



**PROPOSED CONSTRUCTION OF A POTABLE WATER
GRAVITY PIPELINE AND APPURTENANT WORKS FROM
BRAKFORTEIN FARM TO LADYSMITH WATER
TREATMENT WORKS, EMNAMBITHI / LADYSMITH
MUNICIPALITY KWAZULU-NATAL.**

ENVIRONMENTAL MANAGEMENT PROGRAMME

September 2015

REVISION 001

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ENVIRONMENTAL MANAGEMENT PROGRAMME

PROPOSED CONSTRUCTION OF A POTABLE WATER GRAVITY PIPELINE AND APPURTENANT WORKS FROM BRAKFORTEIN FARM TO LADYSMITH WATER TREATMENT WORKS, EMNAMBITHI / LADYSMITH MUNICIPALITY KWAZULU-NATAL.


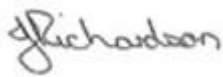


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QUALITY VERIFICATION This report has been prepared under the controls established by a quality management system that meets the requirements of ISO9001: 2008 which has been independently certified by DEKRA Certification under certificate number 90906882 				
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TABLE OF CONTENTS

LIST OF ACRONYMS	3
1. INTRODUCTION.....	4
1.1 The Polluter-Pays Principle.....	4
1.2 Progressive Rehabilitation.....	4
2. PROJECT DETAILS.....	5
3. LEGISLATIVE REQUIREMENTS.....	5
3.1 Signing of the EMPr	5
3.2 Legislation	5
4. COMPLIANCE WITH THE EMPr	5
4.1 Record Keeping.....	5
4.2 Monitoring and Compliance.....	7
4.3 Auditing Process.....	7
4.4 Failure to complete corrective actions	7
5. GENERAL CONSTRUCTION PHASE EMPR REQUIREMENTS	9
5.1 Preparation of Method Statements / Management Plans.....	9
5.2 Permit Requirements	9
6. AMENDMENTS TO THE EMPr	9
7. ENVIRONMENTAL MANAGEMENT PROGRAMME	11
8. STAFF CONDUCT CONTROL AND INFORMATION SHEET	42
9. ALIEN PLANT CONTROL.....	43
APPENDIX 1 – EMPR ACKNOWLEDGEMENT FORM	44

LIST OF ACRONYMS

DWS	-	Department of Water and Sanitation
DEA/T	-	Department of Environmental Affairs / and Tourism - National
EDTEA	-	Economic Development, Tourism and Environmental Affairs - Provincial
EIA	-	Environmental Impact Assessment
EMPr	-	Environmental Management Programme
ER	-	Employer's Representative
MSDS	-	Material Safety Data Sheet
NEMA	-	National Environmental Management Act (Act 107 of 1998)
WUL	-	Water Use Licence

1. INTRODUCTION

Terratest (Pty) Ltd were appointed by WMN Consultancy (Pty) Ltd to compile an Environmental Management Programme (EMPr) for the construction works associated with the construction of a bulk gravity water pipeline from Brakfontein Farm to the Ladysmith Water Treatment Works, Emnambithi / Ladysmith Municipality, KwaZulu-Natal.

In accordance with the Integrated Environmental Management Guidelines published by the Department of Environmental Affairs & Tourism (DEAT) in 1992, the purpose of an EMPr is *“to describe how negative environmental impacts will be managed, rehabilitated or monitored and how positive impacts will be maximised”*.

National Environmental Management Act, (Act 107 of 1998)

Section 28 of NEMA (National Environmental Management Act, Act 107 of 1998) which pertains to “Duty of care and remediation of Environmental Damage” states that:

“(1) Every person who causes, has caused or may cause significant pollution or degradation of the environment, must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot be reasonably avoided or stopped, to minimise and rectify such pollution or degradation of the environment.”

This EMPr must form an integral part of the contract documents for the proposed pipeline construction, as it outlines the methodology & duties required such that construction can be achieved in an environmentally sustainable manner; with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. Such mitigation measures will have a financial impact on the projects costing’s.

This EMPr is a dynamic document that may need to evolve during its implementation period, such that it recognises any new issues that may arise; or changes in the parameters of identified issues which can be addressed with the required/amended mitigation.

1.1 The Polluter-Pays Principle

This principle provides for *“the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.”*

The Polluter Pays Principle must be rigorously applied throughout the Construction Phase of this project.

1.2 Progressive Rehabilitation

Progressive rehabilitation must also be undertaken throughout the Construction Phase of the project with areas that have been impacted on. Rehabilitation should commence as soon as construction is completed in the specific area and not at the end of the entire project.

2. PROJECT DETAILS

The proposed water pipeline has been assessed in a corridor of disturbance, with a varying width of 70m – 350m to allow for unforeseen construction deviations should these be required. The length of the corridor and hence pipeline, is approximately 25km and the general working corridor is 25m, with the exception being in sensitive areas where the corridor will be reduced as per specialist recommendations.

The development comprises the installation of a new 900 – 1 200mm ø bulk gravity water pipeline from Brakfontein Farm to the Ladysmith Water Treatment Works, Emnambithi / Ladysmith Municipality, KwaZulu-Natal. The pipeline will primarily be located adjacent to the road reserves of the R600, N11 and R103 and will have a throughput capacity of approximately 1736 litres per second. A Locality Map is provided in Figure 1.

The majority of the alignment falls within agricultural lands with a small portion falling within the urban edge of Ladysmith. The Basic Assessment Process involved extensive consultation with the Ladysmith Farmers Association and directly affected landowners in order to determine the preferred alignment. It is imperative that the appointed Contractor maintain open lines of communication with the Ladysmith Farmers Association in order to efficiently attend to any grievances which may arise and to avoid any unnecessary disturbance and / or damage to land or livestock.

As several watercourses, including the Klip River will be intercepted during construction, a Water Use Licence Application has been made to the Department of Water and Sanitation (DWS). The necessity of such is substantiated in the National Water Act (No. 36 of 1998), Section 21: Water Use Authorisation Requirements. As per this legislation, any activity that would impede or divert the flow of water in a watercourse (Section 21c), or any activity which will alter the bed, banks or characteristic of a watercourse (Section 21i) will require a licence prior to undertaking the proposed construction activity.

3. LEGISLATIVE REQUIREMENTS

3.1 Signing of the EMPr

The Acknowledgement Form at the back of the EMPr (Appendix 1), must be signed by the Proponent, Implementing Agent, all Contractors and Sub-contractors, the Employer's Representative (ER) and the Environmental Control Officer (ECO); acknowledging that all parties are familiar with the requirements of the EMPr.

3.2 Legislation

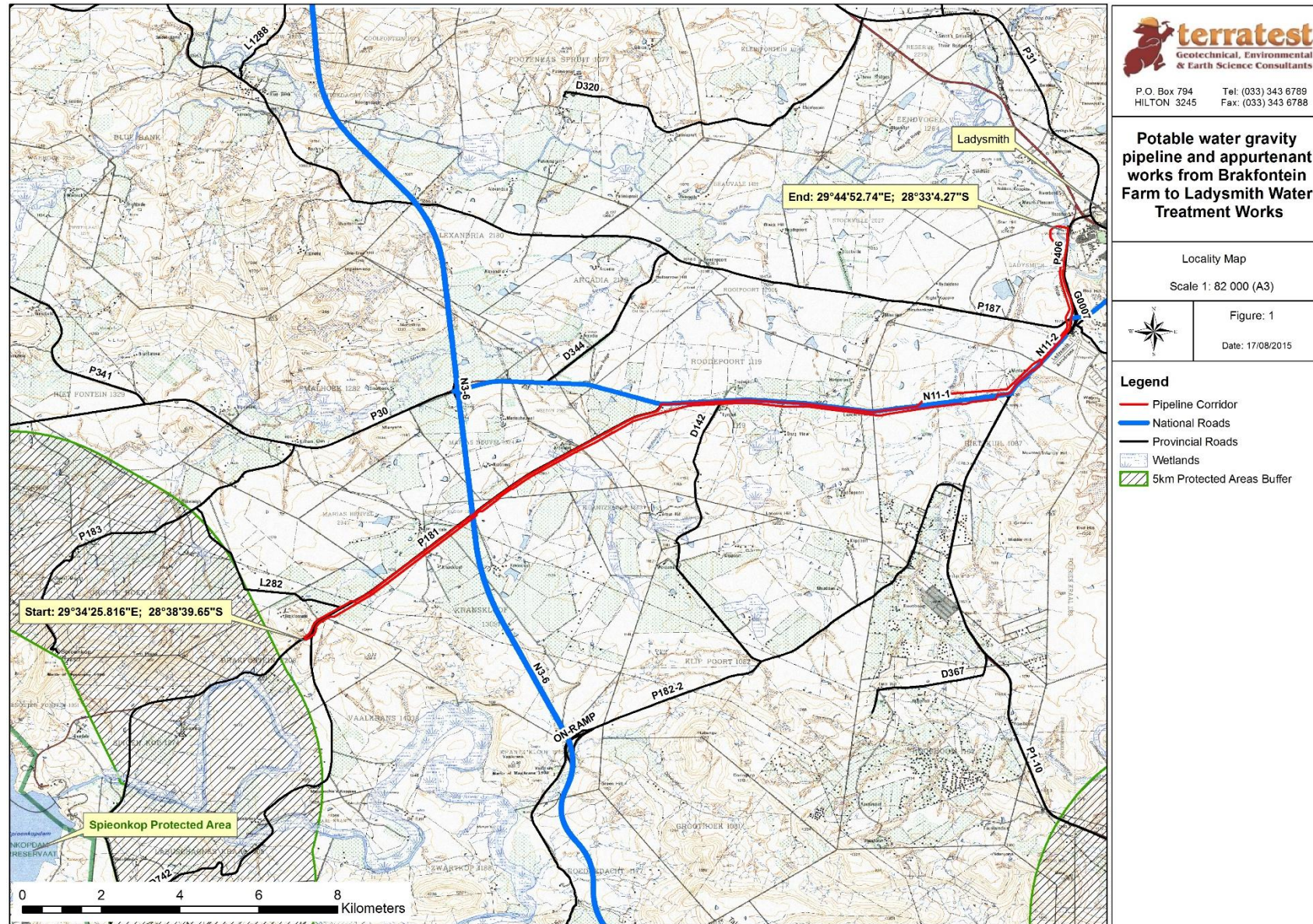
Of importance are all national, provincial and municipal by-laws and regulations. Statutes are amended periodically and it is the Proponent's responsibility to identify legislation relevant to the proposed activity.

