

**LUDEKE DAM REPAIRS, MBIZANA WITHIN THE WINNIE MADIKIZELA-MANDELA
LOCAL MUNICIPALITY, ALFRED NZO DISTRICT MUNICIPALITY, EASTERN CAPE**

Draft Environmental Management Programme

MAY 2023



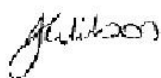
Environmental Authorisation Reference: To Be Confirmed

Name of Applicant: Umgeni Water

EAPS DECLARATION

I, **Joleen Wilson** declare that -

- I act as the independent environmental assessment practitioner in this matter;
- I do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I performed the work relating to the application in an objective manner, even if it results in views and findings that are not favourable to the applicant;
- I declare that there were no circumstances that compromised my objectivity in performing such work;
- I have expertise in conducting the screening assessment relevant to this application, including knowledge of the National Environmental Management Act (Act 107 of 1998) (NEMA), regulations and any guidelines that have relevance to the proposed activity;
- I comply with the NEMA Act, regulations and all other applicable legislation; and
- I disclosed to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this report are true and correct.
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B (1) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Joleen Wilson

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1. PROJECT DETAILS

1.1 Project Background and Location

The proposed project for the repairs to the Ludeke Dam will be occurring at the Ludeke Dam. The dam is situated in the Nkantlo Settlement, north-west of Mbizana Town within the Winnie Madikizela-Mandela Local Municipality in the Eastern Cape.

Directions to Ludeke Dam: Follow the N2 south from Durban to Port Shepstone. Continue onto the R61 south towards Port Alfred, pass Port Alfred and cross the Mtamvuna River into the Eastern Cape Province. Continue along the R61 for approximately 60.4 km to the area of Mbizana. At Nomlacu turn right into the unnamed untarred road. Follow this road for approximately 9.7km. At this intersection, turn left, drive towards the dam. The dam wall will be reach first. Before the dam wall, turn right and follow the dirt road to get to the dam office and pump station. The distance between Durban and Ludeke Dam using this route is approximately 234km.

The proposed construction and installation of pipework is planned for Portion 0 of 169 Farm Isikelo with surveyor general 21-digit reference number:

C	0	8	6	0	0	0	0	0	0	0	0	0	1	6	9	0	0	0	0	0
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The approximate centre of the development is: 30°44'35.31" S | 29°44'50.43" E.

1.2 Listed Activities under EIA Regulations 2014, as amended

Table 1: Details of the proposed infrastructure required for the repairs

Triggered Activity	Proposed Feature	How is this Activity Triggered	Location and sensitivities
(GNR 327) Activity 12 – The development of – (ii) infrastructure or structures with a physical footprint of 100 square metres or more; Where such development occurs – (a) Within a watercourse; (b) If no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	Two pipeline networks, consisting of 20: 1. 110mm diameter uPVC/HDPE Slotted Pipe segments 2. 2 160mm diameter unperforated uPVC pipes) Existing toe drain pipe which will be realigned as part of this project	The construction footprint including working servitudes is planned to be approximately 20 000m ² / 2 ha. The construction for the installation of the pipe segments making up the pipe network and the re-alignment of the existing toe drain occurs within 32m of a watercourse as well as within a watercourse.	The pipe networks will be installed in an area which has been delineated as an artificial wetland. A wetland is included in the definition of a watercourse.
	Three Headwalls and discharge points	The overall construction footprint is planned to be approximately 20 000m ² / 2 ha.	The headwalls, concrete encasement structures and man-hole covers will be constructed within watercourses / wetlands.
	Three concrete encasements for pipe sections crossing roads		
	Man-hole covers will be installed linking each pipe segment to the main discharge pipe		
(GNR 327) Activity 19 – The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	Two pipeline networks, consisting of 20: 1. 110mm diameter uPVC/HDPE Slotted Pipe segments 2. 2 160mm diameter unperforated uPVC pipes) Existing toe drain pipe which will be realigned as part of this project	Excavation and removal and then infilling and depositing of material of more than 10 cubic metres will be carried out during the construction and laying of the pipelines.	All of these structures fall within watercourses and wetlands.
	Three Headwalls and discharge points		

Triggered Activity	Proposed Feature	How is this Activity Triggered	Location and sensitivities
	Three concrete encasements for pipe sections crossing roads		
	Man-hole covers will be installed linking each pipe segment to the main discharge pipe		
GNR 324) Activity 12 – The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. a. Eastern Cape v. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	Two pipeline networks, consisting of 20: 1. 110mm diameter uPVC/HDPE Slotted Pipe segments 2. 2 160mm diameter unperforated uPVC pipes) Existing toe drain pipe which will be realigned as part of this project Three Headwalls and discharge points Three concrete encasements for pipe sections crossing roads Man-hole covers will be installed linking each pipe segment to the main discharge pipe	Approximately 2 hectares of land will be disturbed for the installation of the subsoil pipe networks. Removal of indigenous vegetation will be required along all work surfaces to ensure that excavating and pipe laying can occur. Although the proposed site does not fall within a critically endangered or endangered ecosystem, the area may be zoned as open space, conservation or the equivalent zoning.	Although the proposed site does not fall within a critically endangered or endangered ecosystem the proposed construction area may be located within an area zoned as open space, conservation or the equivalent zoning.

1.3 Water Use License

In accordance with Section 21 of the National Water Act (Act No. 36 of 1998), a water use license will be required. It has been confirmed by the Department of Water and Sanitation that the project will apply for registration of water uses within the ambit of a general authorisation (GA) in terms of Section 40 of the National Water Act, 1998 (Act 36 of 1998).

2. OUTCOME AND OBJECTIVES

This EMPr is a practical document that provides a pro-active and feasible working tool to enable the guidance, measurement and monitoring of environmental performance on site. The EMPr sets out the objectives and outcomes required for mitigation. These requirements will have a financial impact on the projects costing's.

The objectives of the EMPr are to:

- Ensure that the construction, operational and rehabilitation phases of the project continue within the principles of Integrated Environmental Management.
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project.
- Ensure that the recommendations provided in the environmental impact assessment are complied with.

Any environmental issues that are identified during or after construction must be addressed in consultation with the environmental consultant. As such this EMPr must be viewed as a dynamic document that may require updating or revision where necessary.

