

# DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE WILLOWFOUNTAIN ROAD UPGRADE, MSUNDUZI MUNICIPALITY

*September 2013*

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## LIST OF TERMS

**Construction Area:** The Construction Area will be deemed to be that area within which there will be a physical disturbance, and will contain construction machinery and related vehicles, construction staff, and other related equipment. All physical disturbances to the land will be restricted to the demarcated Construction Area.

**Adjacent Properties:** Considered to be the properties within which the proposed development is located.

**Planning Phase:** The period prior to the commencement of construction, during which a number of activities associated with the preparation for construction will be undertaken. This would include preliminary site survey work, measurements, trial pit excavation and an increase in traffic in the area.

**Construction Phase:** The period from the commencement of physical disturbance to land, excluding rehabilitation activities, to the completion of works and clearing of construction camps or work areas.

**Operational Phase:** The period following the Construction Phase, during which the proposed development will be operational or require regular maintenance.

**Contractor:** The contractor covers the firm(s), persons/organizations contracted to carry out parts of the work for the planned development that will include construction of any infrastructure associated with the scheme, land clearing and repair.

**Proponent:** The proponent is the Msunduzi Municipality, whom is legally bound to ensure that all parties are in compliance with the EMPr and the Environmental Authorisation.

**Project Manager/Engineer:** Person/organization appointed to oversee the work of the Contractor. The Project Manager/Engineer will be appointed by the Proponent (Msunduzi Municipality) to administrate and manage the project during construction. The Project Manager/Engineer will be responsible for all direct communication with the construction contractor appointed to construct the proposed road upgrade.

**Environmental Control Officer (ECO):** An independently appointed professional consultant assigned to the project. The ECO will conduct audits and will be part of the Project Team and will advise the Engineer on all environmental matters relating to the works, in terms of this management plan.

**Environmental Management Programme (EMPr):** The EMPr is a detailed plan for the implementation of the mitigation measures to minimise any potential negative environmental impacts associated with all phases of development.

**Rehabilitation:** Rehabilitation is defined as the return of a disturbed area to a state which approximates the state which it was before disruption. Rehabilitation, for the purposes of this specification, is aimed at the post-construction reinstatement of disturbed areas.

**Hazardous Substances and Materials:** Hazardous substances are those that are potentially poisonous, flammable, carcinogenic, or toxic. Some examples are: diesel, petrol, oil, bitumen, cement, solvent based paints, lubricants, explosives, drilling fluids, pesticides, herbicides, LPG.

## 1. INTRODUCTION

This project Environmental Management Programme (EMPr) deals with the environmental impacts that have been identified as part of the Basic Assessment process for this project and the mitigation measures required to help prevent or minimise these impacts. The EMPr is a guideline document that must be adhered to during all phases of the project, including the eventual operational phase. An Environmental Control Officer (ECO) will be required to be appointed to monitor and audit the different phases of the road construction project. The EMPr forms part of the conditions of the Environmental Authorisation (EIA ref: DC22/0008/2013), that will be provided by the DAEA for the project. The EMPr must form an integral part of the contract documents that are prepared for the construction phase of the project and the contractors must ensure that all the conditions and requirements of the EMPr are complied with, which includes any rehabilitation and landscape works which may be required post-construction and which would be carried out by the contractor or any specialist subcontractor who may be appointed to do such rehabilitation work.

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

### **Integrated Environmental Management (IEM) Guidelines**

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

#### **1.1. Background to EMPr**

The EMPr forms part of the conditions of the Environmental Authorisation (EIA ref: DC22/0008/2013).

The Msunduzi Municipality has proposed the upgrade of Willowfountain Road, in Edendale, Pietermaritzburg. The road upgrade aims to allow local residents to have improved, formalised access to their homes, schools, shops and the extended road network. The project is located in Ward 14 of the Msunduzi Local Municipality.

The project involves the construction of a 1.6km, 6m wide black top all-weather road complete with drainage and watercourse crossings and storm water drains and a pedestrian walkway. The road currently consists of a gravel access road and sections of gravel with informal drainage crossings and storm water pipes. The current road conditions are susceptible to erosion which makes access problematic for the local residents of Willowfountain. The road upgrade has been designed to align with the existing roads for the most part, there will be widening by 3 to 5 metres in certain areas, realignment of approximately 500m of road, the upgrading of four existing culverts, the realignment and upgrading of two hairpin bends/watercourse crossing points. The estimated construction period is six months.

## 1.2. Compliance with EIA Regulations

The contents of an EMP are regulated by Section 33 of the Environmental Impact Regulations published in Government Notice R 543 in Government Gazette No 33306 of 18 June 2010, under Section 24(5) of the National Environmental Management Act, 1998 (Act No 107 of 1998), as amended in 2010 (hereafter termed EIA Regulations).

## 1.3. The Environmental Assessment Practitioner

The Msunduzi Municipality has appointed Enviroedge as the independent Environmental Assessment Practitioner (EAP) for the Basic Assessment process for the proposed Willowfountain Road upgrade. The contact details for the EAP are as follows:

**Karin Samouilhan**  
**Enviroedge**  
**PO BOX 1009**  
**Kloof, 3640**  
**Phone: (031) 764 2569**  
**Fax: (086) 654 6598**

## 1.4. The Applicant

The applicant is Msunduzi Municipality. The contact details for the applicant are as follows:

**Ms Banothile Mathenjwa**  
Private Bag X205  
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Tel: 033 392 2537  
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## 1.5. The Relevant Authorities

The Competent Authority for this application is the Department of Agriculture and Environmental Affairs (DAEA). The contact details for the authority are as follows:

**Mavis Padayachee**  
**KZN Department of Agriculture and Environmental Affairs**  
A Block  
4 Pin Oak Avenue  
Hilton  
3245  
Tel: 033-347 1820



## **2. Roles and Responsibilities**

This chapter defines the general roles and responsibilities of the persons or firms whom are required to ensure compliance with this EMPr. The proponent will need to define the relevant individuals during the detailed design and planning phase, prior to construction.

### **2.1. The Proponent – Msunduzi Municipality**

Msunduzi Municipality is the project proponent, and will function as the primary employer for all other parties. The responsibilities of the proponent include:

1. Acceptance of all liabilities associated with environmental compliance.
2. Enforcement of this EMPr.
3. Ensuring the adoption of the EMPr in all relevant construction and rehabilitation tender documents, and ensuring that the EMPr is binding on all Contractors.
4. Ensuring that Contractors are compliant with the EMPr during planning, construction and rehabilitation.
5. Ensuring that Method Statements are prepared for specific procedures on site including:
  - Hazardous storage areas must be bunded with an impermeable liner to protect groundwater quality. The Contractor shall submit a method statement to the Engineer for approval.
  - A permitted hazardous waste contractor should be consulted should any accidents / spillages of hazardous substances and / or materials take place. The Contractor is to outline a Method Statement for dealing with accidents / spillages of hazardous materials. This Method Statement must be handed to the Engineer as well as to DWA should any incident occur.
  - Reinstatement of vegetation - The Contractor is to water and maintain all planted vegetation until the end of the defect liability period and is to submit a method statement regarding this to the Engineer.

These method statements must include the roles and responsibilities of the various parties, engineer, contractor, proponent etc.

6. Contracting a suitably experienced and independent Environmental Control Officer (ECO).
7. Ensuring the implementation of environmental monitoring and audits during planning, construction and rehabilitation.
8. Ensuring that compliance and non-compliance records are maintained.
9. Ensure Environmental Audit Report copies are submitted to the Department of Agriculture and Environmental Affairs.

### **2.2. The Engineer – TLS Engineers and Project Managers**

The engineer will be contracted by the proponent to undertake the detailed design and construction and rehabilitation supervision of the project. The responsibilities of the engineer will include:

1. Provision of a detailed design of the scheme in compliance with the EIA and EMPr.
2. Ensuring that Contractors are in compliance with this EMPr.

3. To cease any work that is deemed to result in negative environmental impacts or which is not in compliance with this EMPr.
4. To consult with the proponent and the ECO in terms of decisions and actions that may impact on the environment, or that may require an amendment to this EMPr.

### **2.3. Environmental Control Officer**

The ECO will be an independent environmental specialist with appropriate experience in EIA and ECO work. The ECO will be contracted during the construction phase. The responsibilities of the ECO will include:

1. Undertake management of the EMPr.
2. Provide management recommendations and guidance to the proponent and the engineer in terms of improved environmental management.
3. Where required, make amendments to the EMPr and ensure that it is submitted to the proponent. The ECO should identify whether or not any EMP amendments are substantial, and, in such a case, the EMP will need to be re-submitted to the DAEMA for approval prior to the amendments being implemented.
4. The ECO is to monitor and report on the project in terms of the compliance of the proponent, engineer and contractors with the EMPr. The proponent is to ensure that the engineer and contractors are in compliance with the EMPr.
5. Highlight non-compliance with the proponent and engineer. Serious cases of non-compliance will be reported to the relevant authorities.
6. Undertake the required environmental monitoring and audits, draft the respective reports and submit them to the proponent for review and comment.

### **2.4. Contractor**

The contractor covers the firm(s), persons/organizations contracted to carry out parts of the work for the planned development that will include construction of any infrastructure associated with the scheme, land clearing and repair. The responsibilities of the contractor include:

1. To formally accept the EMPr as one of their conditions of contract.
2. To implement the recommendations and actions required in this EMPr.
3. To follow the spirit of good environmental management.
4. To ensure that all site staff are aware and trained in the EMP requirements by providing adequate training and conducting regular toolbox talks.
5. To ensure that the required rehabilitation measures are implemented on site.+

### **2.5. Conditions of Environmental Authorisation**

TBC

These conditions will define specific requirements in terms of environmental management of the site.



Copies of the project Environmental Authorisation, together with a copy of the EMPr and copies of any ECO Audit reports must be kept on file on site and made available for inspection by environmental officials or other authorities visiting the site.

Any issues of non-compliance with the Environmental Authorisation or project EMPr will be documented in the regular audit reports generated for the site. These audit reports are copied to the client and the competent authority (DAEA).

Any complaints received by the Contractor or other representative on site regarding activities on the construction site, relevant to the environment, must be recorded by the Contractor on site, and any response/action to complaints duly noted in the Complaints Register. The Complaints register must, likewise, be kept on file on site and made available for inspection by environmental officials or other authorities visiting the site.

## 2.6. Compliance and Penalties

The Contractor is liable for the project for the full length of the construction period, as well as a specific time frame after the contract completion, as stipulated in the General Conditions of Contract, namely the Defects and Liability period.

The Contractor and Landowner is deemed to be non-compliant with the EMP if certain findings are made. These may include:

- Within the construction area, site extensions and access roads there is evidence of contravention of clauses;
- Environmental damage is caused owing to negligence;
- The Contractor fails to comply with corrective or other instructions, (subject to specific timeframes); and,
- The Contractor fails to respond adequately to any complaints received from the public or local community.

The Contractor shall then, upon receipt of a notice of non-compliance, act immediately to correct the cause of the non-compliance notice. There will also be the application of a penalty clause which will apply for incidents of continued non-compliance. Any penalties imposed, (per incident, or violation), will be paid into an account designated for rehabilitation expenses. The following list provides a breakdown of compliance penalty items and details a penalty or fine that might be imposed per issue.