4. COMPLIANCE WITH THE EMPr

4.1 Record Keeping

The Implementing Agent and appointed ECO must monitor the Contractor's adherence to the approved impact prevention procedures on a monthly or bi-weekly basis, and must issue the Contractor a Notice of Non-compliance whenever transgressions are observed. The ECO must document the nature and magnitude of any non-compliance, the action taken to correct the non-conformance, the actions taken to mitigate its effects and the results of those actions. The results thereof must be reported to the Compliance and Monitoring section of the Department of Economic Development, Tourism and Environmental Affairs (EDTEA) in the form of a monthly Audit Report, to be compiled by the ECO, but

submitted by the Implementing Agent. Any emergency incidents occurring during the Construction Phase must be reported to the EDTEA: Compliance and Monitoring, as well as other affected parties such as the Department of Water and Sanitation (DWS). Records relating to monitoring and auditing must be kept on site and made available for inspection by the EDTEA: Compliance and Monitoring and any other relevant authorities.



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**Potable water gravity
 pipeline and appurtenant
 works from Brakfontein
 Farm to Ladysmith Water
 Treatment Works**

Locality Map
 Scale 1: 82 000 (A3)

Figure: 1
 Date: 17/08/2015

- Legend**
- Pipeline Corridor
 - National Roads
 - Provincial Roads
 - Wetlands
 - 5km Protected Areas Buffer

FIGURE 1: Layout Plan

4.2 Monitoring and Compliance

The monitoring and compliance of the development must take place as follows:

- The ECO has the authority to instruct the Contractor to cease a particular operation causing, or liable to cause, significant environmental damage and issue fines or penalties for non-compliance of the EMPr;
- An independent ECO must audit the construction site during the Construction Phase of the pipeline;
- The ECO must audit the site once every two weeks while the construction activities involving the crossing of the Klip River are underway;
- The ECO must audit the site once month while construction is taking place in less sensitive areas until completion of the rehabilitation phase of project; and
- The Project Manager is responsible to ensure that an Environmental Audit Report is submitted to the EDTEA: Compliance and Monitoring for the duration of the construction period.

4.3 Auditing Process

The terms of reference for the audits must comprise the following:

- Develop a checklist against which the criteria can be referenced during the audit;
- During the audit process, key individuals involved with the management of the site/project are to be given the opportunity to comment on issues being audited and will be invited to accompany the Auditor/ECO during the site inspection; and
- Compile a monthly Audit Report on the implementation of the EMPr and submit this report to the Competent Authority (EDTEA: Compliance and Monitoring), via the Project Manager.

4.4 Failure to complete corrective actions

In the event that a Contractor fails or refuses to complete the corrective action, either at all or within the allocated timeframe, the ECO must:

- Formally (in writing) inform the Implementing Agent; and
- Motivate that a Stop-work Order be issued to the Contractor.

The Proponent's Implementing Agent is responsible for resolving the impasse with the Contractor. Failure to address any non-compliance may lead to the termination of the contract and removal of the Contractor and staff from the site.

The Proponent / Contractor are deemed not to have complied with the EMPr if:

- Within the boundaries of the site there is evidence of a contravention of clauses; or
- Environmental damage occurs due to negligence / inappropriate actions taken by the Contractor or any of his staff or Sub-contractors.

On receiving a Notice of Non-compliance, the Contractor is required to swiftly address the issue/s taking all corrective actions required to rectify the situation. Penalties will be applied for non-compliant situations. Penalties/fines are advocated to ensure corrective measures are successfully undertaken and the necessary standard of rehabilitation is achieved. The penalties imposed per incident or violation are noted in Table 1:

TABLE 1: Penalties for Non-Compliance

Incident / Violation	Penalty	Administering Authority
Failure to stockpile material in designated areas in the correct manner	R 5, 000.00	ECO / Competent Authority
Removed topsoil being stockpiled at a height greater than 2m, and being used for purposes other than rehabilitation/landscaping.	R 2, 500.00	ECO / Competent Authority
Failure to manage spoil and topsoil	R 2, 500.00	ECO / Competent Authority
Building materials, such as river sand, being sourced without a necessary permit.	R 15, 000.00	ECO / Competent Authority
Pollution of watercourse ¹	R 25, 000.00	ECO / Competent Authority
Failure to control and manage stormwater	R 10, 000.00	ECO / Competent Authority
Failure to provide adequate sanitation at construction working area	R 15, 000.00	ECO / Competent Authority
Unauthorised clearing / removal of vegetation	R 15, 000.00	ECO / Competent Authority
Failure to provide adequate waste disposal facilities and services	R 15, 000.00	ECO / Competent Authority
Failure to reinstate and rehabilitate disturbed areas, within specified time period	R 15, 000.00	ECO / Competent Authority
Failure to comply with recommendations	R 5, 000.00	ECO / Competent Authority
Burning of waste on site	R 5, 000.00	ECO / Competent Authority
Failure to minimize the effects of erosion (on-going).	R5, 000.00	ECO / Competent Authority
Sourcing of water for construction purposes other than from a municipal supply without necessary permit authorisation by DWS	R 15, 000.00	ECO / Competent Authority
Failure to protect sensitive areas.	R 2, 000.00	ECO / Competent Authority
Failure to ensure that the construction site is left devoid of pollution, erosion and unwanted/ surplus material.	R 5, 000.00	ECO / Competent Authority
Failure to allow for rehabilitation of wetland and buffer areas.	R 80, 000.00	ECO / Competent Authority
Failure to obtain necessary permits for the removal of indigenous vegetation that is endangered or which is protected under National statute.	R 15, 000.00	ECO / Competent Authority
Drainage channels, wetlands, trees/bush being used for urination/washing purposes	R 5, 000.00	ECO / Competent authority
Failure to comply with findings and recommendation of all specialist reports.	R 5, 000.00	ECO / Competent authority

The penalty associated with a chemical spill is not a set amount but will depend on the nature and extent of the spill; the cost of any soil and / or groundwater monitoring; and any soil and / or groundwater remediation required by Authorities will be to the Contractor's account.

The imposition of such penalties / fines will not preclude the relevant Competent Authority from applying an additional penalty in accordance with their statutory powers.

¹Definition of a watercourse: "(a) a river or spring; (b) a natural channel or depression in which water flows regularly or intermittently; (c) a wetland, lake or dam into which, or from which, water flows; and (d) and collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks"

Failure to address the cause must be reported to the relevant Authority for them to deal with the transgression as deemed fit.

5. GENERAL CONSTRUCTION PHASE EMPR REQUIREMENTS

Construction Phase EMPr activities are those relating to the preparation of the site prior to commencing the Construction Phase, as well as the construction and rehabilitation activities themselves.

5.1 Preparation of Method Statements / Management Plans

Method Statements and/or Management Plans must be submitted by the Contractor to the Proponent and Implementing Agent for approval for the following activities prior to any construction commencing on site:

1. Construction camp locality and layout plans;
2. Management, use and storage of hazardous goods / substances, including petrochemicals;
3. Stormwater management at the construction Camp/s and at the construction work front;
4. Traffic, accommodation and construction vehicle movement routes during the Construction Phase;
5. Spill Contingency Plan;
6. Construction works at wetland crossings;
7. Alien invasive Plant Management Plan;
8. Emergency Response Procedures; and
9. Construction works at minor and major watercourse crossings.

The ER must monitor the implementation of the Method Statements and Management Plans during the Construction Phase of the project.