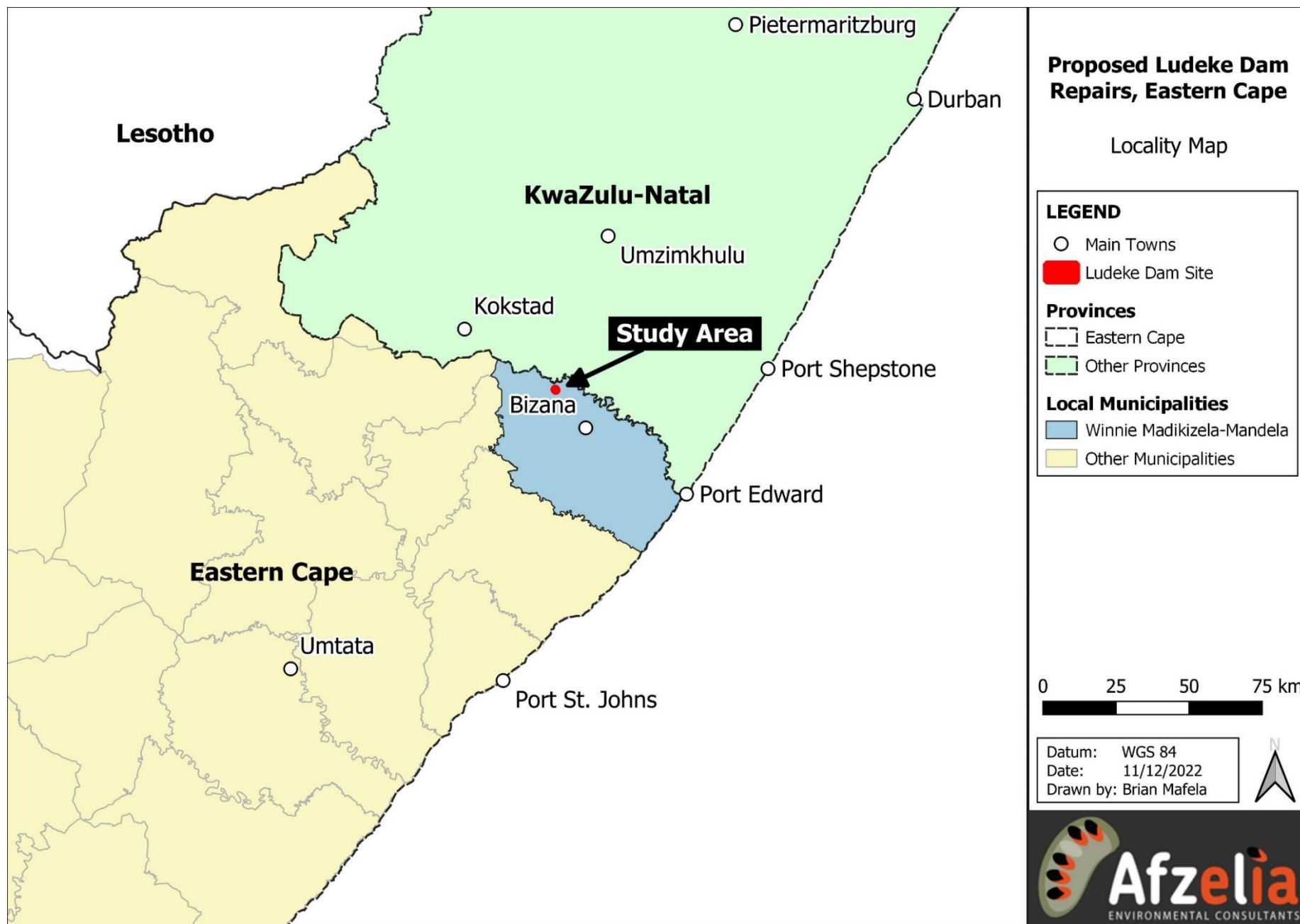


Figure 1: Locality Map of Ludeke Dam

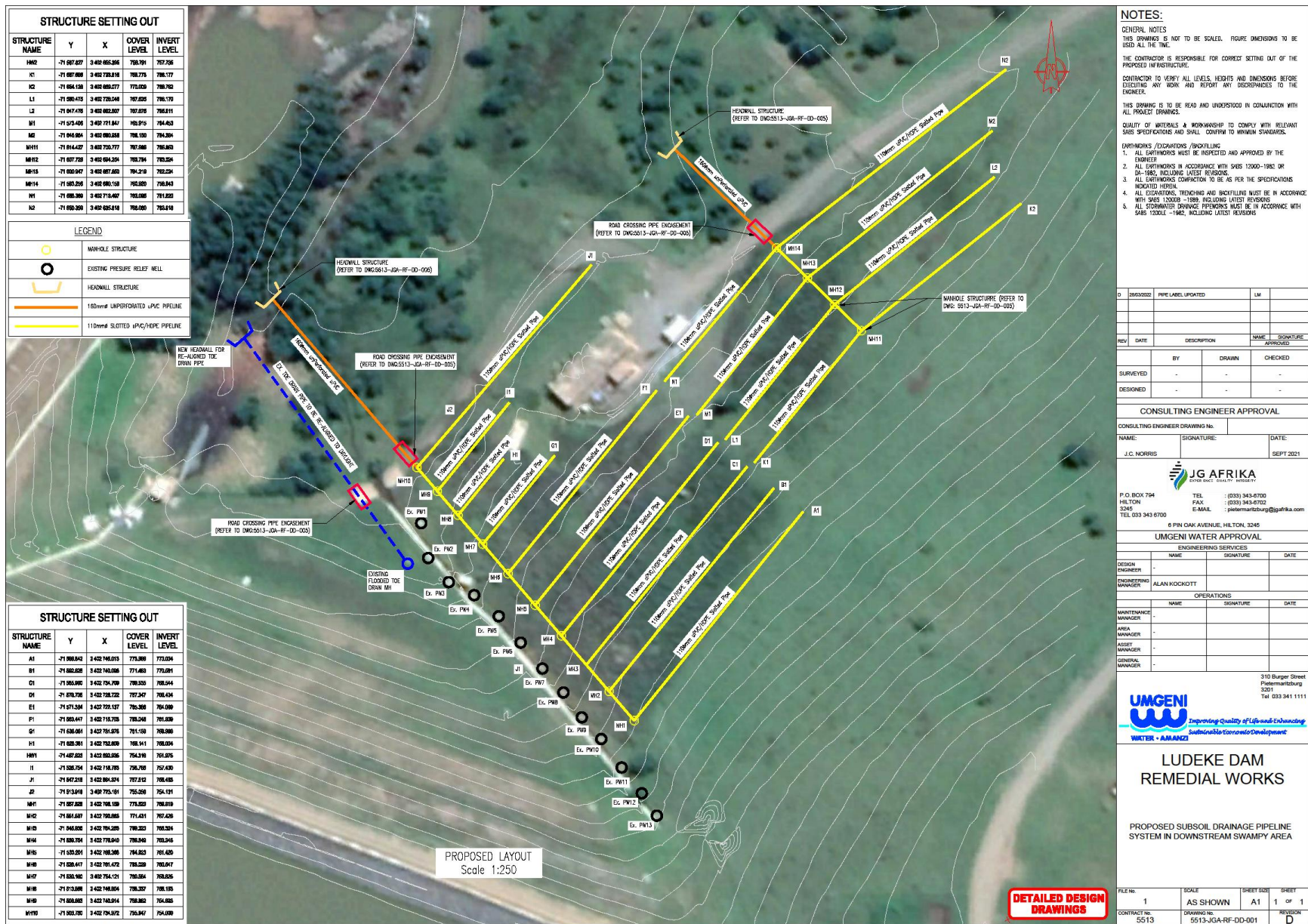


Figure 2: Layout for the proposed subsoil drainage pipeline network

3. SUMMARY OF POTENTIAL IMPACTS ASSOCIATED WITH THE SUBSOIL DRAINAGE NETWORK CONSTRUCTION

Identified Impacts	Significance Scoring Without Mitigation	Significance Scoring with Mitigation
Construction Phase		
Loss of vegetation communities	65 Medium	18 Low
Loss of plant species of conservation concern	33 Low	10 Low
Loss of faunal species of conservation concern	44 Medium	15 Low
Fragmentation, loss of ecosystem function and edge effects	48 Medium	12 Low
Invasion of alien plant species	52 Medium	14 Low
Disturbance of watercourse habitat	45 Medium	25 Low
Pollution of watercourse habitat	28 Low	12 Low
Disruption of stream flow	60 Medium	21 Low
Increased sedimentation	70 Medium	36 Low
Direct habitat disturbance	60 Medium	21 Low
Operation Phase		
Transformation of watercourse habitat	45 Medium	45 Medium
Disturbance of watercourse habitat	52 Medium	21 Low
Pollution of watercourse habitat	22 Low	6 Low
Disruption of stream flow	70 Medium	18 Low
Increased sedimentation	75 Medium	18 Low
Direct habitat disturbance	30 Low	12 Low

4. ENVIRONMENTAL MANAGEMENT PROGRAMME

3.2 Planning, Pre-construction, Construction and Decommissioning Phase

This pertains to all environmental impacts associated with construction and is not limited to the land on which the project is located. It includes the site footprint, construction campsites, access roads, all watercourses, admiralty zone the ocean, as well as any other area affected or disturbed by construction activities.

Activity	Management / Mitigation	Responsibility	Frequency / Timing
Legislation permits and agreements	Fourteen (14) calendars day's written notice must be submitted to DFFE , DWS and the local municipality indicating that the construction phase will commence. The notice must include: the EIA reference number; site preparation activities; commencement date; and information regarding the appointed Environmental Control Officer (ECO).	Pro	Before construction commences
Auditing of Construction	A suitably experienced ECO must be appointed to monitor and audit the construction site on a regular basis. It is proposed that the ECO attend the site weekly and produce weekly site inspection reports and monthly audit reports to be sent to the Applicant, the Contractor/s and to the Proponents (i.e., DFFE and DWS as stipulated as per the Environmental Authorisation.	Pro, C & PM	
	The camp must be established on level ground.	PM, E & C	

Activity	Management / Mitigation	Responsibility	Frequency / Timing
Setting up and Access to site	The location of the camp site must be approved by the ECO.	PM, C & ECO	
Routing	Access to site must be via existing and planned roads only. Access must cause minimum disturbance to surrounding residents and/or vegetation and must not impede traffic flow.	PM, E & C	Planned prior to construction commences and on-going.
	Machine / vehicle operators must receive clear instructions to remain within demarcated access routes. Machines MUST NOT enter private properties.	PM & C	Communicated prior to construction commences and on-going
Maintenance of the access	Signs must be erected leading up to the construction area to caution drivers and pedestrians of the construction work and potential for turning heavy machinery.	C & PM	Planned prior to construction commences and on-going
Camp Set-Up and Management	No vehicle / machinery maintenance or servicing is permitted in the camp site.		
	Adequate parking must be provided for site staff and visitors.		
	The construction camp must be properly fenced, secured and locked after construction hours. A 24-hour security may be required.		
	The Contractor must attend to, monitor and manage the drainage of the campsite to avoid sheet erosion and / or standing water. Run-off from the camp site must not discharge into neighbouring properties.		
	The construction camp must be kept clean and in a neat condition at all times.		
Ablutions	No refuse storage outside the fence of the camp site will be permitted.		
	Temporary chemical toilets must be provided in the construction camp and on site. These facilities must be maintained in a clean and hygienic condition; toilet paper must be provided. The toilets must be serviced at least once a week by a registered service provider, e.g. Sanitech. The use of surrounding bush, or other areas as a toilet facility is strictly forbidden.		
	Records of toilet maintenance and sewage removal must be kept on site to ensure that sewage is not disposed of into watercourses.		
Ablutions	There must be a minimum of 1 toilet for every 10 workers . The toilets must be placed on an impervious and/or bunded surface.	C & PM	Planned prior to construction commences and on-going
	Toilets must be placed at least 100m away from drainage lines, watercourses, riparian edge and outside the 1:100-year flood line.		
General Hazardous Substances and Materials	Choice of location for equipment lay-down and storage areas must consider, prevailing winds, distances to drainage channel, general on-site topography, and water erosion potential of the soil. These areas must be located within previously disturbed areas.		
	Construction materials and equipment must be stored at least 100m away from any water resource.		
	Hazardous storage and refueling areas must be bunded prior to their use on site during the construction period following the appropriate SANS codes. The bund wall should be high enough to contain at least 110% of any stored volume. The surface of the bunded surface should be graded to the center so that spillage can be collected and satisfactorily disposed of.		

