach in the face of uncertainty with regard to the environmental implications of construction.
3. I/ we acknowledge and accept the right of _____ to deduct, should they so wish, from any amounts due to me/us, such amounts (hereinafter referred to as fines) as the Resident Engineer and Environmental Site Officer shall certify as being warranted in view of my/ our failure to comply with the terms of the Contract dealing with protection of the environment, subject to the following:
 - 3.1 The Resident Engineer and Environmental Officer, in determining the amount of such fine, shall take into account *inter alia*, the nature of the offence, the seriousness of its impact on the environment, the degree of prior compliance/non-compliance, the extent of the Contractor's overall compliance with environmental protection requirements and, in particular, the extent to which he considers it necessary to impose a sanction in order to eliminate/reduce future occurrences.
 - 3.2 The Resident Engineer and Environmental Officer shall, with respect to any fine imposed, provide me/ us with a written statement giving details of the offence, the facts on which the Resident Engineer and Environmental Officer has based his assessment and the terms of the Contract (by reference to the specific clause) which has been contravened.

Signed _____
CONTRACTOR

Date _____

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