5.2 Permit Requirements

The necessary permits must be obtained by the Proponent and Contractor prior to the commencement of any activities requiring such a permit. These could include permits for activities such as:

- The disposal of effluent on site;
- Impacting on water resources, would constitute a Water Use Licence (WUL) from the Department of Water and Sanitation (DWS);
- Protected tree or plant relocations, and cutting, removal or destruction of protected trees and plants;
- Disturbance to items of heritage significance or the relocation of graves from Amafa Heritage; and
- Mining permits / licenses for borrowed material required for the construction activities if this material will not be obtained from an authorised / legal commercial source.

6. AMENDMENTS TO THE EMPr

This EMPr outlines the environmental practices and mitigation measures to be adhered to during the Construction Phase, in order to curtail and/or minimise potential negative impacts and promote sound environmental practises.

The EMPr is a dynamic document and is subject to change from time to time. Amendments to the EMPr will require consultation with and approval from the EDTEA: Compliance and Monitoring Department and the Environmental Consultants.

7. ENVIRONMENTAL MANAGEMENT PROGRAMME

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
Access to the site	<ul style="list-style-type: none"> • The construction site must have access control. • Haulage and construction routes must be carefully planned to utilise existing roads wherever possible. • All access and haul roads within the site need to be maintained in a good condition. • The ER must conduct weekly site inspections of the route and instruct the Contractor to address any problems as and when they are identified. • Unnecessary compaction of soil on site by heavy vehicles must be avoided as far as possible and construction vehicles need to be restricted to demarcated access, haulage routes and turning areas. 		
Method Statements	<ul style="list-style-type: none"> • The following Method Statements are required from the contractor: <ol style="list-style-type: none"> 1. Construction camp locality and layout plans; 2. Management, use and storage of hazardous goods / substances, including petrochemicals; 3. Stormwater management at the construction Camp/s and at the construction work front; 4. Traffic, accommodation and construction vehicle movement routes during the Construction Phase; 5. Spill Contingency Plan; 6. Construction works at wetland crossings; 7. Alien invasive Plant Management Plan; 8. Emergency Response Procedures; and 9. Construction works at minor and major watercourse crossings. <p>The ER must monitor the implementation of the Method Statements during the Construction Phase of the project.</p> 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
Permit Requirements	<ul style="list-style-type: none"> • The necessary permits must be obtained by the Proponent and Contractor prior to the commencement of any activities requiring such a permit. These could include permits for activities such as: <ul style="list-style-type: none"> - The disposal of effluent on site; - Impacting on water resources, would constitute a Water Use Licence (WUL) from the DWS – including construction activities which occur within 500m of a wetland; - Protected tree or plant relocations, and cutting, removal or destruction of protected trees and plants; and - Mining permits / licenses for borrowed material required for the construction activities if this material will not be from an authorised / legal commercial source. 		
Environmental Awareness Training	<ul style="list-style-type: none"> • The Contractor must ensure that the construction team and all sub-contractor/s are familiar with the EMPr requirements and have a basic level of Environmental Awareness Training. • The Contractor’s ER shall undertake Environmental Awareness Induction Training prior to the start of any construction activities on site. • Topics to be covered by the training should include: <ul style="list-style-type: none"> - Explanation of what is meant by “environment” and why the environment needs to be protected and conserved; - How construction activities can impact on the environment, and what measures can be taken to mitigate against these impacts; - Awareness of emergency and hazardous spills response provisions; - Prevention of pollution and litter control and the minimization of disturbance to sensitive areas; - Social responsibility during construction. This entails being considerate to local land owners; - Construction Workers need to be made aware that they are not to make excessive noise (e.g. shouting/hooting); - The need for a “clean site” policy also needs to be conveyed to construction workers; 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> - Worker conduct on site which encompasses a general regard for the social and ecological wellbeing of the site and adjacent areas. Workers need to be made aware of the following general rules of behaviour: <ol style="list-style-type: none"> 1. No alcohol / drugs to be present on site and no firearms permitted on site or in vehicles transporting staff to / from site, (unless used by security personnel); 2. Prevention of noise and unsocial behaviour; 3. Bringing pets on site is forbidden; 4. No harvesting of fruit or firewood from the site or from areas adjacent to it; 5. Workers are to make use of facilities provided for them, as opposed to <i>ad-hoc</i> alternatives (e.g. the use of surrounding bush as a toilet facility is forbidden; fires for warmth or cooking are forbidden); 6. Driving under the influence of alcohol is prohibited; 7. Trespassing on private / commercial properties bordering the site is forbidden; and 8. Other than pre-approved security staff, no workers shall be permitted to live on site unless deemed necessary due to the specific project. • It is also important that the Proponent or Implementing Agent is on hand to explain more complex / technical issues and to answer any questions which may arise. 		
Staff Conduct	The Contractor needs to monitor the performance of workers to ensure compliance with good environmental practices and general conduct.		
Construction Camp	<ul style="list-style-type: none"> • A site camp position must be identified by the Contractor and approved by the Proponent, Implementing Agent and ECO prior to construction commencing. • The Construction Camp must not be located within 100m of a watercourse or any other sensitive environmental feature, or within the 1:100 year floodline. • The placement of the Construction Camp must take into consideration the locality of surrounding residents such that disturbance impacts to the community is minimised. The potable water, ablution facilities and electrical connection details are to be furnished by the contractor to the Proponent and Implementing Agent. • The construction camp should at a minimum comprise the following: <ul style="list-style-type: none"> - A site office; 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> - Formal ablution facilities (Chemical Toilets); - A designated first aid area; - A designated eating area; - Designated general and hazardous material storage areas; - Designated waste storage area; - Formalised and appropriate refuelling area; and - Designated maintenance area. <ul style="list-style-type: none"> • The size of the camp must be kept to a minimum (especially where vegetation has to be cleared for its construction). • Parking for staff and visitors needs to be adequately provided. • The Contractor must also ensure that drainage on the camp site is such to prevent standing water and / or sheet erosion from taking place. • A Complaints Register must be maintained on site by the Foreman for all complaints received (from the surrounding community). • The Contractor must monitor and manage drainage and runoff from the Construction Camp on a weekly basis to avoid standing water and soil erosion. 		
Site Ablution Facilities	<ul style="list-style-type: none"> • Temporary chemical toilets must be supplied by the Contractor at the site camp and at the work front. 1 toilet per 20 staff members must be provided for. • Weekly servicing of chemical toilets needs to be undertaken by a licenced Service Provider and service records must be filed at the site office. • Toilets must be located at least 100 metres from any watercourse or wetland system and outside of the 1:100 year floodline. • The construction of "long drop" toilets is forbidden. • Under no circumstances may neighbouring, open areas or the surrounding bush, be used as a toilet facility by site staff and a R200 spot fine must be imposed on any site staff caught ignoring this specific EMPr requirement. 		
Traffic Management	<ul style="list-style-type: none"> • The Contractor must ensure that all construction vehicles are in a road-worthy condition. 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> No loose materials may be transported onto or off the site without the load being secured. Construction vehicle movement within the construction zone should be restricted to 25km/hr. All un-surfaced roads on site shall be damped down on a regular basis to reduce the levels of dust created by construction vehicles. Alternatively chemical suppressors may be utilised for dust suppression. Appropriate temporary traffic control and warning signage must be erected and implemented on all affected roads in the vicinity of the construction zones; Construction workers / construction vehicles must take heed of normal road safety regulations, thus all personnel must obey and respect the law of the road. A courteous and respectful driving manner must be enforced and maintained so as not to cause harm to any individual; and Any damage cause to surrounding roads as a result of construction activities must be repaired as soon as possible to prevent further deterioration to the private or public road network. Construction vehicles and plant must not be permitted outside of the demarcated construction working zone unless it is on a public road. The use of private access roads must be strictly forbidden unless a prior agreement has been entered into with the affected landowner. 		
Waste Management	<ul style="list-style-type: none"> Appropriate waste receptacles such as skips / bins need to be provided at intervals along the work front and in the Construction Camp area. 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> • Regular disposal needs to be practiced for these containers. • Non-hazardous waste generated on site needs to be disposed of at a registered landfill site and waybills filed at the site office for auditing purposes. • Any hazardous waste generated needs to be collected and disposed of by an approved licenced Waste Contractor. • Chemical toilets on site need to be regularly serviced by a licenced Service Provider on a weekly basis. • The bins should have liner bags for easy control and safe disposal of waste. • There should be recycling of waste practiced with separate drums provided for paper and cardboard; glass; plastics; metals and organic waste. • The provision of separate skips for different waste types (i.e. "household" type refuse; building rubble) needs to be provided. • The excavation and use of rubbish pits on site is strictly forbidden. • The burning of waste is forbidden. • Any area demarcated for the sorting or temporary storage of waste needs to be signposted and fenced off. • If required a designated, bunded area is to be set aside for vehicle washing and maintenance and hazardous wastes. Any waste effluent or materials caught in this bunded area must be disposed of to a suitable and licenced waste site by a licenced Service Provider. • Waybills for safe disposal must be must be filed at the site office. • The Contractor must ensure that all litter is collected daily from the work front and site camp areas daily. Similarly, all bins and/or skips must be regularly emptied and their waste disposed of at a registered landfill site. All waybills are to be filed at the site office. • Construction rubble needs to be disposed of at a registered landfill site and a sump (earth or other) must be created for concrete waste. This is to be de-sludged regularly and the cement waste is to be removed to a registered landfill site. • The following general principals must apply to waste management on the site: <ul style="list-style-type: none"> - The Contractor responsible for the waste removal and management on the site, which must be undertaken in accordance with local municipal requirements; 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> - Transport of all waste on site must be undertaken by a reputable, registered waste contractor, approved by the local authority; - The construction site should be inspected for litter on a daily basis. Extra care should be taken on windy days. Precautions must be taken to avoid litter from entering watercourses and the Klip River; - Any hazardous waste such as fuel, oils and chemicals shall be disposed of by a licenced Service Provider at a licensed hazardous waste disposal site; - The Contractor must keep the site clean, tidy and litter free at all times; - No refuse or waste material is to be disposed of by burying or burning; and - All asbestos material shall be disposed of according to the Asbestos Regulations 2001, as per Government Notice. R: 155, dated 10 February 2002, promulgated under the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). - Any significant spills on-site must be reported to the relevant Authority (e.g. Department of Water and Sanitation / EDTEA / Municipality etc.) and must be remediated as per the requirements of this EMPr. 		