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	<p>Storage areas must be designated, demarcated, and fenced off. Storage areas must be secured to prevent entry by unauthorised persons.</p> <p>Portable construction equipment (e.g. generators) must be stored on an impervious surface or alternatively, within lipped drip trays.</p> <p>Storage facilities must be protected from the ingress of storm water from surrounding areas to ensure accidental spillage does not pollute the local soil or water resources.</p> <p>Mixing and decanting of all chemical and hazardous materials must take place on a tray, shutter board or impermeable surface.</p> <p>No vehicles transporting concrete, asphalt or any other bituminous product may be washed on site.</p> <p>No vehicle maintenance must take place on site.</p> <p>All equipment must be checked regularly for oil and fuel leaks before it is operated. Lipped drip trays must be placed underneath equipment to contain contaminants during spills.</p> <p>Dispose of used oil, grease, diesel and petrol in specified containers which must be marked accordingly. Always ensure that the lid of the container used for disposal is closed /tightened.</p> <p>Soil that is contaminated e.g. with cement, hydrocarbons or paint must be stored in drums or a provided spill bin and disposed of at a registered hazardous landfill site. Waybills for such disposal must be kept on site for record keeping.</p> <p>Contaminated water containing fuel, oil or other hazardous substances must never be released into the environment. It must be stored in an iso-tankers and disposed of at a registered hazardous landfill site.</p> <p>Concrete and other hazardous must be disposed of at a licensed hazardous waste site.</p> <p>Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used, this includes diesel. MSDSs must include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.</p> <p>Fuel storage tanks must meet relevant specifications and be bunded and elevated so that leaks are easily detected. Bunded areas must be able to contain 110% of the volume of liquids being stored.</p> <p>Spill kits must be available on site and staff must be properly trained on the use of spill kits. Spills must be cleaned up immediately and contaminated soil/material disposed of appropriately at a registered site (See Appendix C).</p> <p>Contractors must have and submit method statements for storage of hazardous materials and emergency procedures to the Engineer, Project Management and ECO.</p>		
Source of Materials	<p>Contractors must prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, etc.) and submit these to the Engineers and ECO for approval prior to commencement of any work</p> <p>A signed document from the supplier of natural materials must be obtained confirming that they have been obtained in a sustainable manner and in compliance with the relevant legislation.</p> <p>Where materials are borrowed (mined), proof must be provided of authorisation to utilise these materials from the landowner / mineral rights owner and the Department of Minerals Resources (DMR).</p>	C	Planned prior to construction commences and on-going

Activity	Management / Mitigation	Responsibility	Frequency / Timing
Education on general and environmental conduct	Ensure that all site personnel have a basic level of environmental awareness training. This must be done through Environmental Induction (See Appendix A).	C, PM & ECO	
	Environmental awareness training must include awareness and impacts relating to the watercourse and nearby marine environment.		
	No-Go areas must be highlighted in the training and during weekly toolbox talks.		
Disruption of recreational activities	Danger tape and adequate signage must be set up to warn local people of on-going construction.	C & PM	
	Sign boards must be erected informing users of the dam of the construction activities	C & PM	
Social Impacts	A site notice (i.e. a public notice) must be erected on the construction site giving contact details of the Project Manager, the Contractor and the ECO before construction activities commence.	C & PM	
	A complaints register must be kept on site. Details of complaints must be incorporated into the audits as part of the monitoring process. Complaints must be efficiently dealt with by the relevant party e.g. contractor / project manager etc.	C, PM & ECO	
Noise Impacts	During construction phase, construction equipment may only operate between the hours of 08h00 and 17h00 on weekdays, 08h00 and 13h00 on Saturdays. Notify adjacent landowners and ECO of after-hours construction work and of any other activity that could cause nuisance.	C, PM, ECO	
	During Operation, operational activities are prohibited on Sundays and Public Holidays.	C & PM	
	Temporary noise pollution due to construction works should be minimized by ensuring the proper maintenance of equipment and vehicles and tuning of engines and mufflers as well as employing low noise equipment where possible.		
Visual Impacts	Artificial lighting must be restricted to areas under construction and not directed towards the sensitive areas. (i.e. the watercourse)	C, PM, ECO	
	Lighting required for safety and security reasons must be targeted on the areas required.	C, PM	
	Yellow sodium lights or compressed Fluorescent Bulbs must be used instead of other types.		
Dust and Air	Water trucks will be required to suppress dust by spraying water on affected areas producing dust. This will likely be required daily.	C & PM	
Soil Erosion and Conservation of Soil Resources	Wherever possible, existing vegetation cover on the development site should be maintained during the construction phase.	C, PM, ECO	
	Lowering of the existing ground level must be avoided or restricted to less than 0.5m below ground level.		
	Clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities must be put on hold. The contractor must be aware of weather forecasts.	C	
	All bare slopes to be exposed during clearing and earthworks must be protected against erosion using hay-bales, sandbags and/or silt fences aligned along the contours and spaced at regular intervals (e.g., every 2m).	C & PM	
	After every rainfall event, the contractor must check the site for erosion damage and rehabilitate the damage immediately. Erosion rills and gullies must be filled in with appropriate material and silt fences must be established along the gulley for additional protection until re-vegetation. Geobags must be used when and where required.	C & PM	

Activity	Management / Mitigation	Responsibility	Frequency / Timing
Topsoil and Stockpiling	Erosion control measures such as silt fences, low soil berms or wooden shutter boards must be placed around the stockpiles.	C & PM	Planned prior to construction commences and on-going
	Stockpiles must be placed at least 100m away from the high-water mark.		
	The stockpiles must only be placed within demarcated stockpile areas, which must fall within the demarcated construction area. The contractor shall, where possible, avoid stockpiling materials in vegetated areas that will not be cleared.		
	Stockpiles of construction material must be clearly separated from soil stockpiles.		
	Stockpiled soils are to be kept free of weeds and not compacted. The stockpiled soil must be kept moist using some form of spray irrigation.		
	Stockpiles kept for more than 3 months must be hydroseeded.		
	The slope and height of stockpiles must be limited to 1.5m and not be sloped more than 1:2 to avoid collapse.		
Storm Water Management	An effective storm water management plan must be designed and implemented. The storm water management plan MUST include Sustainable Urban Drainage Systems (SUDS). Refer to Appendix E for different SUDS that may be applied.	C & PM	Planned prior to construction commences and on-going
	An on-going maintenance management plan must be in place to ensure that the storm water facilities are kept free of silt and debris to prevent any blockages that may arise. Appropriate inlet protection measures must be installed around storm water inlets to reduce risks of sediment blockages.		
	Temporary cut off drains and berms must be provided to capture storm water and promote infiltration.		
	Plans for storm water control must include attenuation ponds, U-drains with raised stone pitching, infiltration measures, vegetated swales and natural depressions.		
	NEVER allow storm water to exit onto unprotected slopes.		
Water Resources & Water Quality	Contact numbers for the Department of Water and Sanitation, the ECO, the Compliance, Monitoring and Enforcement Component of DFFE as well as other emergency contact numbers provided by the Municipality must be made available and easily accessible on site. If spillages or contamination occur on site these departments and the ECO are to be contacted immediately to deal with the spillage or contamination.	C & PM	Planned prior to construction commences and on-going
	Erosion berms, silt traps, etc. must be in place for all areas where vegetation removal or excavation activities occur to ensure excess sedimentation does not enter the watercourses.		
	Dewatering of tanks, etc. is to take place in a controlled manner. No uncontrolled release of water is allowed onto the site area.		
	Ensure that a potable water source is maintained for domestic use ONLY during construction.		
	Contaminated water from bunded areas must not be released into the storm water system. When required, the contaminated water must be pumped from the bunded area and removed from site using a registered service provider.		
	No construction activities or material must encroach into the watercourse or dam.		
Conservation of the Natural Environment	No firewood or medicinal plants may be harvested.		
	Alien vegetation MUST NOT be introduced on site (See Appendix B).		
	Disturbance to birds, animals and reptiles and their habitats must be minimised.		

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	No wild animals may under any circumstance be hunted, snared, captured, injured, killed, handled, removed or be interfered with. This includes animals perceived to be vermin. Any fauna that are found within the construction corridor should be moved to the closest point of natural or semi-natural vegetation outside the construction servitude. No impoundment of any watercourse / ocean is permitted. No activities must take place outside the boundary of the planned development footprint. Indigenous vegetation must not be cleared from any area outside of the proposed development footprint.		
Solid Waste Management	Provide adequate rubbish bins and waste disposal facilities at convenient intervals on site. Educate/encourage workers not to litter or dispose of solid waste in the natural environment.	C, PM & ECO	Planned prior to construction commences and on-going
	Litter bins must be equipped with a closing mechanism to prevent their contents from blowing out or wild animals from accessing the contents.	C & PM	
	Litter bins should have lined bags for easy disposal and be cleaned regularly.		
	Waste bins must be provided at eating areas.		
	The contractor is responsible for the internal collection (and sorting) of refuse and to ensure that it is transported to a registered landfill site. Removal of waste must be done at a least once a week.	C	
	The use of rubbish pits is forbidden.	C & PM	
	Burning of waste is forbidden.		
	Construction solid waste must be collected in skips. Solid waste containers must be made available where required throughout the work front.		
	The construction site must be inspected for litter daily. Extra care must be taken on windy days.		
	All waybills for waste disposal must be kept on file and on site. The waybill must state the name of the refuse site.		
Solid Waste Management	A safe disposal certificate must be obtained from the waste disposal company to indicate the type of waste and the quality of the waste being disposed of at the correct waste site.		
	Dumping of waste on open spaces is strictly prohibited.		
Safety and Security	Potentially hazardous areas such as excavated trenches or pits / storage areas must be demarcated and made clearly visible at ALL times.	C & PM	Planned prior to construction commences and on-going
	Site demarcations must remain in position until all construction work has stopped.		
	Material stockpiles must be stable and well secured to avoid collapse and possible injury to site workers.		
	Flammable materials must be stored as far as possible from sensitive receptors.		
	Firefighting equipment must be present on site at all times.		
	First Aid kits must be available on site at all times.		
	No materials are to be stored in unstable or high-risk areas such as on steep slopes or banks of watercourses.		
Construction Camp	The Contractor must arrange the cancellation of all temporary services.	C & PM	Close to the end of construction activities and again when construction has been completed