<b>Violation/Contravention of the project EA/EMP</b>	<b>Penalty</b>
Failure to stockpile material correctly (height/location/appropriate source separation)	R 1 500.00
Pollution of water bodies	R 5 000.00
Failure to control storm water runoff adequately	R 1 500.00
Failure to provide adequate on-site sanitation	R 5 000.00
Unauthorised clearing / removal of vegetation	R 5 000.00

Failure to provide adequate waste disposal and waste services	R 10 000.00
Failure to reinstate disturbed areas within designated time frame	R 4 500.00
Failure to rehabilitate disturbed/cleared areas within 3 months of completion	R 5 000.00
Any other contravention of environmental specifications	R 2 000.00
Chemical spill – see note below	

**Note:****Chemical spills:**

The penalty associated with any chemical spill that occurs on site will be dependent upon the nature and extent of a specific spill, as well as the context. Any spill that might occur will be individually assessed, no set amount has, therefore, been stipulated in the list above. In terms of the EMP, the Contractor will be required to pay for the cost of any soil or groundwater monitoring and also any soil and/or groundwater remediation that may be required by the authorities, should any spill occur.

Any penalty issued in terms of the project EMP, shall not preclude the relevant authorities from applying any additional penalty in accordance with statutory powers. Any failure to comply with remediation requirements, will result in a report being forwarded to the relevant authority in order for the authority to deal with the transgression. The principle of the “polluter pays”, would be applied.

**The Polluter Pays Principle:**

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

Section 28 of the National Environmental Management Act (Act 107 of 1998), also imposes a “Duty of care and remediation of environmental damage” on 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 is to the environment is authorised by law or cannot reasonably be avoided or stopped,” NEMA requires that the pollution be rectified and minimised and time frames for completion will be set and the determination of environmental degradation and the need for remediation will be decided by the competent authority.

NEMA also makes provision for contravention of certain environmental laws, such as the National Water Act (Act 36 of 1998), and the Environmental Conservation Act No. 73 of 1989, where damages can be awarded by courts in cases where loss or damage has occurred as a result of contraventions of these Acts.

Penalties may also be imposed in terms of NEMA, and, liability on conviction of employees, managers, agents and directors may be imposed for any offences resulting from failure to take all reasonable steps necessary under the specific circumstances to prevent the occurrence of an offence.

### 3. Amendments to the EMP

The EMPr is a living document and is subject to change from time to time, in consultation with the DAEA. As such, any amendments to the EMPr will require approval from the DAEA. The official DAEA letter confirming and approving any amendments made to the EMPr will be attached as an Appendix to the EMP document. The front page of the EMPr document will also confirm the original and any subsequent revisions, as well as dates of any revisions made.

#### **4. Enforcement of the EMPr**

The Project Engineer, Contractor and Proponent have a responsibility to ensure that all persons involved with the construction of the proposed road upgrade are both aware of, and familiar with the environmental requirements for the project, this includes ALL sub-contractors and casual labourers etc. The EMP will form part of the Terms of Reference for all contractors, sub-contractors and suppliers. The Project Engineer and Contractor will ensure that all staff members are provided with adequate environmental training, all staff members will attend a formal environmental induction process of note here ALL machine and equipment operators, where after, they will complete a questionnaire and sign a form to be maintained on record, as acknowledgement of understanding of the environmental requirements and the EMP.

The EMPr will form part of all tender documents issued for the construction process.

The mitigation measures required to mitigate the issues identified during the environmental impact assessment phase would include the following:

##### **Vegetation disturbance**

- Any marking of survey points must be done with the Engineers approval.
- Any vegetation clearing must be kept to a minimum.
- Any vegetation disturbance to be rehabilitated immediately upon completion of investigation work.
- Only vegetation in the immediate vicinity of the construction site and the proposed road to be removed, and only directly prior to construction commencing.
- Once construction has been completed, indigenous vegetation must be re-installed wherever possible over the disturbed area.
- Any vegetation which is to be removed for post construction rehabilitation must be re-instated and replanted as soon as construction activities are complete. Seeding of suitable indigenous grasses must be effected on denuded areas and removed plant material re-planted as close to area of source as possible.
- No "muthi" plants are to be removed from areas surrounding and adjacent to the proposed road upgrade.
- No indigenous trees to be cut, trimmed, damaged or removed under any circumstances. The clearing of indigenous trees is prohibited, unless the relevant license from DAFF has been received, any such activity requires a license from DAFF.
- Alien invasive management programme - All alien invasive vegetation which emerges must be removed according to accepted alien invasive plant removal techniques for each species for two years after the completion of the construction phase, or as per the agreed maintenance period stipulate in the construction contract.

The existing alien invasive plants that have established along the existing road edges, in particular in the vicinity of the four watercourse crossings, should be cut down and appropriately treated to help eradicate these weeds according to accepted alien invasive plant removal techniques for each species for two years after the completion of the construction phase, or as per the agreed maintenance period stipulated in the construction contract. Rehabilitation in these spaces with suitable indigenous vegetation will also assist greatly in reducing this problem. A programme to control and eradicate the alien invasive weeds along the proposed roadside upgrade, would, therefore, help to prevent further spread and infestation. This programme must be effected within the road reserve and construction areas where disturbance occurs within the watercourse crossings and drainage line areas.

### **Disturbance of soil**

Soil erosion retention mechanisms to be put in place as necessary:

- Soil erosion prevention measures should be taken into consideration in the design of the construction camp/s and any access spaces and the road itself. Designated pedestrian access systems should also be provided.
- All topsoil is to be removed from the road alignment (where new), and stored in a designated area and protected from runoff by diversion berms wherever necessary. Topsoil stockpiles that are not to be used immediately should be seeded to minimise the erosion potential.
- Topsoil stockpiles are not to exceed 1.5m in order to help maintain soil viability.
- Drainage embankments are only to be disturbed where required and any such activities are to be kept to a minimum.

### **Watercourse/Drainage Line crossing**

- The proposed upgraded bridging/culvert structures must be designed to accommodate seasonal peak flow.
- Drainage areas to be avoided wherever possible.
- River flow is not to be obstructed or blocked or damaged during the upgrading of the river crossings.
- The construction area must be kept to a minimum when working in the watercourse crossings.
- Construction within the watercourse areas should be scheduled to take place during low rainfall months (if feasible).
- Any banks disturbed during the construction process must be adequately retained and rehabilitated.
- Any outfall points must be designed to include treatment of the soil below with either gabion baskets, stone pitching, stilling pond or other mechanism to help reduce erosion potential and dissipate water flow and velocity or as per Engineering specifications.
- Watercourse/drainage line crossings/culvert design to be designed to allow for animal passage and to allow habitat linkages.

### **Air Pollution and Dust**

- Burning of waste material on site must not take place.
- Fumes (or black smoke) emitted from vehicles and equipment/appliances must be mitigated & monitored and action must be taken to avoid nuisance to the public. All construction vehicles must be fitted with operational silencers and should be regularly serviced so as not to emit smoke. Proof of maintenance records is required.

- Dust suppression by watering can assist significantly to help reduce dust problems. Watering down will form part of the road upgrade construction process.

### **Spillages and storage of hazardous substances**

- Should any hazardous materials be spilt, the soil/substrate onto which they are spilt must be cleaned up immediately and removed to an approved hazardous waste site. Proper site records must be kept of any spillages.
- Vehicles must not be serviced on site.
- Drip trays must be provided for leaky vehicles left on site, and these vehicles must be repaired immediately.
- Hazardous substances are those that are potentially poisonous, flammable, carcinogenic, or toxic. Some examples are: diesel, petrol, oil, bitumen, cement, solvent based paints, lubricants, explosives, drilling fluids, pesticides, herbicides, and LPG.
- Hazardous storage and refuelling areas must be 110% bunded with an impermeable liner to protect groundwater quality.
- Fuel tanks must meet relevant specifications and be elevated so that leaks are easily detected. Fuel tanks must be 110% bunded.
- Storage areas containing hazardous substance/ materials must be clearly sign posted.
- The proximity of houses, schools and powerlines etc. should be taken into consideration when deciding on storage areas for any hazardous substances.
- Residents living adjacent to the construction sites must be notified of the existence of the hazardous storage area.
- Staff dealing with these materials/substances must be aware of their potential impacts and follow appropriate safety measures. This must be monitored (ECO function). Staff must also be aware of how to deal with any incident that might occur, relating to any hazardous materials/substances stored or used on site. Any spillages must adhere to the OHS Act.
- A spill contingency plan should be kept onsite for any spills that might occur.
- Should any significant chemical spillages occur the following steps must be followed:
  - Stop the source of the spill;
  - Contain the spill;
  - Any significant spills must be reported to DWA, DAEMA, the ECO and Project Manager;
  - The spilled product must be removed for treatment or alternatively authorised disposal;
  - It must be determined on site, in conjunction with the ECO, whether or not there is any soil, surface water, groundwater or other environmental impact;
  - If deemed necessary by DWA or the ECO, remedial action must be taken; and,
  - The spill incident must be documented and reported to DWA and the DAEMA.

### **Waste**

- No littering or illegal dumping of any waste material is to take place on site and/or as the result of construction activities.
- The contractor shall ensure that no littering occurs in the work or camp areas.
- Products, equipment and materials packaging, paper, containers and plastics must be carefully managed to help avoid any dispersal by wind or other. These waste products to be sorted for recycling purposes.
- Provision must be made for waste collection facilities (i.e. bins or refuse plastic bags) and the waste must be disposed of at a registered waste site.

- No burning of waste will be permitted on site, no waste disposal holes or trenches may be constructed.
- Ensure that all hazardous substances (i.e. oil contaminated soil or water etc.) are labelled and disposed of at a landfill site licensed to accept such hazardous waste. All waste disposed of during construction must be documented during construction. Active records must be kept with references and verification documentation.
- Bins and/or skips to be provided at convenient intervals for disposal of waste within the construction camp.
- Bins should have liner bags for efficient control and safe disposal of waste.
- All bins and skips must be fitted with lids – these lids/covers must be monkey proof.
- Where water borne sewerage is not available, temporary chemical toilets must be provided by a company approved by the Engineer. Chemical toilets to be provided at a rate of 1:20 with regular servicing weekly/fortnightly, (as deemed necessary to maintain hygienic standards), in areas where work teams are located. These toilets are to be within easy access to the workers onsite. They are to be located away from sensitive natural areas.
- The construction of pit latrines or “long drop” toilets is forbidden.
- Under no circumstances may open areas or the surrounding bush or degraded or built up areas be used as a toilet facility. An environmental awareness program and training must be provided to all workers.

#### **Noise will be generated by the activity**

- Construction vehicles must be regularly serviced to ensure a level of minimum emissions.
- Where necessary workers are to wear ear protection.
- No construction activity is to take place from 6pm to 6am, or on weekends.

#### **Graves may be disturbed during construction works**

A grave site buffer zone is to be established, this will be a No-go zone.

Graves and a cemetery have been identified by AMAFA along the road, within the study area, and in close proximity to the road. These graves require protection. These grave site areas are, therefore, No-go areas. (An HIA is currently in progress).

The following buffer zones must be ascribed to the grave and cemetery sites.

- Any graves identified in close proximity to the proposed road layout must be ascribed an appropriate buffer zone and fenced/cordoned off and marked/demarcated with danger tape (or similar) to prevent any access/encroachment.
- The developer must maintain a buffer zone of 10m around each site where no development may occur.
- No removal of artefacts or alterations of any heritage structure will be allowed within this buffer zone.
- No construction activities may occur near to the identified graves.
- All members of the construction team and personnel working on site must be made aware of the graves and the protection requirements through regular awareness training. The 10m buffer zone will be a No-go area.

Alternatively, should the developer wish to develop in the immediate vicinity of each grave site (within the 10m buffer zone) then a phase two archaeological assessment should take place in order to assist with the mitigation process. Depending on the recommendations of this second phase assessment a grave exhumation and relocation process may be called for. Such an

excavation can only take place once the local heritage agency AMAFA has issued a permit to such effect.

- Should construction activities uncover or expose any archaeological or historical residues, construction activities must cease immediately pending an evaluation by the heritage authorities, in line with the KwaZulu-Natal Heritage Act.