Stormwater Management	<ul style="list-style-type: none"> • The Contractor must ensure that stormwater management controls are planned and implemented. • The increase in stormwater runoff resulting from construction activities must be estimated and the temporary drainage system assessed. • If required, a Stormwater Management Plan for the temporary control of stormwater emanating from the site must be submitted by the Contractor and approved by the Implementing Agent. • During site establishment, any existing stormwater culverts and drains are to be located and covered with metal grids to prevent blockages if deemed necessary by the Implementing Agent. • Provision must also be made during the Establishment Phase for all polluted runoff to be treated to the Proponents and Implementing Agents approval before being discharged into the stormwater system. • Stormwater contaminated with hazardous chemicals or petrochemicals must be treated and disposed of by a licenced Service Provider and waybills must be filed at the site office. 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> The Contractor must not, in any manner, modify or damage the banks or bed of streams, rivers, wetlands, other open water bodies and drainage lines adjacent to, or within the designated working area, without the necessary environmental approvals being in place from the Competent Authorities. Earth, stone and rubble must not be placed in stormwater channels, drainage lines or rivers, nor is such material to be excavated. 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> • The stormwater management plan/system implemented must be functioning as intended and that the peak storm water discharge from the site has not increased as a result of construction activities. • Further principles that should be followed in terms of temporary stormwater management on site include: <ul style="list-style-type: none"> - The avoidance of the use of high velocity stormwater pipe lines in favour of open, high friction, semi-permeable channels wherever feasible; - The construction of a number of smaller stormwater outfall points instead of a few large outfall points; and - The design of stormwater outfalls should facilitate reduced flow velocity and minimize and avoid stream banks and soil erosion through design features such as reno-mattresses or splitter blocks. • Similarly, un-channelled flow must be controlled to avoid erosion (i.e. brush packing). • In situations where the surface run-off is concentrated, flow should be attenuated by contouring with hay bales/berms. These should channel concentrated flow into detention/attenuation ponds or areas protected with hay bales for flow minimisation and sediment trapping. • Furthermore, physical measures that must be taken to prevent stormwater pollution include: <ul style="list-style-type: none"> - Where necessary, rock pitched diversion ditches or berms are to be used to divert water runoff away from exposed soil or construction areas. Silt fences may also be used; - Separate stormwater collection areas and interceptors at fuel storage areas, batching plants and other potentially polluting activities must be constructed; - The use and storage of all materials, fuels and chemicals, which could leach into the ground, shall be controlled. - Any residue from spillages shall be removed from site by appropriate contractors. Handling, storage and disposal of excess or containers of potentially hazardous materials shall be in accordance with the requirements of the adjudicating authority or any other relevant department; 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> - No storage of any materials whatsoever will occur on or within 50 metres of a natural drainage system or within its 1:100 year floodline; and - Erosion gullies and rills within the construction site must be rehabilitated immediately and the root cause of the erosion dealt with immediately. • All of the above-listed mitigation measures must be costed for in the Construction Phase financial planning and budget. 		
Water Quality and Soil Contamination Management	<ul style="list-style-type: none"> • Every precaution must be taken to ensure that chemicals or hazardous substances do not contaminate the soil, surface or groundwater on site. • For this purpose the Contractor must: <ul style="list-style-type: none"> - Ensure that the mixing / decanting of all chemicals and hazardous materials takes place on a tray or impermeable surface. Waste generated from these activities should then be disposed of at a registered landfill site; - Ensure all storage tanks are properly designed and managed in order to prevent pollution of surface and groundwater, and soils; - Construct separate stormwater collection areas and interceptors at storage tanks and other associated potentially polluting activities; - Ensure that use and storage of fuels and chemicals that could potentially leach into the ground is properly controlled. Adequate spillage containment and clean-up measures must be implemented; - Fuel and chemical storage containers must be set on a secure bunded platform with 110% containment capacity. The containment capacity shall be equal to the full amount of material stored, plus 10%. - Appoint appropriate contractors to remove any residue of hazardous substance spillages from site; - Ensure that used oils / lubricants are not disposed of on / near the site, and that contractors purchasing these materials understand the liability under which they must operate; and - Ensure that site staff do not use any stream, river, 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 other construction or related activities. 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> • Municipal water or another source approved by the Implementing Agent and Proponent must be used for all activities. • Provision must be made during site establishment for all polluted runoff to be treated to the Proponent and Implementing Agents approval before being discharged into the stormwater system. • Storage areas that contain hazardous substances must be bunded with an approved impermeable liner and fitted with an outlet valve. • The storage areas should preferably have a roof, however, if this is not the case then any stormwater ingress must be considered contaminated and disposed of by a licenced Service Provider. • Any stormwater ingress must be removed on a daily basis to prevent reduced bunding capacity. • Spills in bunded areas must be cleaned up, removed and disposed of safely from the bunded area as soon after detection as possible, to minimise the pollution risk and reduced bunding capacity. • A designated, bunded area is to be set aside for vehicle washing and maintenance if this will be undertaken on the site. Run-off from fuel depots / workshops / truck washing areas and concrete batching / mixing areas shall be directed into a conservancy tank and disposed of at a waste disposal site, approved by the Proponent and the local municipal authority. • Should the Contractor require construction vehicles to be washed on site, all wash areas will have oil traps installed before draining into the sewer system. The Contractor shall confirm that contaminated wash water does not enter drainage structures untreated. • Contaminated water storage facilities shall not be allowed to overflow and appropriate protection from rain and flooding must be implemented. • No storage of hazardous construction materials whatsoever, or placement of temporary ablution facilities, must take place within 100 meters of a watercourse or wetland, or within the 1:100 year floodline. 		
Soil Management	<ul style="list-style-type: none"> • Prior to site establishment, the Contractor must strip and stockpile any topsoil (if any) within the construction zone for re-use during rehabilitation. 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> • Stockpiled soil should not be in excess of 2m in height, and should be protected from wind and rain with the use of tarpaulins, if necessary. • Soil stockpiles must be positioned at least 100 metres away from watercourses or wetlands. • Soil stockpiles must be positioned in an area that will prevent dust particles being blown onto the residents and road users. • Clearing activities, including heavy earthworks, must only be undertaken during agreed working times and permitted weather conditions, as agreed upon with the Proponent and Implementing Agent. If heavy rains are expected shortly before planned clearing activities then these should be postponed until after the rainfall event. • The unnecessary removal of groundcover from slopes must be prevented, especially on steeper slopes. • Following the clearing of an area, the surfaces of all exposed slopes must be roughened to retain water and increase infiltration. • Stormwater control and wind screening must be undertaken where necessary to prevent soil loss from the site. • The battering of any banks shall be such that cut and fill embankments are no steeper than previous natural slopes, unless otherwise allowed by the Engineer. Cut and fill embankments steeper than previous ground levels must be re-vegetated immediately. 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> All embankments, unless otherwise directed by the Implementing Agent, shall be protected by a cut off drain to prevent water from running down the face of the embankment and resulting in erosion. Excavated materials from trenching must be placed within the 25m working servitude, and placed back in the trench in the same order it was removed once the pipe has been installed. Soil erosion prevention measures should be implemented such as gabions, sand bags etc. whilst energy dissipaters should be constructed at any surface water outflow points. The sites should be monitored weekly for any signs of off-site siltation. All areas impacted by earth-moving activities should be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding. All exposed earth should be rehabilitated promptly with suitable vegetation to stabilize the soil; The areas surrounding watercourse crossings must be regularly checked for signs of erosion. If erosion is evident, corrective action must be taken; and Any exposed earth should be rehabilitated promptly with suitable vegetation to protect the soil. Vigorous grasses planted with fertiliser are very effective at covering exposed soil. It is important to note, that the use of fertilisers, must be undertaken with caution and must not be allowed, in any circumstances, to run into drainage lines, rivers, wetlands or the Klip River, to avoid any possible Eutrophication impacts. Special care and erosion prevention measures must be taken when working in areas where naturally dispersive soils occur. Final designs must take into account specialised recommendations made by the geotechnical engineers for sensitive areas which may be naturally prone to soil erosion. 		
General Stockpile Management	<ul style="list-style-type: none"> The general requirements for the sighting of materials stockpiles are that they should be situated in an area that should not obstruct the natural water pathways / flows on site. No material stockpiles of any type must be located within 50 metres of a watercourse and must be positioned in an area that will prevent dust particles being blown on to the adjacent residents. Stockpiles must be placed outside of the 1:100 year floodline. Material stockpiles, or stacks such as pipes, must be stable and well secured to avoid collapse and potential injury to site workers and/or local residents. Obstruction to drivers' line of site due to stockpiles and stacked materials must be avoided, in particular at intersections and sharp corners. 		