Activity	Management / Mitigation	Responsibility	Frequency / Timing
			and the development has been commissioned.
	All structures comprising the construction camp are to be removed from site after construction activities have been completed.	C, PM & ECO	Post-construction
	The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint and fuels, etc. and these must be uplifted and disposed of at a hazardous landfill site.		
	All hardened surfaces within the construction camp area must be ripped, all imported materials removed, and the area must be top-soiled and re-vegetated. ECO / Rehabilitation specialist to advise as to suitably appropriate species to be planted.		
	All stockpile sites must be appropriately rehabilitated once construction activities have ceased.		On-going throughout the project and once the construction activities have been completed. Once the construction activities have been completed
	All soil retention, stabilisation mechanisms and structural requirements must be completed prior to the planting of vegetation (trees, shrubs, plants, grass) required for rehabilitation purposes.		
	The site must be cleared of all rubble and domestic waste and must be disposed of at a registered waste disposal site. All temporary bunds / spill trays must be removed from the site. Materials that will not be used again must be disposed of as hazardous waste.		
	All temporary works and stockpiles must be removed.		
Re-Vegetation / Rehabilitation	Re-vegetation of cleared surfaces and landscaping of disturbed areas must be done with the use of indigenous vegetation.	C & PM	Post-construction
	All exposed earth within and around the construction site must be rehabilitated promptly with suitable vegetation to protect the soil. Necessary rehabilitation and landscaping measures (e.g. hydroseeding, removing alien plants, plugs/or sods etc.) must be undertaken to ensure species composition reverts to a more natural state. Indigenous vegetation with deep set root systems is advisable to limit soil loss on site.		On-going, planned before rehabilitation and during rehabilitation
	If re-vegetation of exposed surfaces cannot be established immediately, temporary erosion and sediment control measures must be maintained. All temporary erosion and sediment control structures must only be removed once vegetation cover has successfully recolonised the affected areas.		
	All land within the area disturbed during the construction phase must be rehabilitated. Rehabilitation should involve the removal of all foreign materials, the reshaping of the land surface replanting with indigenous vegetation common to this area. (See Appendix D).		During rehabilitation
	Planting must be carried out as soon as construction is complete in a section to prevent soil erosion and the invasion of alien plant species onto the site. The ethos of progressive rehabilitation must be adopted.		
	The Contractor is to water and maintain all planted vegetation until the end of the defects liability period and must submit a method statement to the Site Manager & Environmental Control Officer. Furthermore, the Contractor will be held liable for the replacement of any plant or feature under the protection of these specifications that is removed or damaged by the Contractor's negligence or mismanagement.		During rehabilitation and throughout the defect's liability period
	Locally harvested material must be free of alien and invader plants/seeds.		Planned for before rehabilitation commences

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	All rehabilitated areas must be maintained through weekly inspections until at least 85% ground cover success rate has been achieved.		Planned for before rehabilitation commences and on-going through rehabilitation
	Encroachment of invasive alien plants must be monitored on a regular basis to prevent re-infestation as per the Invasive alien plant control plan.		On-going throughout rehabilitation and during the defect's liability period
	An on-going management plan must be implemented (every two weeks) for the clearing / eradication of alien species preferably through uprooting. The contractor should consult the ECO for the preferred method.		Planned prior to rehabilitation and implemented during rehabilitation.
	Herbicides should be utilised where hand pulling/uprooting is not possible. The ECO must be consulted in this regard.		
	Ongoing alien plant control must be undertaken after the construction phase in all disturbed areas.		On-going through rehabilitation and during the defect's liability period
	Monitor the site disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. The site must be monitored on a weekly basis by the ECO during the rehabilitation process and then twice a year for the next five (5) years (after construction) or until the seed bank for alien invasive vegetation has become depleted and indigenous vegetation has become dominant.		
Land Rehabilitation	All embankments, slopes and constructed drainages are to be shaped and topsoil reapplied. Hydroseeding must be done with a suitable grass seed mix to be advised on by a botanist.	C & PM	During rehabilitation
	Execute top soiling activity prior to the rainy season or any expected wet weather conditions.		
	Tilled / ripped subsoil must be covered with a 150 mm – 200 mm deep layer of topsoil. This requirement supersedes ALL other tender specifications.		
	If necessary, rip and / or scarify all areas following the application of topsoil to facilitate mixing of the upper most layers. This must be done by hand. The ECO will specify whether ripping and / or scarifying is necessary, based on the site conditions immediately before these works begin.		
	Do not rip and / or scarify areas under wet conditions, as the soil will not break up.		
Materials and Infrastructure	The Contractor must repair any damage that the construction work has caused to adjacent areas.		Once construction activities have been completed and the development commissioned
	Fences, barriers, and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.		
	All areas where temporary services were installed are to be rehabilitated to the satisfaction of the Engineer and ECO.		Once construction activities have been completed
	The applicant is reminded of Section 24F of the NEMA, Act No. 107 of 1998, as amended, that no listed activity may commence prior to an environmental authorisation being granted by the competent authority.		
General	A post construction audit must be conducted by the ECO, Engineer and Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the ECO. The site may not be handed over until the ECO and Engineer are satisfied.		Once construction activities have been completed and before the development is commissioned
	All activities to be undertaken on the property must be in accordance with the applicable By-Laws, policies, and requirements of the City.		

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	In addition to the above, all relevant legislation and requirement of other government departments (i.e. National, Provincial), in particular Section 28 (duty of care) of NEMA, must be complied with. "Duty of Care" to the environment, means that every person has a duty to avoid pollution and environmental degradation.		
	An erosion management plan must be developed to mitigate habitat degradation and consider all phases of the development		
	A maintenance management plan must be developed to mitigate on habitat degradation and consider all phases of the development.		
	Rehabilitation of natural vegetation must be undertaken to mitigate habitat degradation and consider all phases of the development		
	An Alien Invasive Plant Species Management and Control Plan must be designed and implemented to prevent further loss of floral habitat and diversity as AIPs displace native species.		
Emergency Response	An emergency response plan must be developed for accidental incidences / emergencies which may occur. The plan must clearly outline corrective actions to be undertaken to and prevention of reoccurrence thereof.		

3.3 Commissioning and Operational Phase

Activity	Management / Mitigation	Responsibility	Frequency / Timing
Discharge Outlets	Regular inspections and maintenance of discharge outlet infrastructure must take place on a regular basis over the lifespan of the development.		
Land rehabilitation	Indigenous species common to the area must be used to re-vegetate ground cover on the site.		
	Designated smoking and non-smoking areas to be provided in compliance with the Tobacco Products Control Act, 1999 (Act No. 12 of 1999).		
	The applicant is reminded of Section 24F of the NEMA, Act No. 107 of 1998, as amended, that no listed activity may commence prior to an environmental authorisation being granted by the competent authority.		
General	In addition to the above, all relevant legislation and requirement of other government departments (i.e. National, Provincial), in particular Section 28 (duty of care) of NEMA, must be complied with. "Duty of Care" to the environment, means that every person has a duty to avoid pollution and environmental degradation.		
Emergency Response	An emergency response plan must be developed for accidental incidences / emergencies which may occur. The plan must clearly outline corrective actions to be undertaken to and prevention of reoccurrence thereof.		

4. LEGISLATIVE REQUIREMENTS

The provisions of the EMPr are binding on the Contractor and Proponent during the construction contract and operational phase.

National Environmental Management Act, (Act 107 of 1998): Section 28 of NEMA states:

Duty of care and remediation of environmental damage

"(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 reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment"

The National Environmental Management Act (NEMA) and its Regulations entitle environmental authorities to administer a fine not exceeding R 10 million or 10 years' imprisonment and/or a fine and imprisonment for a person guilty of an unlawful activity. The Act makes allowance for the rectification of the unlawful activity but may charge up to R 2 million administration fees over and above the remediation costs.

Furthermore, NEMA makes provision for damages to be awarded by the courts where loss or damage has occurred as a result of a contravention of certain Environmental Statutes. For example, offences under the National Water Act No. 36 of 1965 and the Environmental Conservation Act No. 73 of 1989 may result in penalties being imposed in terms of NEMA.

Notwithstanding the Companies Act, 2008 (Act No. 71 of 2008), or the Close Corporations Act, 1984 (Act No. 69 of 1984), the directors of a company or members of a close corporation are jointly and severally liable for any negative impact on the environment, whether advertently or inadvertently caused by the company or close corporation which they represent, including damage, degradation or pollution (Section 24N (8) added by Section 5(h) of Act 25 of 2014; Section 24N (8) of Act 62 of 2008).

Environmental legislation applicable to the formulation of the EMPr for the Ludeke Dam Repairs includes, but is not restricted to, the following:

- The Constitution of the Republic of South Africa (Act No. 108 of 1996), including the Bill of Rights (Chapter 2, Section 24)
- National Environment Management Act (Act No. 107 of 1998)
- National Water Act (Act No. 36 of 1998)
- Provincial and Local Government Ordinances and Bylaws
- Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
- National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)
- National Environmental Management: Protected Areas Act (Act No.57 of 2003)
- Threatened or Protected Species Regulations (2015)
- KwaZulu-Natal Nature Conservation Ordinance (Act No 84 of 1974)
- Hazardous Substances Act (Act No. 15 of 1973)
- Occupational Health and Safety Act (Act No. 85 of 1993)
- National Environmental Management: Waste Act (Act No. 59 of 2008)

Statutes are amended periodically and it is the Applicant's responsibility to identify legislation relevant to the proposed activity. Once project implementation starts, legislation and all amendments that are current at that time will apply.

4.1 The Polluter-Pays Principle

This principle provides for "the costs of remedying pollution, environmental degradation and consequent adverse 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 will be rigorously applied throughout the construction phase of this project.

4.2 Project Responsibilities

Responsibility for the implementation of the EMPr lies with the Applicant who must retain the services of a suitably experienced and independent Environmental Control Officer (ECO) who will advise on and guide the construction processes and activities. The ECO will also be required to audit the project with respect to compliance with all requirements as previously outlined and will report on such compliances/non-compliances to the relevant Authorities as required.