### **Fauna may be displaced**

- Killing of fauna for any reason will not be allowed. Any persons found doing so will be removed from site.
- Disturbance to all existing fauna and their respective habitats must be minimised wherever possible.
- The watercourse/drainage line areas provide habitat for fauna. Construction work site areas must be adequately fenced off. Construction workers must not be permitted to gain access to sensitive areas and adequate fencing/controls must be put in place to manage all staff movement.

### **Increased social impacts - Environmental Education**

- Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval prior to the commencement of construction.
- Construction workers should be made aware that they are not to make excessive noise (e.g. shouting/hooting).
- The need for a 'clean site' policy must be explained to the construction workers.
- A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules:
  - a. No alcohol/drugs to be present on site.
  - b. No firearms allowed on site or in vehicles transporting staff to/ from site (unless used by security personnel).
  - c. Prevent excessive noise.
  - d. Prevent unsocial behaviour.
  - e. No harvesting of firewood or plants for 'muthi' from the site or from the adjacent areas.
  - f. Construction staff are to make use of the facilities provided for them, as opposed to ad-hoc alternatives, (e.g. fires for cooking, the use of surrounding areas/bush as a toilet is forbidden). This is a predominantly natural veld/grassland area and there are major risks associated with any fires in the area.
  - g. Trespassing on private/ commercial properties adjoining the site is forbidden.
  - h. Driving under the influence of alcohol is prohibited.
  - i. As this is a residential area, and there are schools located in close proximity to the road, one in the eastern section of the road, approximately 400m from the start point of the road, on the northern side, the second to the south of the road, approximately 250m away. Construction workers are to be made aware of the potential for harm to occur to local residents.
  - j. Pedestrians utilise this road on a daily basis and construction workers must ensure that all road users are provided safe access routes and made aware of the risks to pedestrians from their actions.

### **Stormwater runoff**

- The period that stripped areas are left open to exposure should be minimised wherever possible. Care must be taken to ensure that lead times are not excessive.
- Wind screening and stormwater control must be undertaken to prevent soil loss from the site where required.
- Procedures that are in place to conserve topsoil during the construction phase of the project are to be applied to the set up phase, i.e. topsoil is to be conserved while providing access to the site and setting up the construction camp.

### **Stormwater Damage**

Stormwater management system:

- To help prevent stormwater damage, the increase in stormwater runoff resulting from the construction activities must be estimated and the drainage system designed accordingly.
- During site establishment, stormwater culverts and drains must be located and covered with metal grids to prevent blockages where deemed necessary by the Engineer.
- Temporary cut off drains and berms may be required to capture stormwater and promote infiltration.
- During construction, un-channelled stormwater flow must be controlled to help prevent soil erosion. Where large areas of soil are left exposed, rows of straw/hay or bundles of cut vegetation should be dug into the soil in contours to slow surface wash and capture eroded soil. The spacing between rows will be dependent upon slope.
- Any site access spaces should also be shaped as described above to help reduce stormwater runoff.
- Stormwater cut off drains must be incorporated into the road design to help reduce the erosion potential of stormwater runoff.
- Wherever possible, any stormwater that has become contaminated with silt and soil fines must be prevented from entering the watercourse, with the installation of diversion berms and containment bunds.
- No silt, soil fines, cement, petroleum products, or any form of waste may be allowed to disperse into the surroundings areas, particularly the watercourse.

### **Traffic safety**

- Traffic management and control systems to be put in place as necessary.
- Construction vehicles are to adhere to the speed limit at all times, where necessary speed bumps are to be installed to help enforce this.
- Traffic calming measures should be employed during the construction phase.
- Proper traffic control mechanisms are to be put in place to protect school children, pedestrians and road users in general during both construction and operational phases. This is a residential area, and there are schools located in close proximity to the road, one in the eastern section of the road, approximately 400m from the start point of the road, on the northern side, the second to the south of the road, approximately 250m away. Construction workers are to be made aware of the potential for harm to occur to local residents.
- The road design must allow pedestrians sufficient space to move parallel to the road without affecting vehicle traffic flow.
- Speed limit road signs and pedestrian and school children caution signs must be erected as necessary along the road length.



## Services and Servitude Conditions

### Eskom

- Eskom Powerline Servitude Conditions: No encroachments are permitted within the following in respect of our servitudes:
  - 132kV lines = 18 metres on either side of the centre line
  - 88kV lines = 16 metres on either side of the centre line
  - 33kV lines = 16 metres on either side of the centre line
  - 22kV lines = 12 metres on either side of the centre line
  - 11kV lines = 12 metres on either side of the centre line
- Eskom's underground cables are usually layed 1 metre to 1.5 metres, when excavation is anticipated, ensure you check with our offices for cable positions.
- Prior to the approval of the development, the owner shall lodge with the development Administration, for approval by the Minister, a certificate furnished by Eskom, the local municipality or other supplier of electricity for the benefit of the inhabitants of the development, to the effect that all substation servitudes required by it will be provided and have been depicted on the general plan.
- Trees should not be planted within their horizontal falling distance of the power lines.
- The roads crossing under the power lines may only cross in safe areas where, what is known as "broken conductor conditions" as defined in the Occupational Health & Safety Act 85 of 1993, are met. Generally, roads located within 10 m of wood poles are within legal safety requirements. This will be applicable to all property entrances adjoining existing roads.
- The ground clearance, as prescribed by the law has to be maintained, the natural ground levels within the servitude area are therefore to be retained, and no soil, or any other material, may be stock piled within the servitude area.
- Regarding the use of machinery, the operators are seldom informed as to the extreme danger of using equipment in close proximity to the live overhead conductors. No soil is to be disturbed, by any civil work, within a 3 m radius of any pole or stay wire. Where civil work is done outside of this radius the soil must be suitably sloped and protected so as not to cause erosion in or onto the 3 metre radius of undisturbed soil.
- Please note that the applicable building restrictions either side of any existing powerline must be adhered to when planning new buildings or developments on the property.
- Please further take note that the costs of relocations of any of Eskom's infrastructure, will be for the account of the developer.
- Applications can be lodged via Eskom's call centre on 086 003 7566.
- Please further take note that if any 275kV, 400kV or 765 kV Lines are involved, you need to send a copy of the application to Eskom's transmission division at Megawatt Park. (I can supply details).
- Clearance of 7,0 metres road to conductor to be maintained at all times.

### Telkom

- No telecommunication infrastructure owned by Telkom SA is affected.

- Approval of the proposed is valid for six months. If construction has not yet commenced within this time period then the file must be resubmitted for approval. Any changes and deviations from the original planning during construction must be immediately communicated to this office.  
Telkom SA SOC Ltd Engineering Operations  
Private Bag X54326, Durban  
4000  
If Telkom infrastructure is affected and needs to be relocated, such costs would be for the customer's account.
- Telkom SA to be informed in writing if infrastructure needs to be relocated.

## ENVIRONMENTAL MANAGEMENT PROGRAMME

ECO = Environmental Control Officer

E = Engineer

C = Contractor

The Engineer and ECO need to monitor all compliance.

### 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
<b>A. 1 Access to Site and Definition of No-Go Areas</b>  <i>Sound Environmental principles must be followed whilst establishing access to the site.</i>	A.1.1 <u>Routing</u>		
	a) The contractor must utilize existing access roads to gain access to the site and he must take into account any limitations (such as road widths, property boundary lines, No-go areas and services), identified.	E/ECO	Prior to moving onto the site.
	b) The Engineer must identify the location of all underground services and servitudes. A construction layout plan has been included under Appendix A, and these services are demarcated on this plan. These services must be demarcated on site and the contractor is to ensure that damage thereto is avoided.	E/C	Prior to moving onto the site.
	c) Choice of access routes shall take into account minimum disturbance to residents and road users.	E/C/ECO	Prior to moving onto the site
	d) The contractor must demarcate the No-go areas of the site. These areas will include any grave sites identified and the four watercourse crossings/drainage line areas as illustrated on Figure 6. Appendix A.	E/C/ECO	Prior to moving onto the site
	A.1.2 <u>Survey Points</u>		
	a) Marking of survey points must be done with the Engineers approval.	E	During surveys and preliminary investigations.
b) Vegetation clearing must be kept to a minimum during the survey operations. The clearing of indigenous trees is <u>prohibited</u> , unless the relevant license from DAFF has been received. Any marking of survey points must be done with the Engineers approval.	ECO	During surveys and preliminary investigations.	

#### 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
	c) Any vegetation disturbance to be rehabilitated immediately upon completion of investigation work.	ECO	During surveys and preliminary investigations.
<b>A.2 Setting up Construction Camp</b>	A.2.1 <u>Layout</u> The construction camp site must be well clear of any water course (minimum of 50m distance).	E/ECO	
<i>Careful planning of the construction camp can ensure that time and costs associated with environmental management and rehabilitation are reduced.</i>	a) The site identification for the Contractors Camp must be approved by the Engineer and ECO. Should the contractor require additional space then full consultation shall take place with the relevant landowners and written consent to be submitted to the Engineer prior to the establishment of the construction camp. A site layout plan must be submitted to the Engineer for approval.	E/ECO	During surveys and preliminary investigations, prior to moving onto the site.
	b) There will be no overnight accommodation available at the Contractors Camp, other than for pre-approved security staff. (See also A.5.2. Worker Conduct on Site j).	E/ECO	Ongoing.
	c) The size of the construction camp should be kept to a minimum, ie the smallest feasible size to cater for the campsite requirements. The construction camp must be adequately fenced and access must be controlled.	E/ECO	During site establishment.
	d) Adequate parking must be provided for staff and visitors.	E	During site establishment.
	e) The contractor must attend to the drainage of the campsite to avoid standing water and / or sheet erosion.	E/ECO	Ongoing.
	A.2.2 <u>Ablutions</u>		
	a) Temporary chemical toilets must be provided by a company approved by the Engineer. These toilets must be made available for all site staff, at a rate of no less than 1:20 with regular servicing weekly/fortnightly, (as deemed necessary to maintain hygienic standards), and should be no closer than 50m from any natural water-body. These toilets are to be within easy access to the workers onsite.	E/ECO	During site establishment.

#### 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
	b) The construction of pit latrine toilets is forbidden.	E/ECO	Ongoing.
	c) Under no circumstances may open areas or the surrounding bush or degraded and built up areas be used as a toilet facility.	ECO	Ongoing.
	<u>A.2.3 Provision for Camp Waste Disposal</u>		
	a) Bins and / or skips shall be provided at convenient intervals for disposal of waste within the construction camp.	ECO	During site establishment and ongoing.
	b) Bins should have liner bags for efficient control and safe disposal of waste.	ECO	Ongoing.
	c) Recycling and the provision of separate waste receptacles for different types of waste should be encouraged.	ECO	During site establishment and ongoing.
<b>A.3 Establishing Storage Areas</b>	<u>A.3.1 General Substances and Materials</u>		
<i>Storage areas can be hazardous, unsightly and can cause environmental pollution if not designed and managed carefully.</i>	a) Choice of location for storage areas must take into consideration prevailing winds, distance to water bodies and general on site topography.	ECO	During site establishment.
	b) Storage areas must be designated, demarcated and fenced if necessary.	ECO	During site establishment.
	c) Storage areas should be secure so as to minimise the risk of crime. They shall be safe from access by children and animals, etc.	ECO	During site establishment.
	d) Fire prevention facilities must be present at all storage facilities.	ECO	During site establishment

## 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
	A.3.2 <u>Hazardous Substances and Materials</u>		
	a) Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.	E/ECO	During site establishment.
	b) Hazardous storage areas must be bunded with an impermeable liner to protect groundwater quality. The Contractor shall submit a method statement to the Engineer for approval. Bund volumes: Hazardous storage and refuelling areas must be 110% bunded with an impermeable liner to protect groundwater quality.	E/ECO	During site establishment.
	c) Fuel tanks must be stored ONLY in allocated storage areas and refuelling must take place ONLY in the allocated areas. Re-fuelling will not be permitted elsewhere on the site. Re-fuelling is to take place on a lined or bunded surface. Fuel tanks must be stored in suitable bunded (110%) storage areas. In the event of an emergency, and re-fuelling outside of designated areas is required, this <b>refuelling activity must take place on a lined or bunded surface.</b>	E	Ongoing.
	d) Storage areas containing hazardous substance / materials must be clearly sign posted - Occupational Health & Safety Act, 1993 (Act No. 85 of 1993) (OHSA) as amended in July 2001, including Major Hazard Installation Regulation, GNR 692, 30 July 2001.	ECO	During site establishment.
	e) The proximity of houses and powerlines etc. should be taken into consideration when deciding on storage areas for hazardous substances.	E/ECO	During surveys and preliminary investigations.
	f) Residents living adjacent to the construction site must be notified of the existence of the hazardous substance and material storage area.	ECO	When moving onto site or as the relevant materials arrive on site.