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ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> • Any topsoil stockpiles must be kept separate from other stockpiled materials for later use in rehabilitation requirements. • Subsoil materials excavated for the pipeline construction area must be temporarily stockpiled on the opposite side of the trench, until backfilling occurs to prevent obstruction in the working corridor, if necessary. • If topsoil or subsoil stockpiles are exposed to windy conditions or heavy rain, they could either be protected by vegetation using an indigenous grass seed mix or cloth, depending on the duration of the time which the stockpiles will remain. • Dust suppression in the form of watering must be implemented on all soil stockpile areas during windy conditions. The construction of a berm consisting of sand bags, or a low brick wall, can also be installed around the base of the stockpile for soil retention purposes. • Soil stockpiles must be maintained free of alien vegetation and weeds at all times. 		
General and Hazardous Substances / Materials Management	<ul style="list-style-type: none"> • The selection of the site for the storage of materials needs to consider the prevailing winds, distance to water bodies and general on-site topography. These areas need to be designated in the Construction Camp layout plan and demarcated and fenced, if necessary. • Hazardous substance storage areas must be secured and safe from access from unauthorised personnel, children and animals. They must be located 100m from any watercourse / wetland and outside of the 1:100 year floodline. • A number of general requirements relating to the use of construction materials must be adhered to, these include: <ul style="list-style-type: none"> - The mixing of all concrete must occur on a designated, impermeable surface or mixing board; - Lime and other powders must not be mixed during very windy conditions; - Similarly the spraying of herbicides or pesticides must not occur under windy conditions and must comply with OSHA regulations and other chemical handling laws; - All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed of/removed from the site; and - Hazardous substances / materials are to be transported in sealed containers or bags. 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> • A Method Statement for the Management of Hydrocarbon Spills must be prepared by the Contractor. • The site shall have a ready supply of absorbent material available to absorb any emergency hydrocarbon spills. • In the event of a spillage, the source of the spillage must be isolated. The Contractor must contain the spillage using sand berms, sandbags, pre-made booms, sawdust or other absorbent materials and the area must be cordoned off. The ER and Implementing Agent must be immediately notified so that the correct clean up procedure can be followed. • The ER and Contractor are responsible for ensuring that potentially harmful materials are properly stored and used on the site. • A ledger of all hazardous materials stored on site must be maintained and a record of the people that have accessed the materials must be kept as part of the safety system of the materials. • Material Safety Data Sheets (MSDS's) must be readily available on site for all chemicals and hazardous substances to be used on site. MSDS's must also include information on ecological impacts and measures to minimize negative environmental impacts during accidental releases or escapes. • Fire prevention and fighting equipment, as well as spill kits, must be present at all hazardous chemical storage facilities. • Furthermore, all hazardous storage and refuelling areas must be bunded according to the following minimum requirements: <ul style="list-style-type: none"> - The bunding will be 110% of the capacity of the tank/s, or volumes of liquids being stored; - The bunding must be constructed of a concrete foundation with brick walls, and must have an impermeable lining (e.g. epoxy coating on internal plastered surfaces); - The containment bund must be sloped to a low point; - An outlet valve must be installed at the low point in the wall to allow for the release of excess stormwater in the event of excessive rainfall; and - Should a spill occur within these bunded areas, it must be cleaned up, removed and disposed safely from these areas as soon as possible 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> • A designated, bunded area is to be set aside for vehicle washing and maintenance. Materials collected in this area must be disposed of at a suitable waste site or as directed by the Engineer. • All fuel storage tanks must meet relevant specifications and be elevated so that leaks can be easily detected. • Fuel and oil is to be stored within a specifically demarcated area on site. • Areas for storage of fuels and other flammable materials must comply with standard fire safety regulations and may require the approval of the Local Municipal Fire Prevention Officer. • Oils must be stored in tanks or drums with lids that remain firmly closed and shielded from the elements and kept under lock and key. All staff working with these materials / substances must be aware of their potential impacts and follow and be trained in the appropriate safety measures. • In the event that the concrete requirements are transported to site as “ready mix”, certain precautions must be taken. To prevent spillage onto roads, “ready mix” trucks shall rinse off the delivery chute into a suitable sump prior to leaving the site. • If a concrete batching plant is required on site, the environmental specifications detailed below are to be employed: <ul style="list-style-type: none"> - Shade cloth around the batching plant to prevent the cement dust being dispersed across the site; - A sump for the collection of water overflow from the batching process; and - A Method Statement from the contractor must be drawn up to deal with overruns in the batching of concrete, i.e. 5m³ is batched, but only 4.5 m³ is utilised, the Method Statement is to detail how the 0.5m³ of unused concrete will be disposed of. • Cement / concrete must not be mixed directly on the ground. Mixing boards, mixing trays and impermeable sumps must be used at all mixing and supply points. • Unused cement bags are to be stored so as not to be effected by rain or runoff events. • Used cement bags must be stored in weatherproof containers to prevent windblown cement dust and water contamination. Used cement bags must be disposed of on a regular basis via the solid waste management system and must not be used for any other purpose. 		