The ECO's responsibilities must include, *inter alia*:

- Secure the protection and rehabilitation of the environment.
- Guide, advise and consult with Engineers on environmental issues during construction.
- Guide, advise and consult any contractors, sub-contractors, and suppliers etc. who will be involved in this project.
- Revise the EMPr as required and inform the relevant parties of the changes. Substantive changes **must be** authorised by the relevant authorities.
- Ensure that the EMPr has been accepted and understood as a contractually binding document on all parties involved with this project.
- Manage the project to ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks.
- Educate staff as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources, ensure that they (the staff) have received the necessary safety training, and are aware of the importance of a “clean-site policy”.
- Additionally, staff must be made aware of and receive the necessary environmental training on sensitive environmental areas, i.e. water courses, indigenous vegetation, and fauna in the area.

The responsibilities of the service providers and contractors during the construction phase are to:

- Ensure that all requirements of the Environmental Authorisation (EA) and EMPr and specific project details, are communicated to, understood and followed by all persons working on the project who may have an impact on the environment.
- Ensure that a procedure exists for reporting incidents and resolving any problems rapidly.
- Ensure that ALL staff are thoroughly trained in environmental awareness and carry out their duties with a high degree of environmental ethos.

4.3 Compliance with the EMPr

4.3.1 Record keeping

Copies of the Environmental Authorisation, Water Use License and EMPr as well as any other permits required must be kept on site and made available for inspection to anyone wishing to know the contents.

The ECO and auditor must report incidents of non-compliance to the Proponent, Project Manager and Competent Authority (EDTEA / DWS / Municipality) in Audit Reports as per the conditions set out in the Environmental Authorisation and EMPr. Any emergency incidents during the project must be reported to the Competent Authority and any other affected parties.

Records relating to monitoring and auditing must be kept on site and made available for inspection by Competent Authorities and other interested and affected parties.

All environmental incidents (non-compliance with EMPr) must be recorded as follows:

5.1.1 Time, date, location and nature of incident;

5.1.2 A written record (including photographs) must be kept detailing the incident; and

5.1.3 Corrective actions taken and by whom.

On completion of any component of the project, a post construction environmental audit report that assesses the success of the rehabilitation must be submitted to DFFE Compliance and Monitoring Department.

4.3.2 Monitoring and Compliance

Monitoring and Compliance must be in line with regulation 34 of NEMA (Act 107, 1998).

In order to facilitate communication between the ECO, the applicant, project manager and engineer (if different from the PM) as well as the contractor, it is vital that a suitable chain of command is structured that will ensure that the ECO's recommendations have the full backing of the project team before being conveyed to the contractor. In this way, penalties as a result of non-compliances with the EMPr may be justified as failure to comply with instruction from the highest authority.

The ECO has the authority to instruct the Contractor to cease an operation causing or liable to cause significant environmental damage, and issue fines or penalties for non-compliance with the EMPr. Please note that the responsibility for ensuring compliance with the EMPr and any other statutory requirements is ultimately that of the holder of the Environmental Authorisation or their appointed agents.

The duration over which the Contractor's controls shall be in place cover the construction period of the project as well as the limited time after the contract completion in the General Conditions of Contract, and the project specifications, as the defects liability period.

The responsibility rests with the Applicant to identify any sources or potential sources of pollution from his undertaking and to take appropriate measures to prevent any pollution of the environment. Failure to comply with the requirements of the National Water Act, 1998 (Act 46 of 1998) could lead to legal action being instituted against the Applicant.

4.3.3 Non - Compliance

The non-compliance is defined as, and will be issued for:

- i. Any deviation by Applicant or Contractor from the environmental conditions and requirements as set out in the EA, Water Use License, and EMPr that has or caused environmental impact;
- ii. Any contravention by the Proponent or a contractor of environmental legislation;
- iii. Any unforeseen environmental impact resulting from a direct or indirect actions or activities on site that would be considered as a significant impact. Significance will be determined by the Environmental Control Officer (ECO) but will be informed by geographic extent, duration, lasting effects of the impact and extent of remediation to the impact.

4.3.4 Mechanisms for Regulating Non-Compliance

The following violations and correlating penalties are only given as a recommendation. These must be discussed with DFFE prior to the commencement of the project to ensure that it is agreed upon between DFFE, the Developer, Contractor and the ECO. The violations and penalties agreed upon will then be enforced during the construction phase of the proposed development.

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

Incident / Violation	Penalty	Administering Authority
Failure to manage spoil and topsoil	R 2, 500.00 per day	ECO & Competent authority
Storing equipment or material within the water resource	R 5, 000.00 per day	ECO & Competent authority
Building materials, such as river sand, being sourced without a necessary permit.	R 15, 000.00 Per incident	ECO & Competent authority
Pollution of watercourse ²	R 25, 000.00	ECO & Competent authority
Failure to control and manage storm water	R 20, 000.00	ECO & Competent authority
Failure to provide adequate sanitation at construction working area and the construction camp	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 per day	ECO & Competent authority
Burning of waste on site	R 5, 000.00 per incident	ECO & Competent authority
Chemical and hazardous spills	R25 000.00 per day*	ECO & Competent authority
Starting of indiscriminate fires	R25 000.00 per incident per day excluding costs associated with firefighting, fire damage/destruction to homes, businesses etc	ECO & Competent authority
Failure to minimise the effects of erosion (on-going)	R 5, 000.00 per incident per day	ECO & Competent authority
Sourcing of water for construction purposes without necessary permit authorisation by DWS	R 15, 000.00	ECO & Competent authority
Failure to protect sensitive areas	R 5, 000.00 per day	ECO & Competent authority
Failure to ensure that the construction site is left devoid of pollution, erosion and unwanted/ surplus material	R 50, 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, rivers 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 15, 000.00	ECO & Competent authority

The Project Manager / ECO will inform the Contractor of the contravention when it occurs and applicable fines / penalties must be deducted from the next payment certification if the non-compliance is not remedied within 14 working days.

* The penalty (as indicated in the table above) associated with a chemical spill is a minimum amount payable. The full amount payable will depend on the nature and extent of the spill. In addition to the above stipulated penalty and any

²Definition 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”

additional amount that may be levied, the Contractor will need to pay for the cost of any soil and /or groundwater monitoring and any soil and / or groundwater remediation required by authorities.

The imposition of such a penalty does not preclude the relevant competent authority from applying an additional penalty in accordance with statutory powers.

Failure to redress the cause must be reported to the relevant authority for them to deal with the transgression, as deemed fit.

5. AMENDMENTS TO THE EMPR

Any amendments to the EMPr must be in accordance with regulation 50A of EIA regulations 2014. Any amendments will require approval from EDTEA. A confirmation letter from the relevant Competent Authority approving the amendments to the EMPr must be attached as addenda.

6. DETAILS OF PERSON(S) THAT COMPILED THE EMPR

Name and details of the Environmental Practitioners:

Joleen Wilson – BSc (Hons) Environmental Management

Joleen graduated from the School of Sciences with a Honours degree in Environmental Management. Her work experience includes conducting basic assessment processes, environmental auditing, compilation of EMPr's, Water Use License Applications and Carbon Footprint Analysis. Joleen is a member of the KwaZulu-Natal branch of the International Association for Impact Assessment (IAIASa).

Joleen is registered as a Professional Environmental Assessment Practitioner with EAPASA, registration number: 2020/1067

Email: joleen@afzelia.co.za

APPENDIX A: ENVIRONMENTAL AWARENESS

General

The Proponent or their appointed representative/s must conduct adequate inductions and training prior to commencing the construction of the Ludeke Dam Repairs. The aim of Environmental Awareness Training is to provide contractors and their construction workers with the knowledge to identify environmental issues associated with their activities and best practice methods to minimise environmental impact. It is also to outline environmental legal obligations relevant to construction activities.

The environmental awareness must include the following:

What is meant by “environment”:

Environment” means the surroundings within which humans exist and that are made up of (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

- Why the environment needs to be protected and conserved;
- How construction activities can impact the environment;
- What can be done to mitigate against such impacts;
- Awareness of emergency and spills response provisions;
- Social responsibility during construction e.g. being considerate to local residents;
- Understanding of common environmental terms;
- Understanding of legal obligations and responsibilities in relation to environmental legislation;
- Recognition of common environmental impacts on construction sites and potential impacts resulting from the individual’s work activities;
- Identification of accepted current environmental management best practices for relevant workplace activities;
- Identification of situations which require further advice about appropriate work practices to minimise environmental damage – such as river crossings and working in or near wetlands; and
- Understanding the link between various construction activities and the potential for these activities to impact on the environment.

It is the Proponent’s or their appointed representative/s responsibility to provide the Contractor/s with no less than 1 day’s environmental training and to ensure that the Contractor/s has sufficient understanding to pass this information onto the construction staff. Translators are to be used where necessary during staff training. The Engineer / ECO must be on hand to explain more difficult / technical issues and to answer questions which may be raised. The use of pictures and real-life examples is encouraged as these tend to be more easily remembered. Use must be made of environmental awareness posters on site.

The induction must include the following:

- Walk the construction site to identify the limit of vegetation clearance, significant vegetation, and other ‘no-go’ areas;
- Identification of locations for stockpiles, equipment lay-down areas, construction camp, and access roads;
- Identification of the extent of the construction area and those areas that are to remain undisturbed;
- Identification of sensitive adjacent areas e.g. existing residential areas; wetlands; rivers;
- A presentation of the EMPr and its associated implications;
- It must be emphasized that the PM or ECO must be contacted in instances where clarity is required; and
- Examples of environmental incidents, and how to deal with them, *inter alia*:
 - significant spill of fuel or oil

- significant chemical spill
- severe erosion from flooding
- fire (on site or from off-site)
- damage to a heritage site
- destruction of a rare plant outside the defined construction zone

It is important to be aware of site instruction(s) dealing with such emergencies. Prompt and effective action will significantly reduce the environmental impact. Any such action must not endanger the health and / or safety of any of the site workers. Staff members must be made aware of all emergency plans by the site supervisor.