#### 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
	g) Staff dealing with these materials/substances must be aware of their potential impacts and follow appropriate safety measures. This must be monitored (ECO function). Staff must also be aware of how to deal with any incident that might occur, relating to any hazardous materials/substances stored or used on site. Any spillages must adhere to the OHSA.	E/ECO	Ongoing.
<b>A.4 Materials Management – Sourcing</b> <i>Materials must be sourced in a legal and sustainable way to prevent off-site environmental degradation.</i>	A.4.1 <u>Source of Materials</u> All materials must be sourced locally from commercial sources.		
	a) Contractors shall prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners etc.) and submit these to the Engineers for approval prior to commencement of any work.	E/ECO	On award of contract.
	b) Where possible, a signed document from the supplier of natural materials should be obtained confirming that they have been obtained in a sustainable manner and in compliance with the relevant legislation.	ECO	On receipt of the materials.
	c) 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 and Energy.	ECO	On receipt of the borrowed materials.
<b>A.5 Education of Site Staff on General Environmental Conduct</b>	A.5.1 <u>Environmental Education and Awareness</u>  The ECO will provide the initial environmental awareness training to the contractor, thereafter, the contractor is to ensure that any new labourers are provided with environmental training.		
		ECO/C	During staff induction and ongoing.

#### 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
<i>These points need to be made clear to staff on site before the project begins.</i>	<p>The <u>contractor</u> must ensure that all site personnel have a basic level of environmental awareness training. Workers must understand the following:</p> <ul style="list-style-type: none"> <li>• What is meant by “environment”;</li> <li>• Why the environment needs to be protected and conserved;</li> <li>• How construction activities can impact on the environment;</li> <li>• What can be done to mitigate against such impacts;</li> <li>• Awareness of emergency and spills response provisions;</li> <li>• Social responsibility during construction, e.g. being considerate to local residents and road users.</li> <li>• Construction workers should be made aware that they are not to make excessive noise (e.g. shouting/hooting) as the site falls within a residential area.</li> <li>• The need for a ‘clean site’ policy also needs to be explained to the construction workers.</li> </ul>	C	During staff induction and ongoing.
	It is the contractors responsibility to provide the site foreman with comprehensive and practical environmental training and to ensure that the site foreman has sufficient understanding to pass this information onto the construction staff.	C/ECO	Prior to moving onto the site.
	a) Translators are to be used where necessary.	ECO	Ongoing.
	b) The use of pictures and real-life examples is encouraged as these tend to be more easily remembered.	ECO	Ongoing.
	<u>A.5.2 Worker Conduct on Site</u>		
	A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules:	ECO	During staff induction, followed by ongoing monitoring.
	a) No alcohol / drugs to be present on site.	ECO	Ongoing.
	b) No firearms allowed on site or in vehicles transporting staff to / from site (unless used by security personnel).	E/C	Ongoing.
	c) Prevent excessive noise.	E/C	Ongoing.



#### 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
	d) Prevent unsocial behaviour.	E/C	Ongoing.
	e) Bringing pets onto the site is forbidden.	ECO/E	Ongoing.
	f) No harvesting of firewood, fruit, or plants for 'muthi' from the site or any other natural material on site or in adjacent areas.	ECO	Ongoing.
	g) Construction staff are to make use of the facilities provided for them, as opposed to ad-hoc alternatives, (e.g. fires for cooking, the use of surrounding areas / bush as a toilet is forbidden).	ECO/E/C	Ongoing.
	h) Trespassing on private / commercial properties adjoining the site is forbidden.	ECO/E/C	Ongoing.
	i) Driving under the influence of alcohol is prohibited.	ECO/E/C	Ongoing.
	j) Other than the pre-approved security staff, no workers shall be permitted to live on site.	ECO/C	Ongoing.
<b>A.6 Dust / Air Pollution</b> <i>Establishment of the camp site and related temporary works can reduce air quality.</i>	A.6.1 <u>Air Quality</u>		
	a) Vehicles travelling along the access roads must adhere to the speed limits to avoid creating excessive dust.	ECO	Ongoing.
	b) Camp construction / haulage road construction – areas that have been stripped of vegetation must be dampened periodically to avoid excessive dust.	ECO	Ongoing – more frequently during dry and windy conditions.
	c) The Contractor must make alternative arrangements (other than fires) for cooking and / or heating requirements. LPG gas cookers may be used provided that all safety regulations are adhered to.	E/ECO/C	Ongoing.
	d) Burning of waste material on site is prohibited.	E/ECO/C	Ongoing.
<b>A.7 Soil Erosion</b>	A.7.1 <u>Conservation of Valuable Soil Resources</u>		

#### 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
<i>The stripping of vegetation during preliminary activities on site greatly increases the risk of soil erosion.</i>	a) The time that stripped areas are left open to exposure should be minimised wherever possible. Care should be taken to ensure that lead times are not excessive.	E/ECO	Throughout the duration of the project.
	b) Wind screening and stormwater control should be undertaken to prevent soil loss from the site.	E/ECO	During site establishment.
	c) Procedures that are in place to conserve topsoil during the construction phase of the project are to be applied to the set up phase, i.e. topsoil is to be conserved while providing access to the site and setting up the camp. Once an area has been cleared of vegetation, the top layer (nominally 150mm) of soil should be removed and stockpiled in a designated area.	E/ECO	Daily monitoring during site establishment.
	d) Erosion prevention measures should be taken into consideration in the design of the construction camp/s, access areas and the road itself. Designated pedestrian access systems should also be provided	E/ECO	Throughout the duration of the project.
	e) Drainage embankments are only to be disturbed where required and any such activities are to be kept to a minimum.	E/ECO	Throughout the duration of the project.
<b>A.8 Stormwater Construction activities frequently result in diversions of natural water flow resulting in concentration of</b>	<u>A.8.1 Stormwater Damage Prevention</u>		
	a) During site establishment, stormwater culverts and drains are to be located and covered with metal grids to prevent blockages if deemed necessary by the Engineer.	E/C	During site establishment.
	b) Temporary cut off drains and berms may be required to capture stormwater and promote infiltration.	ECO	During site establishment.
	c) The use of high velocity stormwater pipelines should be avoided in favour of open, high friction, semi-permeable channels wherever feasible.	E/ECO	During site establishment and ongoing.

#### 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
<i>flow and an increase in the erosive potential of the water. Measures in this section are aimed at reducing the erosive potential of stormwater.</i>	d) A number of smaller stormwater outfall points should be constructed rather than a few large outfall points.	E/ECO/C	During site establishment and ongoing.
<b>A.9 Water Quality</b>	A.9.1 <u>Maintenance of Water Quality</u>		
<i>Incorrect disposal of substances and materials and polluted run-off can have serious negative effects on groundwater quality.</i>	a) Storage areas that contain hazardous substances must be 110% bunded with an approved impermeable liner.	E	During site establishment.
	b) Spills in bunded areas must be cleaned up, removed and correctly disposed of from the bunded area as soon after detection as possible to help minimise the associated risk of pollution and the resultant reduced bunding capacity. The removal and disposal of spill material must be according to the relevant safety regulations and specifications - Occupational Health & Safety Act, 1993 (Act No. 85 of 1993) (OHSA) as amended in July 2001, including Major Hazard Installation Regulation, GNR 692, 30 July 2001.	E/ECO	During site establishment.
	c) No vehicle washing may occur on site.	E/ECO	Ongoing.
<b>A.10 Conservation of the Natural Environment</b>	A.10.1 <u>Fauna and Flora</u>		
	a) No vegetation may be cleared without prior permission from the Engineer and ECO.	E/ECO	During site establishment, and ongoing.

#### 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
<p><i>Alien plant encroachment is particularly damaging to natural habitats and is often associated with disturbance to the soil during construction activities.</i></p>	<p>b) Trees that are not to be cleared should be marked beforehand with danger tape. The ECO must be given a chance to mark vegetation that is to be conserved before the Contractor begins clearing the site.</p>	E/ECO	During site establishment.
	<p>c) Any indigenous trees on site may not be cut, trimmed, damaged or removed. Any such activity will require licenses from DAFF.</p>	E/ECO	During surveys and preliminary investigations and ongoing.
	<p>d) Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. As there are already a number of alien plants on the site, an alien eradication programme should be implemented.</p>	ECO	Ongoing in camp site, haulage areas.
	<p>e) Any smaller vegetation which is to be removed for post construction rehabilitation must be re-instated and re-planted as soon as construction activities are complete. Seeding of suitable indigenous grasses must be effected on denuded areas and removed plant material re-planted as close to area of source as possible.</p>	E/ECO	During surveys and preliminary investigations and ongoing.
	<p>f) Disturbance to birds, mammals and reptiles and their habitats should be minimised wherever possible.</p>	E/ECO	During surveys and preliminary investigations and ongoing.
	<p>A.10.2 <u>Sensitive Habitats – No-go areas</u></p>		
	<p>a) Areas identified by the Engineer or the ECO as being ecologically sensitive and adjacent to any construction work are to be suitably demarcated to prevent damage by plant and labour. There are four water course crossings located at: 29°42'57.78S; 30°18'37.75"E (WC1), 29°42'54.90"S 30°18'33.26"E (WC2), 29°42'53.21"S 30°18'30.65"E (WC3) and 29°42'46.80"S 30°18'31.66"E (WC4), which have been identified as sensitive habitats. See Figure 6. Appendix A.</p>	E/ECO	During surveys and preliminary investigations and ongoing.

#### 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
	b) Previous MOSS areas, now replaced as ESP areas have been identified on site. There is a Riparian corridor running along the eastern portion of the road, from the start point of the proposed road upgrade up to Water course 1 crossing. Water course crossing 1, (please refer to Figure 7), is described as a Key Area, and on the Msunduzi C-Plan (Figure 5a), Site/Unit ID 14478 indicates Midlands Mistbelt Grassland and Dry Ngongoni Veld, together with the Natal Banana Frog, the African Striped Weasel and the Natal Cycad. These sensitive areas are No-go areas, together with the four watercourse crossings, which are all classified as sensitive areas. No access to these areas is to be permitted.	E/ECO	During surveys and preliminary investigations and ongoing.
	c) The proposed upgraded bridging/ culvert structures must be designed to accommodate seasonal peak flow.	E	During surveys and preliminary investigations and ongoing.
	d) Drainage areas to be avoided wherever possible.	E	During surveys and preliminary investigations and ongoing.
	e) Construction within the watercourse areas should be scheduled to take place during low rainfall months (if feasible).	E	During surveys and preliminary investigations and ongoing.
	f) Any banks disturbed during the construction process must be adequately retained and rehabilitated.	E/ECO	During surveys and preliminary investigations and ongoing.
	g) Any outfall points must be designed to include treatment of the soil below with either gabion baskets, stone pitching, stilling pond or other energy dissipator mechanism to help reduce erosion potential and dissipate water flow and velocity or as per Engineering specifications.	E/ECO	During surveys and preliminary investigations and ongoing.
	h) Drainage line crossings/culvert design to be designed to allow for animal passage and to allow habitat linkages.	E/ECO	During surveys and preliminary investigations and ongoing.
<b>A.11 Set up of Waste Management Procedures</b>	A.11.1 <u>Waste Management</u>		
	a) The use of rubbish pits is forbidden.	ECO	Ongoing.
	b) Burning of waste is forbidden.	ECO	Ongoing.