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ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> All visible remains of excess concrete must be physically removed on completion of the plaster or concrete pour section and appropriately disposed of. Washing the remains into the ground is not acceptable as groundwater contamination could occur. All excess aggregate shall also be removed. With respect to exposed aggregate finishes, the Contractor shall collect all contaminated water and fines and store it in sumps for disposal at an approved waste site. 		
Conservation of Natural Resources	<ul style="list-style-type: none"> No natural vegetation may be cleared during construction without the prior permission of the Implementing Agent and ECO. Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. Particular attention must be paid to imported material as it may contain an alien seed bed. An Alien invasive Plant Management Plan for the construction zone must be developed and implemented by the Contractor for the duration of the Contract and Defects Liability Period. Monthly alien invasive plant management and removal must be undertaken by the contractor in all areas which are disturbed by construction activities. This must continue during the defects liability period. Access into all protected areas and nature reserves, if applicable, must be restricted by the Contractor. Furthermore, no construction works / disturbance must be allowed in watercourses / wetlands without prior permission of the Proponent and Implementing Agent and without the necessary environmental approvals. Identify sensitive fauna and flora prior to construction works commencing and once the final pipeline alignment has been established and preferably pegged. This is to be undertaken by a suitably qualified environmental / biodiversity specialist/s who must be required to identify any features which require permit applications prior to their removal / destruction. Any required permits must be obtained prior to the feature being removed or destroyed; Site personnel must undergo Environmental Training and be educated on keeping any vegetation disturbance to a minimum; Poaching or harvesting of indigenous flora / fauna must be strictly forbidden; Alien plant encroachment must be monitored and prevented as outlined in the EMPr; 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> All exposed earth should be rehabilitated promptly with suitable vegetation to protect the soil. Vigorous grasses planted with fertiliser are very effective at covering exposed soil. Necessary rehabilitation measures (e.g. burning, seeding, removing alien plants etc.) should be introduced to ensure species composition reverts to a more natural state (with regards to affected areas). Indigenous vegetation with deep set root systems is advisable to limit soil loss on site. Alternatively, water dissipating mechanisms such as gabions or reno-mattresses may be implemented on-site to help stabilize the surrounding soil and provide a platform for the growth of vegetation. No hunting is permitted on-site or the surrounding areas; No animals required for hunting e.g. dogs, under the supervision of construction workers, should be allowed into the area. All construction personnel on the property should be informed of this ruling; and Any construction personnel found to be poaching in the area should be subjected to a disciplinary hearing. The working corridor must be no wider than 25 metres under normal circumstances. Where sensitive features occur this must be reduced to an appropriate width as per the recommendations of the appropriate specialist. In terms of watercourse and wetland crossings the working corridor must be no wider than 14m either side of the centre of the pipeline. Where the construction corridor transverses agricultural land the working zone must be appropriately fenced off in the same manner which is practiced by the affected landowner. No clearance of vegetation must occur outside of this zone. Post construction agricultural lands must be rehabilitated as close as possible back to their previous state and in accordance with the grassing requirements of the landowner. Appropriate stormwater / surface water management measures must be put in place before construction commences and maintained throughout the lifetime of the development; An appropriate number of toilets (1 toilet for every 20 workers) must be provided for labourers during the Construction Phase. These must be maintained in a satisfactory condition and a minimum of 100m away from any water resources and outside of the 1:100 year floodline of a watercourse; Any contaminated water associated with construction activities must be contained in separate areas or receptacles such as Jo-Jo tanks or water-proof drums, and must not be allowed to enter into the natural drainage systems / watercourse / wetlands; 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> • The Construction Camp should be positioned on previously disturbed areas (if possible) and must be located outside of the 1:100 yr floodline of a watercourse and more than 100m away from any other water resource; • Soil erosion prevention measures must be implemented such as gabions, sand bags etc. whilst energy dissipaters must be constructed at any surface water outflow points. The site must be monitored by the Contractor weekly for any signs of off-site siltation. All areas impacted by earth-moving activities must be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding; • Appropriate silt control mechanisms must be installed around all soil excavations to prevent silt from entering the Klip River and surrounding watercourses; • Should any excavations require dewatering, this is to occur through an adequately designed silt trap prior to discharge. All silt traps are to be regularly monitored and maintained to ensure efficient and effective use; • Special care must be taken in regard to the stability of the river banks once the pipeline has been installed. It is strongly recommended that the rehabilitation measures be undertaken with emphasis on the use of plants to protect the river bank. Hard structures such as gabions and mattresses should be avoided if possible since they may well lead to bank erosion in the long term; • All recommendations noted in the Wetland Assessment Report (Appendix 9) must be adhered to; and • At the end of the construction phase, the site must be fully revegetated to match as closely as possible the pre-construction condition. 		
Safety and Security	<ul style="list-style-type: none"> • During site establishment, the Construction Camp must be secured to minimise the opportunity for criminal activity occurring. • The Construction Camp must be fenced and manned on a 24 hour basis. • All deep excavations or dangerous areas must be adequately demarcated and sign posed with safety warning signage, or fenced. 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> All hazardous material storage areas must have appropriate signage and must have the necessary firefighting and spill containment and clean-up equipment in case of emergency situations. No staff other than security staff are permitted to reside at the construction camp after working hours. No construction staff must be permitted to trespass on private land. Any construction personnel found to be trespassing on private land must be immediately subjected to a disciplinary hearing; Construction workers / construction vehicles must take heed of normal road safety regulations, thus all personnel must obey and respect the law of the road. A courteous and respectful driving manner must be enforced and maintained so as not to cause harm to any individual; and A safe designated speed limit must be set by the project managers to limit possible road strikes and accidents. 		
Visual Impacts	<ul style="list-style-type: none"> The erection of lighting must be undertaken in such a manner as to preclude the lighting from becoming intrusive. Storage facilities, elevated tanks and other temporary structures on site must be located such that they are visually un-obtrusive to the local residents. The Construction Camp should be screened with the use of shade cloth prior to the start of construction as considered necessary by the Implementing Agent and Proponent. Screening of highly reflective material must be given particular attention. 		
Dust / Air Pollution Impacts	<ul style="list-style-type: none"> The site must be dampened with a water bowser or sprinklers, as necessary to minimise dust problems. Alternatively chemical soil stabilisers may also be used for dust suppression. Vehicles and machinery are to be kept in good working order and should excessive emissions be noted, the Contractor is to have equipment repaired and serviced. No fires, whatsoever, are to be permitted on site. Should burning be required, the necessary written approval must be obtained from the local Fire Chief and all the necessary precautions taken to avoid any potential damage occurring to surrounding land owners or environment. 		
Noise Impacts	<ul style="list-style-type: none"> Construction vehicles are to be fitted with standard silencers prior to the start of construction. 		

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ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> Should the vehicles or equipment not be in good working order, the Contractor must be instructed to remove the offending vehicles or machinery from site. Equipment that is fitted with noise reduction facilities (e.g. side flaps, silencers etc.) must be used as per operating instructions and maintained properly during site operations. No works shall be executed between sunset and sunrise and on the non-working and special non-working days as stated in the Contract Data unless otherwise agreed between the Engineer and Contractor. Blasting, piling or any other 'noisy' activities must take place during normal working hours (8am - 5 pm Monday to Friday). The surrounding community must be notified 3 days prior to any planned activities that will be unusually noisy. 		
Fire Control	<ul style="list-style-type: none"> All fire requirements must be carried out as contained in the National Building Regulations SABS 0400 and the safety code of the N.F.P.A. The Contractor must take all reasonable and active steps to avoid increasing the risk of fire through their activities on site. The Contractor must ensure that basic fire-fighting equipment is to the satisfaction of the Local Fire Services. The Contractor must designate a Fire Control Officer. The Contractor must ensure that all the correct fire-fighting equipment is available on site and within easy access. No fires for heating or cooking is permitted on the construction site. The local farmers' association must be advised in 14 days in advanced of any activity which poses a fire risk to their lands. Firebreaks are to be burnt as and when required along the working servitude. Appropriate financial compensation must be provided to landowners should they, under agreement, agree to undertake these duties on behalf of the contractor. The disposal of any matter by burning is strictly prohibited. 		
Welding	<ul style="list-style-type: none"> The Contractor must take precautions when working with welding or grinding equipment near potential sources of combustion. This includes agricultural areas where portable firefighting equipment must be available at all times. 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
Private property and landowner interaction	<ul style="list-style-type: none"> • The Contractor is to maintain open lines of communication with the Ladysmith Farmers Association at all times during the construction phase of the project. In this regard a designated representative from the association must be identified. • It is recommended that a Steering Committee be established to attend to any grievances raised and to keep landowners abreast of construction progress. A Land Liaison Officer or Community Liaison Officer could assist in this regard. • Any damage to property, as a result of construction activities, is to be immediately repaired and/or replaced to its previous state, if not better. This includes fencing. • Should, for whatever reason, fencing associated with the stocking of livestock be damaged, the landowner is to be notified immediately so as to prevent any livestock from escaping. • The construction corridor is to be adequately fenced during construction and removed in its entirety post-construction, unless prior arrangement is reached with the affected landowner. • All landowners are to be notified timeously of construction activities which are to occur on their property. At least one week's prior notice is to be given. The estimated construction duration per property is to be provided to the landowner. • Under no circumstances are construction personnel to trespass on private property. • Should the burning of firebreaks be required for construction purposes, the landowner is to be informed timeously. Agreement is to be reached concerning the area to be burnt, any areas to be avoided and the proposed day for burning. • Firebreaks are to be burnt by suitability experienced personnel, in the presence of the designated Fire Control Officer. • Adequate firefighting mechanisms are to be available at all times. • Where possible, a representative of the landowner is to be present on the day of the burn. • The Contractor and landowner are to agree on compensation prior to the burn. 		
Social and Socio Economic Impacts	<ul style="list-style-type: none"> • No private lands outside of the construction zone may be accessed without the permission of the landowner; • Local people must be employed where ever possible; • Materials for construction must be sourced from local suppliers wherever possible and feasible; 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> Reasonable financial compensation must be provided to local landowners where their agricultural activities or infrastructure is directly affected by construction activities. This also applies to businesses and other landowners who may also be directly affected by construction activities; Where boundary fences are removed in agricultural areas the project managers and contractor are to ensure that adequate temporary fencing to secure the affected farm land / livestock is in place prior to it being removed; A Community Liaison Officer would assist in raising any concerns / complaints noted by the affected community to the Construction Team. It is recommended that a clear line of communication and contact person be established to inform local farmers of any upcoming construction activities during the construction phase. This representative must be invited to monthly progress meetings so that project information can be relayed back to the Ladysmith Farmers Association; and No staff accommodation must be provided on site or in the more rural areas immediately surrounding the project. Foreign site staff should preferably be housed in Ladysmith and transported to the work front on a daily basis. 		
Impacts on Existing Infrastructure	<ul style="list-style-type: none"> Prior to construction activities commencing the contractor and project manager must ensure that the adequate measures have been taken to identify underground / hidden services and potential features of heritage significance which could potentially be on / at the specific site. The construction and design requirements of the owners of any underground services must be adhered to at all times. The contractor must notify IAPs as soon as possible of the commencement of construction in areas close to their services, such as SANRAL; DoT, Transnet, Eskom and Telkom. This must be done prior to construction commencing; Reasonable financial compensation must be provided to local landowners where their agricultural activities or infrastructures is directly affected by construction activities. This also applies to businesses and other landowners who may also be directly affected by construction activities; No-go areas must be clearly demarcated, such as graves and other sensitive features, and must be afforded an appropriate no-go buffer to prevent disturbance 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
Cultural Heritage Environment	<ul style="list-style-type: none"> • Before construction commences, all staff are to be informed of possible archaeological or historical objects of value could be found on the site. Site staff must be informed that they need to notify the Contractor and Implementing Agent should such any item be unearthed. This item must be covered during the Environmental Awareness Training Process. • The ECO of the project must be informed of the fact that all the geological formations, except for dolerite, are likely to contain fossils if exposed at a depth of more than 1,5m. • All sections of the development where bedrock is exposed due to erosion or where geotechnical surveys indicate that trenching will exceed 1,5m in areas underlain by Very High, High and Moderate Palaeontologically Sensitive rocks must be inspected by a qualified palaeontologist as part of a Phase 1 Palaeontological Impact Assessment. The professional Palaeontologist must be appointed to record and collect the fossils according to SAHRA and AMAFA specifications as part of a Phase 1 Palaeontological Impact Assessment, preferably before construction in areas where the rocks area exposed due to erosion and also during construction when trenching exceeds 1,5m in depth. • Site 1NOD06 (28°34'14.11"S; 29°44'55.30"E) must be demarcated before construction begins. • Should any items of heritage significance be discovered during construction, construction is to cease in that area and Amafa is to be notified immediately. • The contractor is to bear in mind that human settlements may yield graves. Should any graves be intercepted, the following procedure is to be followed: <ul style="list-style-type: none"> – Amafa should be contacted if any heritage objects are identified during earthmoving activities and all development should cease until further notice; – No structures older than sixty years or parts thereof are allowed to be demolished altered or extended without a permit from Amafa; – No activities are allowed within 50m of a site which contains rock art; – Amafa should be contacted if any graves are identified during construction and the following procedure is to be followed: <ul style="list-style-type: none"> ○ Stop construction; ○ Report finding to local police station; and ○ Report to Amafa to investigate. 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> No walling may be damaged without permission from the archaeologist and/or Amafa KZN. 		
Site Specific Construction Works & Wetland / Watercourse Management & Rehabilitation Requirements	<ul style="list-style-type: none"> No construction or rehabilitation works, whatsoever, are permitted within any watercourse² or wetland on, or surrounding the site and not forming part of this project without the necessary approvals from the Competent Authorities, which include the EDTEA and DWS. The following recommendations noted in the Wetland Assessment Report must be implemented for watercourse crossings <p><u>Impact Mitigation for Wetland Areas:</u></p> <ul style="list-style-type: none"> ➤ Prior to the start of construction, the project Environmental Control Officer (ECO) must set out markers indicating the area within which the wetland-related precautionary measures must be adhered to. ➤ The total width of the working servitude in wetland areas may not exceed 10 m – 12 m. ➤ The construction of the pipeline crossing should be done during the dry season when ground water will be at a minimum. ➤ Soil excavated from the trench must be set aside from the wetland. Great care must be taken to keep the topsoil separated from the subsoil. ➤ No materials or soils, including pipe bedding material, may be stockpiled in the wetland. ➤ Once the pipe is set in place impervious plugs of compacted clay-rich material must be set in place on each side of the wetland. The purpose of these plugs is to prevent water flowing out of the wetland and along the pipeline trench. 		