- Foremen and workers must be made aware of the following requirements prior to commencing any work:
- They must check for areas which may have been marked to indicate that construction activity therein is excluded.
- They must check with the supervisor if unsure about anything.

All buffers required must be demarcated before the construction commences to ensure that employees are aware of the 'no-go' / buffer areas.

APPENDIX B: ALIEN VEGETATION PLANT CONTROL

Many Invasive Alien Plants (IAP) are products of unwise and unintentional plant introductions and are widely considered as a major threat to biodiversity, human health and livelihoods and economic development. IAPs cost South Africans tens of billions of rand annually in lost agricultural productivity and resources spent on management. The introduction and spread of invasive alien species is closely correlated with human activities.

Virtually all ecosystems and habitats in South Africa have been modified or transformed by human activities. Three key, inter-related threats are habitat removal, invasive alien species and climate change. Land degradation, clearing of indigenous vegetation, invasion of land by alien species and climate change all interlink to create synergies that exacerbate and compound the impact on biodiversity, leading in turn to further degradation and loss

IAPs pose a threat to the survival of thousands of species of plants of all ecosystems in South Africa. They increase fire hazards and accelerate soil erosion; they are usually “water-hungry” plants/shrubs/trees resulting in a much higher use of precious ground water

All land users/owners must integrate biodiversity considerations into management and mitigation plans.

LEGISLATIVE AND POLICY FRAMEWORK GOVERNING IAP CONTROL

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

The National Environmental Management: Biodiversity Act (NEMBA) regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Regulations were published in Government Notices R.506, R.507, R.508 and R.509 of 2013 under NEMBA. All listed Invasive Alien Plants are divided into three categories which are:

Category 1a: invasive species that may not be owned, imported into South Africa, grown, moved, sold, given as a gift or dumped in a waterway. These species need to be controlled on your property, and officials from the Department of Environmental Affairs must be allowed access to monitor or assist with control.

Category 1b: invasive species that may not be owned, imported into South Africa, grown, moved, sold, given as a gift or dumped in a waterway. Category 1b species are major invaders that may need government assistance to remove. All category 1b species must be contained, and in many cases, they already fall under a government sponsored management programme.

Category 2: These are invasive species that can remain in your garden, but only with a permit, which is granted under very few circumstances.

Category 3: These are invasive species that can remain in your garden. However, you cannot propagate or sell these species and must control them in your garden. In riparian zones or wetlands all category 3 plants become category 1b plants.

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

Regulation 15 of CARA regulates and restricts the propagation, harbouring and sale of invasive alien plant and weed species listed in a set of Regulations published in terms of the Act.

Please Note: This Invasive Alien Plant Programme does not cover aquatic IAPs as control of these needs specialised input, equipment, and herbicide.

Reference is particularly made to the National Environmental Management Act (Act 10 of 2004) Chapter 5 which states that:

“The purpose of this Chapter is-

to prevent the unauthorized introduction and spread of alien species and invasive species to ecosystems and habitats where they do not naturally occur;

- a. to manage and control alien species and invasive species to prevent or minimize harm to the environment*

and to biodiversity;

- b. to eradicate alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats.”

Part 2 Section 76 specifically addresses the responsibilities of Local Government with respect to the eradication of alien invasive species by stipulating that:

Invasive species control plans of organs of state

“(2) (a) All organs of state in all spheres of government must prepare an invasive species monitoring, control and eradication plan for land under their control, as part of their environmental plans in accordance with section 11 of the National Environmental Management Act.

(b) The invasive species monitoring, control and eradication plans of municipalities must be part of their integrated development plans.”

“(4) An invasive species monitoring, control and eradication plan must include-

- (a) detailed list and description of any listed invasive species occurring on the relevant land;
- (b) a description of the parts of that land that are infested with such listed invasive species;
- (c) an assessment of the extent of such infestation;
- (d) a status report on the efficacy of previous control and eradication measures;
- (e) the current measures to monitor, control and eradicate such invasive species; and
- (f) measurable indicators of progress and success, and indications of when the control plan is to be completed.”

Please Note: This Invasive Alien Plant Programme does not cover aquatic IAPs as control of these needs specialised input, equipment, and herbicide.

ALIEN PLAN CONTROL

Benefits of control

- Reduction of spread of alien plant species into non-affected areas;
- Improvement of water quality and quantity;
- Legal compliance (landowners are required to eradicate or control declared weed and alien invader plants in terms of the Conservation of Agricultural Resources Act 43 of 1983 and National Environmental Management: Biodiversity Act 2004 (Act No. 10 of 2004) as amended from time to time).
- Improvement of biodiversity in and around the construction area.
- Reduction in soil erosion. Certain species of alien invader plants reduce soil cover, leading to increased erosion.

Important factors influencing the effectiveness of a control programme


- Timeous implementation of control operations is important as alien plants are more susceptible to herbicides when they are young and lower herbicide rates can be used.
- Appropriate herbicides must be chosen. Selective broadleaf herbicides must be chosen where it is the intention to achieve rapid colonisation of the site by grasses. Care must be taken when applying herbicides and label prescriptions must be strictly adhered to. The Environmental Control Officer (ECO) to advise.
- Operations must be directed towards eradicating alien vegetation.
- A reputable company must be hired to undertake herbicide application. The ECO must be available to monitor/supervise this activity.

Requirements for an effective alien vegetation control programme

- Identify the problem: extent, location and species of problem plants;

- Identify any sensitive ecosystems, rare or endangered plants etc. which may be affected by a control programme. Identify the original ecosystem applicable to the area. The method of control will be influenced by the type of vegetation to which the area must revert;
- Identify an appropriate control method: mechanical or chemical, type of herbicide, application etc (Mechanical and biological methods are preferred, compared to chemical methods); and
- Make provision for a number of follow up operations. The initial clearing operation is only part of the total programme. Failure to follow up will result in a failure of the entire programme.

INVASIVE ALIEN PLANT CONTROL METHODS

Control Methods	Description
Mechanical Methods	
Hand pulling / Hoeing	<ul style="list-style-type: none"> • Hand pulling is most effective with small (300 mm), immature or shallow rooted plants such as black jack, tall khaki weed, <i>Chromolaena odorata</i> etc. • 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 prevent the spread of seeds while shaking. If seeds are present they need to be cut off and bagged. • When piling the removed plants either place on a plastic sheet or placed into a plastic bag to prevent seed spreading – do NOT leave it lying around.
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, or larger root systems such as Lantana, American bramble, Bugweed and Castor Oil Bush must be done in conjunction with chemical treatment of the cut stumps (application by painting the herbicide onto stumps cut approximately 100mm above the ground). <p>Note</p> <ul style="list-style-type: none"> • Cut/slash the stem of the plant at approximately 100 mm to ground level. • Paint all cut plants with an appropriate herbicide immediately after they have been cut. • Stockpile removed material into piles after removing seeds or pods collect all the seeds from the ground. All seeds must be put in a plastic bag that is tightly sealed. The seeds must be disposed of at the nearest garden refuse site. • Cut stems can be used as firewood, poisonous plants must not be burned i.e. castor oil bush, oleanders and parthenium.
Ring Barking	<ul style="list-style-type: none"> • Remove bark in a 300-400 mm band and paint herbicide immediately to exposed band. • This method results in the death of the area above the girdle over time.
Mechanical Methods	
Felling - This may only occur on instruction and guidance from the ECO.	<ul style="list-style-type: none"> • De-branch trees and remove all material. Branches can be chopped to small blocks and used as fire wood (provided that they are not poisonous); • Cut the tree down to approximately 150 mm from ground level; • Dissect the stump as much as possible to increase the surface area for the effective application of herbicide. Apply the herbicide by painting it on the stump immediately (no later than 30 mins) to the dissected stump.
Control Methods	Description
	<ul style="list-style-type: none"> • Branches can be used as erosion logs for storm water bio-engineering control measures. See photograph below. 

Chemical Control Method	
<ul style="list-style-type: none"> • <u>Chemical control of alien plants must not be done in aquatic systems.</u> • Plenum and Kaput Gel (trade names), with active ingredients Picloram, Fluroxypyr and Triclopyr, are recommended for this project, the ECO will advise if other herbicides are needed. • No application of herbicide is to be carried out during wet or windy conditions. • The spraying of herbicides is STRICTLY prohibited. 	
Cut Stump Application This is the preferred chemical control method.	<ul style="list-style-type: none"> • This is a highly effective and appropriate control method for woody vegetation or larger specimens of alien invasive vegetation. • The appropriate herbicide (after it has been mixed or diluted as per its instructions) must be applied to the stump using a paintbrush within 30 min of being cut. • Stems must be cut to approximately 150mm close to ground level. Dissect the stump as much as possible to increase the surface area for the effective application of herbicide.
Scrape and Paint This is an acceptable chemical control method.	<ul style="list-style-type: none"> • This method is suitable for large vines and scrambling plants i.e. creepers such as balloon vines; <i>Ipomoea spp</i> and <i>Pereskia</i>. • Starting from the base of the stem, scrape 20-100cm of the stem to expose the sapwood just below the bark. • Immediately apply the herbicide to the scraped section. • Leave the vines to die in place. Do not try and pull them down off the tree/shrub on which they are growing.
Droplet Application	<ul style="list-style-type: none"> • Droplet application deposits herbicides directly where it is needed / wanted. • A small amount of herbicide is used per plant. • This is a good application for regrowth onto your leaves below knee height.
Disposal Methods	
Landfill Site	<ul style="list-style-type: none"> • If alien plant vegetation is to be disposed of at a landfill site, seeds are to be placed in sealed plastic bags to minimise contamination of the environment.
Stacking <u>(Do not stack for more than a week, the ECO will advise)</u>	<ul style="list-style-type: none"> • Stack light branches separately from heavy timber (75mm and more). Remove heavy branches to reduce long burning fuel loads that can result in soil damage from an intensely hot fire. • Do not make stacks under trees, power and telephone lines, within 30 meters of a fire belt or near watercourses, houses and other infrastructure. • The local municipality must be informed of the alien vegetation burning exercise prior to implementation. Burning must not take place during windy conditions and/or after 3 pm, • Firefighting equipment must be available at all times during this exercise. • Cut material may be donated to community members, provided that all seeds have been removed from the branches to prevent dispersal of IAP.