## 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
	c) A fenced area must be allocated for waste sorting and disposal.	ECO	During site establishment.
<p><b>A.12 Social Impacts – Visual &amp; Noise</b></p> <p><i>It is important to take notice of the needs and wishes of those living or working adjacent to the site. Failure to do so can cause disruption to work and increase costs in the form of delays.</i></p>	<p>A.12.1 <u>Public Participation</u> IAPs can be identified as those who either: live close by the site; work close to the site; will have their services / infrastructure affected by the project; have a general interest in the project; the Councillor for the ward in which the construction is taking place.</p>		
	a) During site establishment, the Contractor must notify in writing adjacent property owners. These people will usually have been identified by the environmental consultant assigned to the project.	E/C	Prior to moving onto site.
	A.12.2 <u>Noise Impacts</u>		
	a) Construction vehicles are to be fitted with approved silencers prior to the beginning of construction.	ECO/E/C	Prior to moving onto site.
	b) Equipment that is fitted with noise reduction facilities will be used as per operating instructions and maintained properly during construction operations.	ECO/C/E	Ongoing.
	A.12.3 <u>Visual Impacts</u>		
	a) Storage facilities, elevated tanks and other temporary structures on site should be located such that they have as little visual impact on local residents as reasonably practical.	E/ECO	Ongoing.
<p><b>A.13 Cultural Environment</b></p>	<p>A.13.1 <u>Protection of Cultural Environment</u> Graves may be disturbed during construction works. Graves and a cemetery have been identified by AMAFA along the road, within the study area, and in close proximity to the road. These graves require protection. These grave site areas are, therefore, <u>No-go areas</u>. (An HIA is currently in progress).</p>		

#### 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
	a) The identified graves in close proximity to the proposed road layout must be ascribed an appropriate buffer zone and fenced/cordoned off and marked/demarcated with danger tape (or similar) to prevent any access/encroachment. These grave sites are No-go areas and no encroachment is to be allowed.	E/ECO	Ongoing.
	b) The developer must maintain a buffer zone of 10m around each site where no development may occur.	E/ECO	Ongoing.
	c) No removal of artefacts or alterations of any heritage structure will be allowed within this buffer zone.	E/ECO	Ongoing.
	d) No construction activities may occur near to the identified graves.	E/ECO	Ongoing.
	e) All members of the construction team and personnel working on site must be made aware of the graves and the protection requirements through regular awareness training. The 10m buffer zone will be a No-go area.	E/ECO	Ongoing.
	f) Alternatively, should the developer wish to develop in the immediate vicinity of each grave site (within the 10m buffer zone) then a phase two archaeological assessment should take place in order to assist with the mitigation process. Depending on the recommendations of this second phase assessment a grave exhumation and relocation process may be called for. Such an excavation can only take place once the local heritage agency AMAFA issued a permit to such effect.	E/ECO	Ongoing.
	g) Should construction activities uncover or expose any archaeological or historical residues, construction activities must cease immediately pending an evaluation by the heritage authorities, in line with the KwaZulu-Natal Heritage Act.	E/ECO	Ongoing.
	h) Prior to the commencement of construction, all staff need to know what possible archaeological or historical objects of value may look like, and to notify the Engineer / Contractor should any such item be uncovered.	C/E	Ongoing.
<b>A.14 Safety and Security</b>	A.14.1 <u>Fencing</u>		
	a) The site camp should have a perimeter security fence.	E/C	During site establishment.

#### 4.1. Section A: Site Establishment Activities

Issue	Management Specifications	Responsible Party	Frequency
	b) Such a confined site within a residential / commercial area should be fenced and manned to control the access of persons to the site.	C	During site establishment.
	c) Potentially hazardous areas such as trenches are to be demarcated and clearly marked with danger tape (or similar).	C	Ongoing.
	d) Deep trenches must be provided with places where trapped people or animals can easily exit.	C	Ongoing.
	A.14.2 <u>Risks Associated with Materials on Site</u>		
	a) Material stockpiles or stacks, such as pipes must be stable and well secured to avoid collapse and possible injury to site workers / local residents.	ECO/E/C	Ongoing.
	b) Flammable materials should be stored as far as possible from adjacent residents / businesses.	ECO/E/C	Ongoing.
	c) Fire fighting equipment should be present on site at all times. The equipment is to be adequately maintained in good working order in accordance with the Occupational Health & Safety Act, 1993 (Act No. 85 of 1993) (OHSA) as amended in July 2001, including Major Hazard Installation Regulation, GNR 692, 30 July 2001.	ECO/E/C	Ongoing.
	d) Obstruction to drivers' line of site owing to stockpiles and stacked materials must be avoided, especially at intersections and sharp corners.	ECO/E/C	Ongoing.
	e) No materials are to be stored in unstable or high-risk areas such as in floodplains or on steep slopes.	ECO	Ongoing.
	f) All IAPs should be notified in advance of any known potential risks associated with the construction site and the activities on it.	ECO	Ongoing.



## 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
<b>B.1 Access to Site</b>	B.1.2 <u>Maintenance of Access</u>		
	a) Contractors should ensure that roads utilised for construction work on a regular basis within close proximity to the site are maintained and in good condition by attending to potholes, corrugations and stormwater damage as soon as these develop.	E	Ongoing.
	b) Unnecessary compaction of soils by heavy vehicles must be avoided; construction vehicles must be restricted to haulage routes and allocated turning areas.	ECO	Ongoing.
	c) The contractor must take into account any limitations (such as road widths, property boundary lines, No-go areas and services), identified.	E/ECO/C	Ongoing.
	d) The Engineer must demarcate the location of all underground services and servitudes. The contractor is to ensure that any damage to these services is avoided. The Conditions of servitude are included under Appendix C.	E	Ongoing
	d) The contractor must demarcate the No-go areas of the site, which will include the grave sites and cemetery identified by AMAFA, (an HIA is in progress), the drainage line areas as illustrated on Figure 6 and the previous MOSS areas, now replaced as ESP areas as depicted on Figure 7.	E/ECO/C	Ongoing.
<b>B.2 Maintenance of Construction Camp</b>	B.2.1 <u>Surfaces</u>		
	a) The Contractor must monitor and manage drainage of the construction camp site. Stormwater outfalls should be designed to reduce flow velocity and avoid stream bank and soil erosion.	C/ECO	Ongoing.
	b) Run-off from the campsite must not discharge directly into neighbouring properties or the nearby watercourse. Runoff must be adequately catered for and water velocity dissipator mechanisms must be incorporated into the design to help reduce erosion/scour potential.	C/ECO	Ongoing.
	c) The use of high velocity stormwater pipelines should be avoided in favour of open, high friction, semi-permeable channels wherever feasible.	C/ECO	Ongoing.

#### 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
	d) A number of smaller stormwater outfall points should be constructed rather than a few large outfall points.	C/ECO	Ongoing.
	<u>B.2.2 Ablutions</u>		
	a) Chemical toilets are to be maintained and kept in a clean state and should be placed to ensure that they adequately service the work areas. They are to be placed away from sensitive natural areas. Chemical toilets are to be provided at a rate of 1:20 with regular servicing weekly/fortnightly, (as deemed necessary to maintain hygienic standards).	ECO	Ongoing.
	b) The Contractor is to ensure that open areas or the surrounding bush are not being used as a toilet facility.	ECO	Daily.
	c) The construction of pit latrines or "long drop" toilets is forbidden.	ECO/C	Ongoing.
	<u>B.2.3 Camp Waste Disposal See also B.10</u>		
	a) No littering or illegal dumping of any waste material is to take place on the site and/or as the result of construction activities. The Contractor shall ensure that no littering occurs in the work or camp areas.	C/ECO	Ongoing.
	b) Bins and/or skips shall be provided at convenient intervals for disposal of waste within the construction camp.	C/ECO	Fortnightly.
	c) Bins should have liner bags for efficient control and safe disposal of waste.	ECO/C	Ongoing.
	d) Recycling and the provision of separate waste receptacles for different types of waste should be encouraged.	ECO/C	Ongoing.
	e) Bins and / or skips should be emptied regularly and waste should be disposed of at a registered landfill site. Waybills for all such disposal are to be kept by the Contractor for review by the Engineer / ECO.	E/ECO/C	Ongoing.

## 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
	f) A registered chemical waste company is to be used to remove waste from chemical toilets on site.	ECO/C/E	Ongoing.
	<b>B.2.4 <u>Eating Areas</u></b>		
	a) Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.	ECO/C	Daily.
	<b>B.2.5 <u>Housekeeping</u></b>		
	a) The Contractor shall ensure that the construction camp and working areas are kept clean and tidy at all times.	C	Fortnightly.
<b>B.3 Staff Conduct</b>	<b>B.3.1 <u>Environmental Education and Awareness</u></b>		
	a) The Contractor must ensure that all new staff receive induction training and the Contractor must provide regular training for example, toolbox talks, to reinforce awareness of relevant EMP specifications.	E/ECO	Ongoing.
	b) The Contractor must monitor the performance of the construction workers to ensure that the points relayed during their induction have been properly understood and are being followed.	E/ECO	Ongoing.
<b>B.4 Dust / Air Pollution</b> <i>Main causes of air pollution are dust from vehicle</i>	<b>B.4.1 <u>Air Pollution Prevention</u></b>		
	a) Vehicles travelling to and from the construction site must adhere to the speed limits so as to avoid producing excessive dust.	E	Ongoing.