² The definition of a watercourse in terms of the NEMA: EIA Regulations of 2010 is as follows:

“watercourse” means:

(a) a river or spring;

(b) a natural channel or depression in which water flows regularly or intermittently; or

(c) a wetland, lake or dam into which, or from which, water flows; and (d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks;

“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.

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> ➤ The soil from the trench must be returned in the correct sequence with the subsoil being located underneath the topsoil. ➤ Once the soil has been returned, the whole area of the trench is to be uniformly and lightly ripped to a depth of approximately 30 cm and is to be levelled to match the original ground profile. ➤ Once the soil has been prepared, the area is to be revegetated. This is to be done by hand planting plugs of wetland species taken from elsewhere in the system. The plugs are not to be greater than 30 cm x 30 cm and must be collected individually. NOTE: No fertiliser is to be applied in the wetland area. ➤ If cattle are likely to graze in the area then the pipeline trench should be fenced off. ➤ The site must be watered until such time as natural water flows will sustain the plants. <p><u>Impact Mitigation for Dams:</u></p> <ul style="list-style-type: none"> ➤ The pipeline route should not pass within 10 m of a dam if at all possible. ➤ As a matter of preference, the pipeline should pass a dam on the downslope side. If it must pass on the upslope side then especial care must be taken to ensure that the construction trench is rehabilitated and revegetated as soon as is possible and care must be taken that any erosion control structures such as drains or berms do not lead water away from the dam. ➤ The pipeline should not ever pass through a dam. If this is unavoidable, then especial care must be taken to seal the pipeline trench along its length within the dam basin so as to avoid establishing a situation in which water leaks away along the trench. The owner of the dam must give written consent and must be adequately compensated if leakage occurs. <p><u>Impact Mitigation for Channels</u></p> <ul style="list-style-type: none"> ➤ The construction of the pipeline crossings should be done during the dry season when flows are likely to be at a minimum. ➤ The working servitude within the channels and for a distance of 20m on either side of them must be no more than 7 m on either side of the centreline of the pipe. 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> ➤ All soil and sediment excavated from the channels and their immediate surrounds must be stockpiled or spoiled at a site at least 20 m from the channel edge. ➤ Great care must be taken to ensure that the channel banks are left in a stable condition at the completion of the construction process. As necessary, use may be made of degradable soil meshes and/or gabions. ➤ All exposed soil must be planted over with indigenous vegetation similar to that of the pre-construction state. It is suggested that extensive use be made of creeping grasses such as Kweek (<i>Cynodon dactylon</i>). If necessary, the seeds and then the young plants must be watered until such time as they are self-sufficient. ➤ At sites where there is a risk of the pipeline trench being trampled by cattle, it must be protected by a fence until such time as it is considered to be fully rehabilitated. <p><u>Impact Mitigation for Rivers</u></p> <p>General:</p> <ul style="list-style-type: none"> ➤ Rivers should be crossed at points where the channel is as narrow as possible. This recommendation is based on reduction of both the extent of time spent working in the channel, and the extent of the working footprint in the channel. ➤ Rivers should be crossed at points where the banks are stable and where rehabilitation of the banks after construction will be most likely to be simple and successful. ➤ To the greatest possible extent the pipeline should approach rivers at right angles since this obviates the banks being cut at sharp angles which will leave spurs which are susceptible to erosion. <p>Site Specific:</p> <p><i>Middelspruit Upstream and Downstream crossings</i></p> <ul style="list-style-type: none"> ➤ The construction of the pipeline crossing should be done during the dry season when flows are likely to be at a minimum. ➤ The working servitude within the stream channel and for a distance of 20m on either side of it must be no more than 7 m on either side of the centreline of the pipe. 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> ➤ All soil and sediment excavated from the channel and its immediate surrounds must be stockpiled or spoiled at a site at least 20 m from the channel. ➤ Great care must be taken to ensure that the channel banks are left in a stable condition at the completion of the construction process. As necessary, use may be made of degradable soil meshes and/or gabions. ➤ All exposed soil must be planted over with indigenous vegetation similar to that of the pre-construction state. Where wetland species are called for they may be sourced from nearby in the channel but only small plugs (± 40 cm x 40 cm) should be moved since extraction of larger plugs may led to damage at the donor site. <p><i>Roodepoort crossing</i></p> <ul style="list-style-type: none"> ➤ The construction of the pipeline crossing should be done during the dry season when flows are likely to be at a minimum. ➤ The working servitude within the stream channel and for a distance of 20m on either side of it must be no more than 7 m on either side of the centreline of the pipe. ➤ All soil and sediment excavated from the channel and its immediate surrounds must be stockpiled or spoiled at a site at least 20 m from the channel. ➤ Great care must be taken to ensure that the channel banks are left in a stable condition at the completion of the construction process. As necessary, use may be made of degradable soil meshes and/or gabions. ➤ All exposed soil must be planted over with indigenous vegetation similar to that of the pre-construction state. Where wetland species are called for they may be sourced upstream of the crossing site but only small plugs (± 40 cm x 40 cm) should be moved since extraction of larger plugs may led to damage at the donor site. The actual crossing site should be fenced off for at least a year so as to prevent cattle from walking over it and possible causing erosion of the trench area. <p><i>Flagstone Spruit Upstream crossing</i></p> <ul style="list-style-type: none"> ➤ The construction of the pipeline crossing should be done during the dry season when flows are likely to be at a minimum. 		