APPENDIX C: SPILL RESPONSE PLAN

INTRODUCTION

The purpose of this Spill Response Plan (SRP) is to develop and highlight the appropriate procedures to follow in the event of a spill to minimise the potential to harm either employees or the environment.

In the event of a spill occurring on the site, this SRP provides a guideline to the process that must be undertaken to ensure that the spill is contained in a manner which is safe for the employees on site and prevents harm to the surrounding environment.

CLEAN

Spilled chemicals must be effectively and quickly contained and cleaned up. Employees may only clean up spill's themselves if properly trained and protected. Employees who are not trained in spill clean-up procedures must report the spill to the relevant emergency staff, warn other employees, and leave the area.

The following general guidelines must be followed for evacuation, spill control, notification of ECO & proper authorities, and general emergency procedures in the event of an incident in which there is potential for a significant release of hazardous materials.

EVACUATION

Persons in the immediate vicinity of a spill must immediately evacuate the premises (except for employees with training in spill response). If the spill is of "medium" or "large" size, or if the spill is deemed hazardous, immediately notify emergency response personnel. A spill response team must be created for the project. This spill response team must be trained on hazardous chemical substances, handling of hazardous chemical substances as well as how to perform clean-ups. The spill response team must only be used to "small" spills and "medium" and "large" spills must be handled by a reputable spill response company, i.e. Drizit or Spilltech.

SPILL CONTROL TECHNIQUES

NOTE: Treat all residual chemical and clean-up materials as hazardous waste.

Spill control equipment must be located wherever significant quantities of hazardous materials are received or stored. MSDSs, absorbents, over-pack containers, container patch kits, spill dams, shovels, floor dry, acid/base neutralizers, sealable containers to receive the contaminated spill material and "caution-keep out" signs are common spill response items that must be present.

SPILL RESPONSE AND CLEAN-UP

All spill incidents must be reported to the ECO immediately.

Chemical spills are divided into three categories: Small, Medium and Large. Response and clean-up procedures vary depending on the size of and the type of spill.

Chemical spills include the spilling of COLAS (Bitumen). COLAS can specifically be absorbed/contained using sand and spill control material. Once contained/absorbed, wait for the product to cool **and solidify. It must then be shovelled into a container for disposal at a registered landfill site.**

Small Spills:

Definition: Any spill where the major dimension is less than 50cm in diameter.

Small spills are generally handled by internal personnel and usually do not require an emergency response by police or fire department teams.

- Quickly control the spill by stopping or securing the spill source. This could be as simple as up-righting a container and using floor-dry or absorbent pads to soak up spilled material. Wear gloves and protective clothing, if necessary.
- Put spill material and absorbents in secure containers.
- Consult with the Operational Health and Safety (H&S) representative and the MSDS for spill and waste disposal procedures.
- In some instances, the area of the spill must not be washed with water. Use Dry Clean-up Methods and never wash spills into the natural environment.
- Determine if there is any soil, groundwater or other environmental impacts.
- If necessary, remedial action must be taken.
- Both the spilled material and any absorbent may be considered hazardous waste and must be disposed of in compliance with municipal, provincial and national regulations.
- Incident must be recorded (recording must include photographs of during and after the spill and measures put in place to prevent another spill of the same/similar nature).

Medium Spills:

Definition: Spills where the major dimension exceeds 50cm but is less than 2m.

Outside emergency response personnel (police and fire department teams) must usually be called for medium spills. Common sense, however, will dictate when it is necessary to call them.

- Immediately try to contain the spill at its source by simple measures only. This means quickly up righting a container, or putting a lid on a container, if possible. Use absorbent material. Once you have made a quick attempt to contain the spill, or once you have quickly determined you cannot take any brief containment measures, leave the area and alert emergency response personnel (police and fire department teams). Give personnel accurate information as to the location, chemical, and estimated amount of the spill.
- Evaluate the area outside the spill. Engines and electrical equipment near the spill area must be turned off and if necessary electricity must be cut. This eliminates various sources of ignition in the area. Do not go back into the spill area once you have left.
- Help emergency response personnel by advising as to how to turn off engines or electrical sources.
- If emergency responders evacuate the spill area, follow their instructions in leaving the area.
- After emergency response personnel have contained the spill, be prepared to assist them with any other information that may be necessary, such as MSDSs and questions about the facility. Emergency response personnel or trained personnel with proper personal protective equipment will then clean up the spill residue. Do not re-enter the area until the emergency response personnel in charge gives the all clear. Be prepared to assist these persons from outside the spill area with MSDS, absorbents, and containers.
- Determine if there is any soil, groundwater or other environmental impacts.
- Remedial action must be taken in consultation with necessary departments and specialists if required.
- Reports must be filed with proper authorities. It is the responsibility of the contractor to inform the emergency response personnel as to what caused the spill. The response for large spills is similar to the procedures for medium spills, except that the exposure to danger is greater.
- The incident must be documented. Reporting must include photographs of the incident during and after as well as mitigation measures put in place to prevent future incidents of a similar nature.

Large Spills:

Definition: Any spill involving flammable liquid where the major dimension exceeds 2m in diameter; and any “running” spill, where the source of the spill has not been contained or flow has not been stopped.

- Leave the area and notify emergency response personnel. Give the operator the spill location, chemical spilled, and approximate amount.
- From a safe area, attempt to get MSDS information for the spilled chemical for the emergency response personnel to

use. Also, be prepared to advise emergency response personnel as to any ignition sources, engines, electrical power, or air conditioning/ventilation systems that may need to be shut off. Advise emergency response personnel of any absorbents, containers, or spill control equipment that may be available. This may need to be done from a point some distance from the spill site.

- Only emergency response personnel, in accordance with their own established procedures, may handle spills greater than 2m in any dimension or that are continuous. Remember, once the emergency response personnel are on the job cleaning up spills or putting out fires, the area is under their control and no one may re-enter the area until the emergency response personnel in charge gives the all clear.
- Provide information for reports to supervisors and emergency response personnel, just as in medium spills.
- Determine if there is any soil, groundwater or other environmental impacts and whether specialists are required for rehabilitation.
- Remedial action must be taken in consultation with various Departments and specialists.
- The incident must be documented. Reporting must include photographs of during and after the event as well as mitigation measures to prevent future incidents of a similar nature from occurring.

Reporting spills

All chemical spills, regardless of size, must be reported as soon as possible to the appropriate official/department, who should be able to determine whether the spill has the potential to affect the environment outside of the facility. If required, either the spill response team or a spill company must be contacted.

Examples of spills that could affect the outside environment include spills that are accompanied by fire or explosion and spills that could reach nearby water bodies.

In the event of a significant spillage that cannot be contained, and which poses a serious threat to the local environment, the following departments must be informed within 6 (six) hours of the incident and in accordance with the Section 30 of the National Environmental Management Act, Act 107 of 1998:

- The Proponent (GIDZ)
- The District Municipality - Municipal Manager (The City of Ekurhuleni)
- Department of Water and Sanitation
- Provincial Department of Economic Development, Tourism & Environmental Affairs (Pollution and Waste Management)
- The Local Fire Department
- Municipal Disaster Management Team
- ECO and Engineer

REVIEW AND RE-STOCK

Following a spill of any material on site, the Health and Safety Officer must complete an incident report; this report shall be completed within (1) week of the event and detail the following:

1. Cause of spill
2. Identify whether the cause of the spill is a procedural error which must be changed
3. Effectiveness of clean up procedures
4. Were the clean-up tools/materials returned to the area or if necessary, replaced

The Health and Safety Officer must undertake a general review of this SRP every six months. This review shall ensure that this SRP is updated should any new materials be stored on site. The review will also ensure that the spill response procedure remains effective and updated.

STAFF TRAINING

The Health and Safety Officer shall ensure that any new staff that are employed on site are familiar with this SRP and the storage location of all oils/fuels and containment equipment.

APPENDIX D: HYDROSEEDING

DEFINITION:

Hydro seeding is a process of applying a mixture of water, seed, fertilizer and mulch to the ground by means of direct spraying using hydromulch equipment. The mixture temporarily protects soils from water and wind erosion, allowing seeding to take root. Hydroseeding is also referred to as hydraulic seeding, hydra-seeding or hydro-mulching.

USE:

Hydroseeding is applied on disturbed soil areas requiring temporary protection until permanent vegetation is established. Hydroseeding can be used for veld reclamation, turf seeding and erosion, sediment and dust control. Hydroseeding can also be used to provide temporary cover to disturbed soils that will be rehabilitated at a later stage. Hydroseeding can cover large and inaccessible areas within a short space of time.

PROCESS:

The seeding process involves the use of highly specialised equipment, including four-wheel drive vehicles that can access almost any type of terrain. The slurry is transported in a Hydroseeding Unit, either truck or trailer-mounted and sprayed over a prepared soil surface in an even layer. Powerful pumps and extension hoses generate a spray range in excess of 100 meters. In general, hydroseeding is a dry land rehabilitation method, which does not require any form of additional irrigation. The use of scarifying drills, soil binder and mulch will retain the application slurry in situ, binding the surface layer. A micro-climate forms as the climate and soil moisture conditions for germination improves, and vegetation establishes.

BENEFITS:

Time and Cost effective

The mixture used for the hydroseeding process is relatively cheaper than traditional broadcast seeding and sodding. When the process is carried out correctly, hydroseeding is time efficient as large and/or inaccessible areas of land can be covered within short spaces of time. An area of up to four hectares can be completed per hydroseeding unit in a single day. This results in a high production rate, particularly where dust pollution and erosion control is of concern.

As germination occurs rapidly, maintenance is nominal.

Faster effects

As a site-specific hydro-mulch mixture is used, hydroseeding vegetation generally comes in quicker than comparative broadcast seeding and sodding. Early growth is usually visible within five to six days. Furthermore, initial weed growth is restricted. Suitable grass cover is established within two to three months.

Limitation of stress caused by varying surface temperatures due to depth of seedbed

This also ensures successful germination of seedlings. This also limits the loss of seed and material by wind and water erosion.

Erosion control

Hydroseeding offers built in erosion control. Erosion issues are often addressed by simple application of the hydroseeding mixture, as the mulch and slurry harden, erosion issues are contained until seed establishes itself and becomes a permanent erosion inhabitant.

APPENDIX E: SUSTAINABLE URBAN DRAINAGE SYSTEMS (SUDS)

Sustainable urban drainage systems (SUDS) are a natural approach to managing drainage and storm water control relating to developments such as roads, pipelines, industrial developments and housing estates. SUDS aim to mimic the way rainfall/storm water drains into natural systems by slowing and holding back the water that runs off from a site and allowing natural processes to break down pollutants. This is particularly relevant in areas where extensive hard surfacing occurs such as urban environs. The prime function of SUDS is to provide effective surface water drainage, ensuring the greatest degree of flood risk protection over the long term both within and downstream of the development and prevent pollution. This will ensure that water entering a local watercourse is cleaner and does not harm wildlife habitats. SUDS attempt to manage surface water drainage systems holistically in line with the ideals of sustainable development. The three main objectives of SUDS are:

- control the quantity (Flow and volume) and rate of run-off from a development;
- to improve the quality of the run-off and
- to enhance the nature conservation, landscape and amenity value of the site and its surroundings.

The benefits of SUDS are:

- preventing water pollution
- slow the velocity of surface water run-off to allow settlement filtering and infiltration and reduce the risk of flooding;
- reducing the risk of sewer flooding during heavy rain
- SUDS will maintain or restore the natural flow regime in streams;
- SUDS will allow natural groundwater recharge (This is particularly important in a water starved country such as South Africa)
- Providing environmental protection by treating the quality as well as the quantity of surface water run-off
- Integrating with the landscape design to add amenity for the community as well as bringing biodiversity value
- providing valuable habitats for wildlife in urban areas

SUDS can be cost-effectively designed to work with retained natural features such as ditches or ponds and to form an integral part of hard and soft landscaped areas. Source control and prevention techniques are designed to counter increased discharge from the road footprint as close to the source as possible and to minimise the volume of water discharged. There are various sustainable techniques that can be implemented.

Permeable Paving – Permeable pavements promote water infiltration which reduces flooding and non-point source pollution, minimise storm water infrastructure costs and maximise groundwater recharge as well as improve ecological functions of nearby streams and wetlands improving biodiversity. Permeable paving could be used on the walkways alongside the roads.



Example of permeable paving

Filter strips – Filter strips are maintained grassed areas of land that are used to manage *shallow* overland storm water runoff through several filtration processes in a similar manner to buffer strips. They are most effective as pre-treatment options to aid the storm water management processes of bio-retention areas, infiltration trenches and swales. They

intercept and spread out storm water runoff resulting in the attenuation of flood peaks. Filter strips are commonly used along stream banks as vegetated buffer systems as well as downstream of agricultural land to intercept and infiltrate storm water runoff. They are particularly useful for providing a first line of defence against sheet flows from large paved areas such as parking lots and roadways. Filter strips use vegetative filtering as a primary means of storm water runoff pollutant removal. Properly designed filter strips remove most sediment and pollutants such as hydrocarbons and nitrates. Furthermore, with the use of appropriate indigenous vegetation, filter strips have the potential to provide a habitat corridor for wildlife. Filter strips should be used alongside the roads and footpaths throughout the proposed development.



Example of a filter strip adjacent to a road

Swales - linear grass covered depressions that typically remain dry between rainfall events. Swales lead surface water overland from a drained surface to a storage or discharge system, typically using road verges. They provide temporary storage for storm water and reduces peak flows. Furthermore, they use partial infiltration and bio-infiltration to remove pollutants from storm water runoff. Swales avoid the need for expensive roadside kerbs, gullies and related maintenance.

The advantages of swales include:

- Vegetated swales are normally less expensive and more aesthetically pleasing than kerbs and their associated concrete- and stone-lined channels;
- Runoff from adjacent impermeable areas is completely infiltrated on site using swales;
- Swales retain particulate pollutants as close to the source as possible; and
- Swales reduce storm water runoff volumes and delay runoff peak flows.



Example of a swale alongside a road.

Any one or more of these systems may be implemented along the road, not only do these systems assist in preventing soil erosion, reducing costs of installation and maintenance of concreted storm water channels, attenuating flood peaks and generally trapping and filtering out pollutants close to the source, but they will also assist in uplifting the surrounding area aesthetically and improve the ecosystems within the nearby environments. Storm water management must be designed and implemented during the early stages of construction and throughout the project's life-span to ensure that

rain and other surface run-off is captured, filtered and released into the environment in a controlled way to reduce the impacts of soil erosion and wetland degradation.

Conclusion

The traditional approach to draining developed areas is having a damaging impact on our environment and is not sustainable. Sustainable Drainage Systems offer various techniques which can be adopted for most new and redeveloped sites to mitigate environmental impacts from surface water drainage. Developers need to include SUDS in their plans at the earliest stages of the process to ensure that they are successfully designed, built and maintained. It is important for developers to consult with planning authorities, highway authorities, sewerage undertakers and regulators (as appropriate), early in the development process, when SUDS options are being considered.

Furthermore, the choice of SUDS system will depend on a number of factors namely

- the pollutants present in run-off;
- the size of and drainage strategy for the catchment area;
- the hydrology of the area and infiltration rate of the soil;
- the presence of Groundwater Source Protection Zones or contaminated land.

For more information, please visit www.wsud.co.za

APPENDIX F: CHANCE FIND PROTOCOL

What is a Chance Finds Procedure?

The purpose of Archaeological Chance Find Procedure (CFP) is to address the possibility of cultural heritage resources and archaeological deposits becoming exposed during ground altering activities within the project area and to provide protocols to follow in the case of a chance archaeological find to ensure that archaeological sites are documented and protected as required. A CFP is a tool for the protection of previously unidentified cultural heritage resources during construction and mining. The main purpose of a CFP is to raise awareness of all mine workers on site regarding the potential for accidental discovery of cultural heritage resources and establish a procedure for the protection of these resources.

Chance finds are defined as potential cultural heritage (or paleontological) objects, features, or sites that are identified outside of or after Heritage Impact studies, normally as a result of construction monitoring. Archaeological sites are protected by The National Heritage Resources Act of 1999. They are non-renewable, very susceptible to disturbance and are finite in number. Archaeological sites are an important resource that is protected for their historical, cultural, scientific and educational value to the general public, local communities.

What are the objectives of the CFP?

The objectives of this 'Chance Find Procedure' are to promote preservation of archaeological data while minimizing disruption of construction scheduling. It is recommended that due to the moderate to high archaeological potential of some areas within the project area, all on site personnel and contractors be informed of the Archaeological Chance Find Procedure and have access to a copy while on site.

Where is a CFP applicable?

Developments that involve excavation, movement, or disturbance of soils have the potential to impact archaeological materials, if present. Activities such as road construction, land clearing, and excavation are all examples of activities that may adversely affect archaeological deposits. Chance finds may be made by any member of the project team who may not necessarily be an archaeologist or even visitors. Appropriate application of a CFP on development projects has led to discovery of cultural heritage resources that were not identified during archaeological and heritage impact assessments. As such, it is considered to be a valuable instrument when properly implemented. For the CFP to be effective, the mine manager must ensure that all personnel on the proposed mine site understand the CFP and the importance of adhering to it if cultural heritage resources are encountered. In addition, training or induction on cultural heritage resources that might potentially be found on site should be provided. In short, the Chance Find Procedure details the necessary steps to be taken if any culturally significant artefacts are found during mining or construction.

What is the CF Procedure?

The following procedure is to be executed in the event that archaeological material is discovered:

All construction activity in the vicinity of the accidental find/feature/site must cease immediately to avoid further damage to the site.

- Briefly note the type of archaeological materials you think you've encountered, its location, and if possible, the depth below surface of the find.

- Report your discovery to your supervisor or if they are unavailable, report to the project Environmental Control Officer (ECO) who will provide further instructions.
- If the supervisor is not available, notify the ECO immediately. The ECO will then report the find to the Manager who will promptly notify the project archaeologist and SAHRA.
- Delineate the discovered find/ feature/ site and provide a 25m buffer zone from all sides of the find.
- An archaeologist should give recommendations on the cause of action to be taken.

APPENDIX G: ACKNOWLEDGEMENT FORM

LUDEKE DAM REPAIRS, MBIZANA WITHIN THE WINNIE MADIKIZELA-MANDELA LOCAL MUNICIPALITY, EASTERN CAPE

DFFE REFERENCE NO: To be confirmed

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 mitigation measures for the project outlined above, and the environmental conditions contained in the contract documents as well as all relevant conditions as stipulated in the Environmental Authorisation as issued by the Department of Forestry Fisheries and Environment.

	NAME & SURNAME	DATE SIGNED	SIGNATURE
PROPONENT			
PROJECT MANAGER			
ENGINEER			
ENVIROMENTAL CONTROL OFFICER			
CONTRACTOR			
CONTRACTOR			
CONTRACTOR			
CONTRACTOR			
CONTRACTOR			