#### 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
<i>movements and stockpiles, vehicle emissions and fires.</i>	b) Access and other cleared surfaces must be dampened on a regular basis and especially in dry and windy conditions to help avoid excessive dust.	E	Ongoing.
	c) If dust is unavoidable, screening will be required utilising wooden supports and shade cloth.	E/C	As directed by Engineer.
	d) Vehicles and machinery are to be kept in good working order and must be serviced regularly to help ensure a minimum level of emissions and to meet safety specifications.	ECO	Ongoing.
	e) Should excessive emissions be observed, the Contractor is to have the equipment serviced / repaired as soon as possible.	E	As directed by Engineer.
	f) No fires are allowed on site. Some equipment/methods (tar) may require flames or fire for heating purposes. Any such requirements must be discussed and managed with the Engineer, ECO and Contractor. The Contractor must make alternative arrangements (other than fires) for cooking and / or heating requirements. LPG gas cookers may be used provided that all safety regulations are adhered to.	E/ECO/C	Ongoing.
	g) Burning of waste material on site is prohibited.	E/ECO/C	Ongoing.
	h) Stockpiles may cause dust and so must be managed in accordance with the guidelines in Materials Management ( <b>Section B.9.1</b> )	E/ECO/C	Ongoing.
<b>B.5 Soil Erosion</b>	<b>B.5.1 <u>Topsoil Stripping and Stockpiling</u></b>  Once an area has been cleared of vegetation, the top layer (nominally 150mm) of soil should be removed and stockpiled in a designated area.	ECO	Ongoing.
	<b>B.5.2 <u>Exposed Surfaces</u></b>		

## 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
	a) The full length of the works shall not be stripped of vegetation prior to commencing other activities. The time that stripped areas are exposed shall be minimised wherever possible.	E/ECO	Ongoing.
	b) Topsoiling and re-vegetation shall commence immediately after the completion of an activity and at an agreed distance behind any particular work front.	ECO	As each activity is completed.
	c) In areas where steep slopes are excavated, erosion control measures must be implemented. These measures may include the planting of suitable indigenous vegetation at short intervals to help prevent the formation of gulleys.	ECO	Ongoing.
<b>B.6 Stormwater</b>	<b>B.6.1 General Principles</b>		
<i>Construction activities frequently result in diversions of natural water flow resulting in concentration of flow and an increase in the erosive potential of the water. This section provides measures aimed at reducing the erosive potential of stormwater.</i>	a) Earth, stone and rubble are to be properly disposed of so as not to obstruct natural pathways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers.	E	Ongoing.
	b) There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.	E/ECO	Fortnightly. (More frequent, should persistent heavy rains occur).
	c) The use of high velocity stormwater pipelines should be avoided in favour of open, high friction, semi-permeable channels wherever feasible.	E/ECO	Throughout the duration of the project.
	d) A number of smaller stormwater outfall points should be constructed rather than a few large outfall points.	E/ECO	Throughout the duration of the project.
	e) Stormwater outfalls should be designed to reduce flow velocity and avoid stream bank and soil erosion.	E/ECO	Throughout the duration of the project.
	a) The time that stripped areas are left open to exposure should be minimised wherever possible. Care should be taken to ensure that lead times are not excessive.	E/ECO	Throughout the duration of the project.
	b) Wind screening and stormwater control should be undertaken to prevent soil loss from the site.	E/ECO	Throughout the duration of the project.

#### 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
	c) Topsoil is to be conserved. Once an area has been cleared of vegetation, the top layer (nominally 150mm) of soil should be removed and stockpiled in a designated area.	E/ECO	Throughout the duration of the project.
	d) Erosion prevention measures must be put in place and maintained in the construction camp/s, access spaces and road areas. Designated pedestrian access systems should also be provided	E/ECO	Throughout the duration of the project.
	e) Drainage embankments are only to be disturbed where required and any such activities are to be kept to a minimum.	E/ECO	Throughout the duration of the project.
	f) Appropriate drainage must be constructed on any new access roads created, in order to help dissipate surface water runoff and sheet erosion that may occur.		
	<u>B.6.3 Un-channelled Flow</u>		
	a) During construction un-channelled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw / hay or bundles of cut vegetation should be dug into the soil in contours to slow surface wash and capture eroded soil. The spacing between rows will be dependent on slope. Cleared alien invasive vegetation to be used under ECO supervision ONLY.	E/ECO	As surface becomes exposed.
	b) Where surface runoff is concentrated (e.g. along exposed tracks), flow should be slowed by contouring with hay bales or bundled vegetation generated during on site clearance, or by inserting water directing 'speed humps' (or berms), along the track to channel water into small detention ponds or areas protected with hay bales for flow reduction and sediment capture. Cleared alien invasive vegetation to be used under ECO supervision ONLY.	E/ECO	Ongoing.
<b>B.7 Water Quality</b>	<u>B.7.1 Prevention of Water Pollution</u>		

#### 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
<i>Water quality is affected by the incorrect handling of substances and materials. Mismanagement of polluted run-off from vehicle and plant washing and wind dispersal of dry materials into rivers and watercourses are detrimental to water quality.</i>	a) Mixing / decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface (110% bunded) with an approved liner. Waste from these should then be disposed of to a suitably licensed waste site.	ECO	Ongoing.
	b) Every effort should be made to ensure that any chemicals or hazardous substances do not contaminate the soils or ground water on site.	ECO	Ongoing.
	c) Site staff shall not be permitted to use any watercourse or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing, or for any construction related activities. Municipal water should instead be used for all activities such as washing of equipment, dust suppression, concrete mixing, compacting etc.	ECO/C/E	Ongoing.
	d) Storage areas containing hazardous substance / materials must be clearly sign posted - Occupational Health & Safety Act, 1993 (Act No. 85 of 1993) (OHSA) as amended in July 2001, including Major Hazard Installation Regulation, GNR 692, 30 July 2001.	ECO/C/E	Ongoing.
	f) Residents living adjacent to the construction site must be notified of the existence of the hazardous substance and material storage area.	ECO/C/E	Ongoing.
	g) Staff dealing with these materials/substances must be aware of their potential impacts and follow appropriate safety measures. This must be monitored (ECO function). Staff must also be aware of how to deal with any incident that might occur, relating to any hazardous materials/substances stored or used on site. Any spillages must adhere to the OHSA.	ECO/C/E	Ongoing.
<b>B.8 Conservation of the Natural</b>	B.8.1 <u>Fauna &amp; Flora</u>		

#### 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
<b>Environment</b>	As the work front progresses the Contractor is to check that vegetation clearing has the prior permission of the Engineer / Environmental Control Officer.	E/ECO	Ongoing.
	a) Only vegetation in the immediate vicinity of the construction site and the proposed road to be removed, and only directly prior to construction commencing.	ECO	Ongoing.
	b) Trees may only be cleared with prior approval from the ECO and relevant authority.	ECO	Ongoing.
	c) Gathering of firewood, fruit, muthi plants or any other natural material on site or in adjacent areas is prohibited.	ECO	Ongoing.
	d) The hunting of animals (incl. birds, mammals, reptiles etc.) on site and in surrounding areas is forbidden.	ECO	Ongoing.
	e) Snares and traps on site and in adjacent areas are forbidden.	ECO	Ongoing.
	f) Immediate re-vegetation of stripped areas and removal of aliens by weeding must take place. This significantly reduces the amount of time and money that must be spent on alien plant management during rehabilitation.	ECO	Ongoing.
	g) Alien vegetation encroachment onto the site as a result of construction activities must be controlled during construction.	ECO	Ongoing.
	h) Where possible, cleared indigenous vegetation should be kept in a nursery for use at a later stage in the site rehabilitation process.	ECO	Construction Phase.
	i) Drainage line crossings/culvert designs to allow for animal passage and to allow habitat linkages.	E	Construction Phase.
j) Previous MOSS areas, now replaced as ESP areas exist within the study area, there is a Riparian corridor running along the eastern portion of the road, from the start point of the proposed road upgrade up to Water course 1 crossing. Water course crossing 1, (please refer to Figure 7), is described as a Key Area, and on the Msunduzi C-Plan (Figure 5a), Site/Unit ID 14478 indicates Midlands Mistbelt Grassland and Dry Ngongoni Veld, together with the Natal Banana Frog, the African Striped Weasel and the Natal Cycad. These sensitive areas are No-go areas, together with the four watercourse crossings, which are all classified as sensitive areas. No access to these areas is to be permitted.	E/ECO	Construction Phase.	



## 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
<b>B.9 Materials Management</b>	<u>B.9.1 Stockpile Management</u>		
	a) Stockpiles should not be situated such that they obstruct natural water pathways. Location as directed by the Engineer.	E/ECO	Construction Phase.
	b) Stockpiles should not exceed 1.5 m in height.	ECO /C	
	c) If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or cloth (short timeframe), depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.	ECO	Ongoing.
	d) Stockpiles should be kept clear of weeds and alien invasive vegetation growth by regular weeding.	ECO	Monthly.
	<u>B.9.2 Handling of Hazardous Materials</u>		
	a) All concrete mixing must take place on a designated, impermeable surface.	ECO	Ongoing.
	b) No vehicles transporting concrete to the site may be washed on site.	ECO	Ongoing.
	c) No vehicles transporting, placing or compacting asphalt or any other bituminous product may be washed on site.	ECO	Fortnightly.
	d) Lime and other powders must not be mixed during excessively windy conditions.	ECO	Ongoing.
	e) All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the site.	ECO	Ongoing.
	f) Hazardous substances / materials are to be transported in sealed containers or bags.	ECO	Ongoing.
	g) Vehicles must not be serviced on site.	ECO	Ongoing.
	h) Drip trays must be provided for leaky vehicles left on site, and these vehicles must be repaired immediately.	E/ECO/C	Ongoing

## 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
	i) Spraying of herbicides / pesticides should not take place under windy conditions and must comply with OHSA specs, chemical handling laws and manufacturer's specifications. Engineer to first approve any herbicides / pesticides that may be utilised on site.	E/ECO	
	j) A permitted hazardous waste contractor should be consulted should any accidents / spillages of hazardous substances and / or materials take place. The Contractor is to outline a Method Statement for dealing with accidents / spillages of hazardous materials. This Method Statement must be handed to the Engineer as well as to DWA should any incident occur.	E/ECO/C	Ongoing
	k) Fire fighting equipment should be present on site at all times. The equipment is to be adequately maintained in good working order in accordance with the Occupational Health & Safety Act, 1993 (Act No. 85 of 1993) (OHSA) as amended in July 2001, including Major Hazard Installation Regulation, GNR 692, 30 July 2001.	E/ECO/C	Ongoing
<b>B.10 Waste Management</b> <i>Definition:</i> "Refuse" refers to all construction waste (such as rubble, asphalt millings, cement, timber, cans, other containers, wire and nails), household and office waste.	<b>B.10.1 On-Site Waste Management</b>		
	a) Refuse must be placed in the designated skips / bins which must be regularly emptied. These should remain within demarcated areas and should be designed to prevent wind born litter.	ECO	Ongoing.
	b) In addition to the waste facilities within the construction camp, provision must be made for waste receptacles to be placed at intervals along the work front.	ECO	Ongoing.
	c) Littering on site is forbidden.	ECO	Ongoing.
	d) Recycling is to be encouraged by providing separate receptacles for different types of waste and making sure that staff are aware of their uses.	ECO	Ongoing.
	<b>B.10.2 Waste Disposal</b>		

#### 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
	<i>Non – hazardous waste</i>		
	All non-hazardous waste must be removed from the site and transported to the nearest landfill.		
	a) Waybills proving correct disposal shall be provided for the Engineers inspection.	E/ECO	Monthly.
	c) Waste from chemical toilets should be disposed of regularly and in a responsible manner by a registered waste contractor. Care must be taken to avoid contamination of soils and water pollution and any nuisance to adjoining areas.	ECO	Fortnightly and at the start of builders holidays.
	<i>Hazardous Waste</i>		
	a) Hazardous waste disposal must be disposed of at a registered hazardous waste facility.	ECO	Ongoing.
<b>B.11 Social Impacts</b> <i>Regular communication between the Contractor and the IAPs is important for the duration of the contract.</i>	B.11.1 <u>Disruption of Infrastructure and Services</u>		
	a) Contractors activities and movement of staff to be restricted to designated construction areas.	E	Ongoing.
	b) Should the construction staff be approached by members of the public or other stakeholders, they should assist them in locating the Engineer or Contractor, or provide a number on which they may contact the Engineer or Contractor.	E/ECO	Ongoing.
	c) The conduct of the construction staff when dealing with the public or stakeholders shall be in a manner that is polite and courteous at all times.	E	Ongoing.
	d) Disruption of access for local residents must be minimised and must have the consent of the Engineer.	E	Ongoing.

## 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
	e) The Contractor is to inform neighbours in writing of disruptive activities at least 24 hrs beforehand. This can take place by way of leaflets placed in the post boxes, or other methods approved by the Engineer, giving the Engineers and Contractor's details.	E/ECO	At least 24 hrs prior to the activity taking place.
	<b>B.11.2 <u>Visual Impacts</u></b>		
	a) Lighting on the construction site should be pointed downwards and away from oncoming traffic and nearby houses.	ECO	Ongoing.
	b) The site must be kept clear and neat to help minimise the visual impact of the site.	ECO	Ongoing.
	c) If screening is being used, this must be moved and re-erected as the work front progresses.	ECO	Ongoing.
	<b>B.11.3 <u>Noise</u></b>		
	a) Machinery and vehicles are to be kept in good working order for the duration of the project to minimise noise nuisance to neighbours.	ECO	Ongoing.
	b) Notice of particularly noisy activities must be given to residents / businesses adjacent to the construction site. Examples of these include: noise generated by jackhammers; blasting; drilling; extraction pumps.	E/ECO	At least 24 hrs prior to the activity taking place.
	c) Noisy activities must be restricted to the times given in the Project Specification or General Conditions of Contract.	E	Ongoing.
	d) Where necessary workers are to wear ear protection.	E	Ongoing.
	e) No construction activity is to take place from 6pm to 6am, or on weekends.	E	Ongoing.
	<b>B.11.4 <u>Communication with Interested and Affected Parties (IAPs)</u></b>		

#### 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
	a) The Engineer and Contractor are responsible for on-going communication with those people that are interested / affected by the project.	E/ECO	Ongoing.
	b) A complaints register should be housed at the site office. This should be in carbon copy format, with numbered pages. Any missing pages must be accounted for by the Contractor. This register is to be tabled during monthly site meetings.	ECO	Monthly.
<b>B.12 Cultural Environment</b>	<p>B.12.1 <u>Protection of Cultural Environment</u></p> <p><b>Graves may be disturbed during construction works.</b> Graves and a cemetery have been identified by AMAFA along the road, within the study area, and in close proximity to the road. These graves require protection. These grave site areas are, therefore, <u>No-go areas. (An HIA is currently in progress).</u></p>		
	a) The identified graves and cemetery in close proximity to the proposed road layout must be ascribed an appropriate buffer zone and fenced/cordoned off and marked/demarcated with danger tape (or similar) to prevent any access/ encroachment.	E/ECO	Ongoing.
	b) The developer must maintain a buffer zone of 10m around each site where no development may occur.	E/ECO	Ongoing.
	c) No removal of artefacts or alterations of any heritage structure will be allowed within this buffer zone.	E/ECO	Ongoing.
	d) No construction activities may occur near to the identified graves.	E/ECO	Ongoing.
	e) All members of the construction team and personnel working on site must be made aware of the graves and the protection requirements through regular awareness training. The 10m buffer zone will be a No-go area.	E/ECO	Ongoing.
	f) Alternatively, should the developer wish to develop in the immediate vicinity of each gave site (within the 10m buffer zone) then a phase two archaeological assessment should take place in order to assist with the mitigation process. Depending on the recommendations of this second phase assessment a grave exhumation and relocation process may be called for. Such an excavation can only take place once the local heritage agency AMAFA issued a permit to such effect.	AMAFA Archaeologist Second Study required and Permits.	As required.

#### 4.2. Section B: Management of Construction Activities and Workforce

Issue	Management Guidelines	Monitor	Frequency
	<p>g) Should construction activities uncover or expose any archaeological or historical residues, construction activities must cease immediately pending an evaluation by the heritage authorities, in line with the KwaZulu-Natal Heritage Act.</p> <p>Possible items of historical or archaeological value include old stone foundations, tools, clayware, jewellery remains, fossils etc. Should anything of this nature be uncovered, the Research and Professional Services Division of <i>AMAFA</i> should be contacted.</p> <p>Contact: Ms Bernadet Pawandiwa – Tel: (033) 394 6543; Fax: (033) 342 6097</p>	E	As required.

### 4.3. Section C: Post Construction Activities

Issue	Management Guidelines	Monitor	Frequency
<b>C.1 Construction Camp</b>	C.1.1 <u>Construction Camp Rehabilitation</u>		
	a) All structures comprising the construction camp are to be removed from site.	E	Post construction
	b) 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 should be cleaned up.	E	Post construction
	c) All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be topsoiled and re-grassed using the guidelines set out.	E	Post construction
	d) The Contractor must arrange for the cancellation of all temporary services.	E	Post construction
<b>C.2 Vegetation</b>	C.2.1 <u>Reinstatement of Vegetation</u>		
	a) All areas that have been disturbed by construction activities (including the construction camp area) must be cleared of all alien invasive vegetation.	E	Post construction
	b) Open areas to be re-planted with indigenous vegetation suitable to the specific habitat.	E	Post construction
	c) All vegetation that has been cleared during construction is to be removed from site or used as mulch, (except for seeding alien invasive vegetation).	E	Post construction
	d) The Contractor is to water and maintain all planted vegetation until the end of the defect liability period and is to submit a method statement regarding this to the Engineer.	E	Post construction
	e) Alien invasive vegetation eradication must be undertaken for the length of the road upgrade.	E	Post construction
<b>C.3 Land Rehabilitation</b>	C.3.1 <u>Land Rehabilitation</u>		
	a) All surfaces hardened owing to construction activities are to be ripped and imported	ECO	Post construction

### 4.3. Section C: Post Construction Activities

Issue	Management Guidelines	Monitor	Frequency
	materials thereon removed.		
	b) All rubble is to be removed from the site to an approved disposal site as listed in Section D or approved by the Engineer. Burying of rubble on site is prohibited.	ECO	Post construction
	c) The site is to be cleared of all litter.	ECO	Post construction
	d) All embankments are to be trimmed, shaped and replanted to the satisfaction of the ECO.	E/ECO	Project completion.
<b>C.4 Materials and Infrastructure</b>	C.4.1 <u>Removal of Barriers, Remediation of Damage</u>		
	a) Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.		Post construction
	b) All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer.		Post construction
	c) All leftover building materials must be returned to the depot or removed from the site.		Post construction
	d) The Contractor must repair any damage that the construction works has caused to neighbouring properties.		As per the Engineer's instructions.
<b>C.5 General</b>	C.5.1 <u>General Remediation</u>		
	a) A meeting is to be held on site between the Engineer, ECO and Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the Engineer.	ECO/E	Post construction
	b) All areas where temporary services were installed are to be rehabilitated to the satisfaction of the Engineer.	ECO/E	Post construction



#### 4.4. Section D: Emergency Contact Details

General Numbers	
SAPS (Police)	(Tel) 033 -996 0612 (General Enquiries)
Community Liaison Officer- TBC	
<b>Department of Water Affairs</b>	Tel: (031) 336 2700
<b>EnviroServ Waste Management (Pty)Ltd</b> (Abzorbit): (24 hour response for oil and chemical spills on land or water, bioremediation, distributors of PEAT SORB)	Tel: (031) 902 1526 Fax: (031) 902 5778
FFS Refiners (for the free collection of used lubricating oil)	Tel: (031) 465 31 03 Fax: (031) 465 14 30
ROSE Foundation (for the free collection of used lubricating oil)	082 378 8556 0800 107 107

#### D.2 Waste Management Contact Details

Waste Management Division	Tel: (033) 394 4202 Fax: (033) 394 6481
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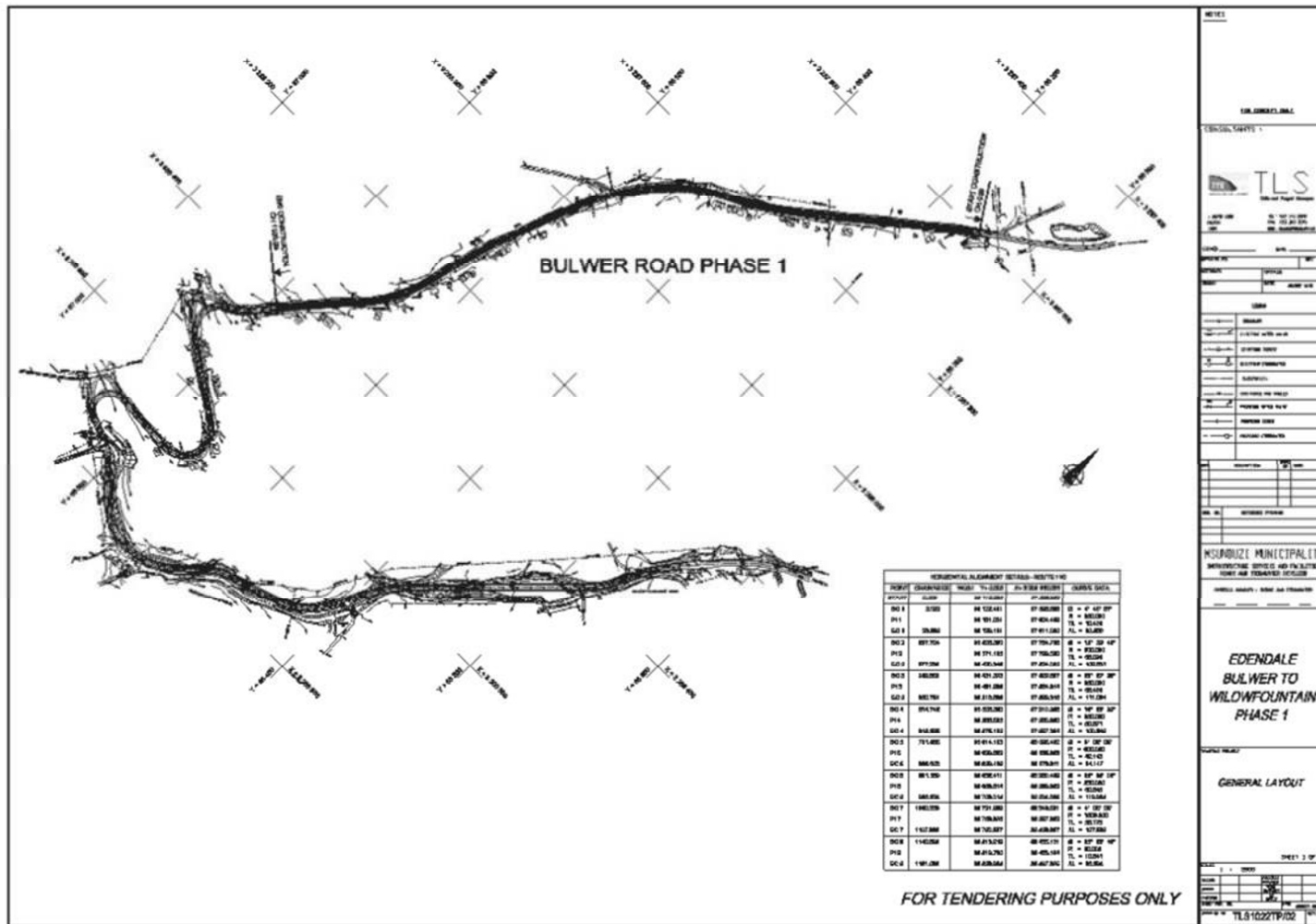
#### D.3 Permitted Hazardous Waste Sites & Hazardous

Shongweni (EnviroServ Waste Management) This site handles general and low hazardous waste.	Tel: (031) 769 1134 (Site – Kevin Nadasen) Fax: (031) 902 1526 (EnviroServ)
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## References

1. *eThekweni Municipality Generic EMP for Construction Activities (2009).*
2. *Afzelia Environmental Consultants: Draft Environmental Management Plan for Construction Phase Environmental Management and Rehabilitation Plan for the Willowfountain Streambank Protection Works Construction Activities, Msunduzi Municipality, KwaZulu-Natal (2009).*

## **Appendix A – Final Site Plan Figure 5a, Figure 6 and Figure7**



**Final Site Plan**

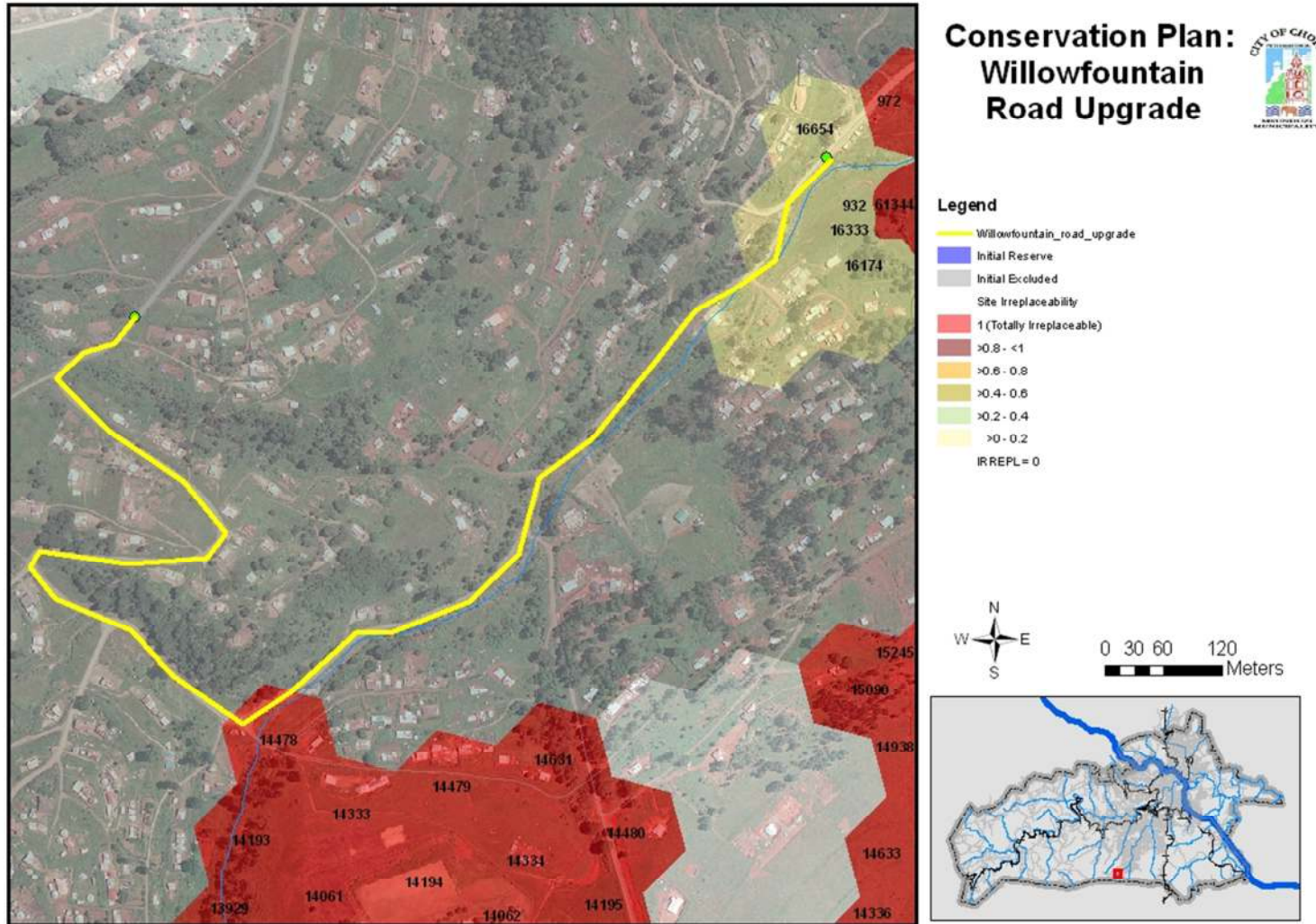
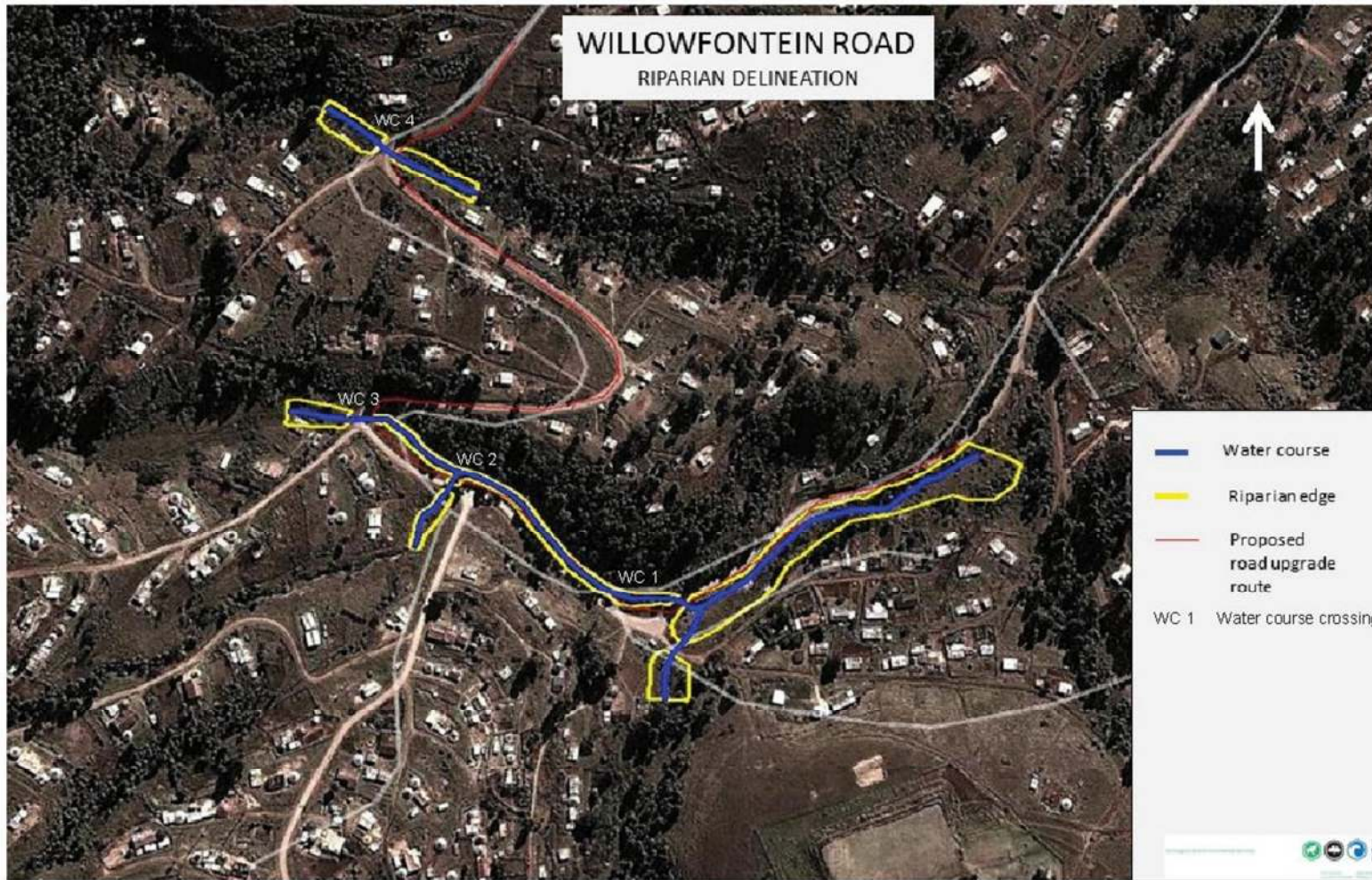


Figure 5a: Msunduzi Municipality C-Plan





**Figure 6: Watercourse Crossings 1 - 4 and riparian Delineation**



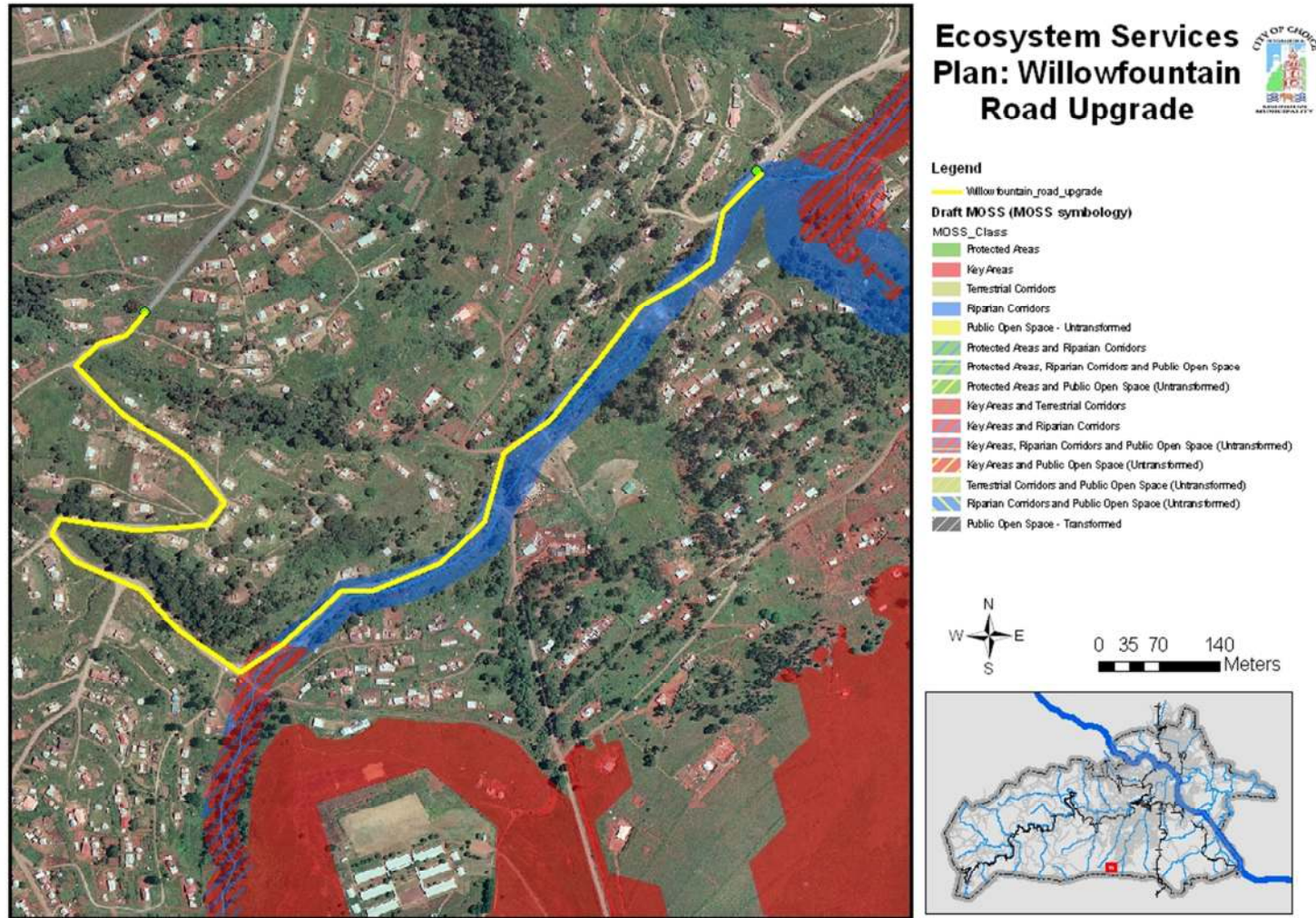


Figure 7: Msunduzi Municipality Ecosystem Services Plan (ESP)

## **Appendix B – Environmental Authorisation**



## **Appendix C – Services and Servitude Conditions**