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ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<ul style="list-style-type: none"> ➤ The working servitude within the stream channel and for a distance of 20m on either side of it must be no more than 7 m on either side of the centreline of the pipe. ➤ All soil and sediment excavated from the channel and its immediate surrounds must be stockpiled or spoiled at a site at least 20 m from the channel. ➤ Great care must be taken to ensure that the channel banks are left in a stable condition at the completion of the construction process. As necessary, use may be made of degradable soil meshes and/or gabions. ➤ All exposed soil must be planted over with indigenous vegetation similar to that of the pre-construction state. It is suggested that extensive use be made of creeping grasses such as Kweek (<i>Cynodon dactylon</i>). Where wetland species are called for they may be sourced upstream of the crossing site but only small plugs (± 40 cm x 40 cm) should be moved since extraction of larger plugs may led to damage at the donor site. <p>Flagstone Spruit Downstream crossing</p> <ul style="list-style-type: none"> ➤ The construction of the pipeline crossing should be done during the dry season when flows are likely to be at a minimum. ➤ The working servitude within the stream channel and for a distance of 20m on either side of it must be no more than 7 m on either side of the centreline of the pipe. ➤ All soil and sediment excavated from the channel and its immediate surrounds must be stockpiled or spoiled at a site at least 20 m from the channel. ➤ Great care must be taken to ensure that the channel banks are left in a stable condition at the completion of the construction process. As necessary, use may be made of degradable soil meshes and/or gabions. ➤ All exposed soil must be planted over with indigenous vegetation similar to that of the pre-construction state. On the south bank, including the area in the secondary flood channel, the primary grasses to be used will be tall species such as Thatch Grass (<i>Hyparrhenia hirta</i>). These plugs may be sourced from the surrounding area but must be small (± 40 cm x 40 cm) should be moved since 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	<p>extraction of larger plugs may led to damage at the donor site. Creeping grasses such as Kweek (<i>Cynodon dactylon</i>) may be seeded between the plugs so as to produce some cover in a short space of time. Kikuyu Grass may not be used as the species is an alien invader.</p> <ul style="list-style-type: none"> ➤ On the north bank if the seep zone is affected, then the balance of grasses used should be dominated by the creeping grasses. Near the river some plugs of sedges and other hygrophilous species may be placed. These may be taken from the surrounding area and should be placed in bands which run along the horizontal contour line. It will not be necessary to cover the entire area with them since they will tend to spread naturally when water is present. ➤ Where the pipeline trench passes through the seep zone care must be taken to ensure that it does not become a preferential channel for ground water since there could then be both damage to the pipe bedding material, and to the seep zone. Therefore impervious barriers of clay or a similar material should be built into the trench at 8 m to 10 m intervals in that section. <p>Klip River crossing</p> <ul style="list-style-type: none"> ➤ The construction of the pipeline crossing must be done during the dry season when flows are likely to be at a minimum. ➤ The working servitude within the stream channel and for a distance of 20m on either side of it must be no more than 7 m on either side of the centreline of the pipe. ➤ All soil and sediment excavated from the channel and its immediate surrounds must be stockpiled or spoiled at a site at least 20 m from the channel. ➤ Great care must be taken to ensure that the channel banks are left in a stable condition at the completion of the construction process. As necessary, use may be made of degradable soil meshes and/or gabions. ➤ All exposed soil must be planted over with indigenous vegetation similar to that of the pre-construction state. The primary grasses to be used will be tall species such as Thatch Grass (<i>Hyparrhenia hirta</i>). Creeping grasses such as Kweek (<i>Cynodon dactylon</i>) may be seeded between the plugs so as to produce some 		

CONSTRUCTION PHASE			
ACTIVITY	REQUIRED ACTION / REMEDIATION TO CONTROL ENVIRONMENTAL IMPACT	IN PLACE (YES / NO)	COMMENTS
	cover in a short space of time. Kikuyu Grass may not be used as the species is an alien invader.		
Site Rehabilitation Guidelines (Terrestrial)	<ul style="list-style-type: none"> • The Rehabilitation Guidelines included in Section 3.4.4. of the terrestrial biodiversity assessment must be utilised as guideline for all terrestrial rehabilitation works on the site. • In areas where natural vegetation may be impacted upon / disturbed by construction activities, these areas are to be topsoiled and re-planted with locally occurring indigenous species and managed until vegetation has become established. • Any indigenous planting programs are to source indigenous plant material from within a 50km radius. Locally harvested material must be free of alien invasive plants / seeds. • Care must be taken to avoid contamination of water bodies with fertilizer. • Fertilizer must be kept in waterproof drums to ensure no leaching occurs into the natural environment. • Rehabilitation works should commence on completed sections of the route as soon as is practically possible. • The Contractor is to make financial provision for regular watering / irrigation while vegetation is becoming established. • Management and maintenance of rehabilitated areas must continue at defined intervals during the Defects Liability Period. • It is advisable that any vegetation rehabilitation activities undertaken by the Contractor be overseen or undertaken by a suitably experienced specialist to ensure successful establishment of vegetation. • Should the Contractor be required to decommission the pipeline on completion of the project, for whatever reason, the following must be noted: <p>Any decommissioning requirement works associated with the pipeline must be undertaken in accordance with a specialised EMPr which is formally approved by the EDTEA prior to implementation. This EMPr does <u>not</u> provide for this specific decommissioning activities and has not been approved for this purpose by the Competent Authority.</p>		

8. STAFF CONDUCT CONTROL AND INFORMATION SHEET

ALL STAFF MUST OBEY THE FOLLOWING RULES:	
1	DO NOT tamper with or destroy nesting sites, lairs or any other form of animal shelter.
2	DO NOT leave the construction sites untidy and strewn with rubbish that will attract animal pests.
3	DO NOT trespass on private properties not linked to the project or adjacent to the project.
4	DO NOT carry a weapon on the construction sites or in the vehicles transporting workers to and from the construction sites.
5	DO NOT set fires unnecessarily.
6	DO NOT cause any unnecessary disturbing noise at the construction site or at any designated worker collection/drop off points.
7	DO NOT drive a vehicle under the influence of alcohol.
8	DO NOT exceed the national speed limits on public roads.
9	DO NOT drive a vehicle that is generating excessive noise (noisy vehicles must be reported and repaired as soon as possible).
10	DO NOT litter along the roadsides, including both public and private roads.
11	DO NOT remove or destroy vegetation at the construction camp / construction site without the prior consent of the Contractor and ECO.
12	DO NOT tamper with, destroy or remove vegetation from any areas that have been fenced off or marked.
13	DO NOT pollute watercourses, whether flowing or not.
14	DO NOT drive through the watercourses except at designated points.
15	DO NOT operate critical items of mechanical equipment without having been trained and certified.
16	ALL employees must undergo the necessary safety training and wear the necessary protective clothing at all times.
17	NO ad-hoc activities are to be undertaken e.g. fires for cooking, the use of surrounding bush as a toilet facility is strictly forbidden
18	NO worker may be forced to do work that is potentially dangerous or for what he / she is not trained to do.

9. ALIEN PLANT CONTROL

Best practice measures that should be undertaken during clearing include the following:

- (i) Cut plants as low to ground as possible.
- (ii) All alien plants must be removed carefully and exposed soil should be covered with cut vegetation or leaf litter that is free of weed seeds to ensure that regrowth will not occur.
- (iii) Press any loosened soil down carefully and firmly and mulch with plant material where possible.
- (iv) All alien seeds, fruit bulbs, tubers and stems must be collected and placed in a sealable container/plastic bag for disposal at a landfill site.
- (v) The roots system of mature trees including alien invasive play an important role in stabilising soil and therefore the up-rooting of large mature specimen of trees is not advocated. It is better to fell the trees and paint the stump with the relevant herbicides.

Control methods

METHOD	DESCRIPTION
MECHANICAL METHOD	
Hand pulling/ hoeing	<ul style="list-style-type: none"> Hand pulling is most effective with small (30cm), immature or shallow rooted plants. Shake the excess sandy material from the plant, this makes the plant easier to stockpile and lighter to transport. However make sure there is no seed on the plant first to eliminate the spread of seed while shaking.
Chopping/ cutting/ slashing	<ul style="list-style-type: none"> This method is most effective for plants in the immature stage, or for plants that have relatively woody stems/ trunks. This is an effective method for non re-sprouters or in the case of re-sprouts (coppicing) it must be done in conjunction with chemical treatment of the cut stumps. <p>Note</p> <ul style="list-style-type: none"> Cut/slash the stem of the plant as near as possible to ground level. Paint re-sprouting plants (i.e. Black Wattle, Lantana and Port Jackson willow) with an appropriate herbicide immediately after they have been cut. Stockpile removed material into piles as prescribed.
Felling	<ul style="list-style-type: none"> De-branch trees and where possible remove all material. Where possible large trees that are to be felled such that they fall uphill. Cut the tree down as low as possible to the ground. Apply herbicide immediately (no later than 30mins) to the cambium layer. Ensure all the cuts in the cambium layer are treated.
Ring barking	<ul style="list-style-type: none"> Remove bark in a 30-40cm centimetre band and leave the tree to die Can be used with or without chemicals but is more successful when herbicide is used

APPENDIX 1 – EMPR ACKNOWLEDGEMENT FORM

**PROPOSED CONSTRUCTION OF A POTABLE WATER GRAVITY PIPELINE
AND APPURTENANT WORKS FROM BRAKFORTEIN FARM TO LADYSMITH
WATER TREATMENT WORKS, EMNAMBITHI / LADYSMITH MUNICIPALITY
KWAZULU-NATAL.**

Record of signatures providing acknowledgment of being aware of, and committed to complying with the contents of this Environmental Management Programme (EMPr), which relates to the environmental management, mitigation and rehabilitation measures for the project outlined above, and the environmental conditions contained in the civil and other construction contract documents.

PROPONENT:

Signed:

Date:

IMPLEMENTING AGENT:

Signed:

Date:

CONTRACTOR:

Signed:

Date:

EMPLOYER'S REPRESENTATIVE (ER):

Signed:

Date:

SUB - CONTRACTOR:

Signed:

Date: