

DRAFT

**ENVIRONMENTAL MANAGEMENT PROGRAMME:  
PROJECT SPECIFIC CONDITIONS**

**(CONSTRUCTION & DECOMMISSIONING)**

FOR THE PROPOSED

**CAPACITY UPGRADES TO THE N2 (SOLOMON  
MAHLANGU I/C TO SOUTH OF UMGENI RD I/C)  
AND THE N3 FROM EB CLOETE TO KEY RIDGE,  
INCLUDING PROVISION OF TEMPORARY  
ACCESS FOR CONSTRUCTION BELOW  
WESTVILLE, PARADISE VALLEY AND  
UMHLATUZANA VIADUCTS AND INCLUDING  
REALIGNMENT OF A SECTION OF TRANSNET  
FUEL PIPELINE NEAR SOLOMON MAHLANGU  
I/C, ETHEKWINI METROPOLITAN MUNICIPALITY,  
KWAZULU-NATAL**

**DEA REFERENCE NUMBER: *To be assigned***

The full EMPr provided for this project comprises SANRAL's standard construction EMP as well as this document (with associated appendices) which address project specific environmental impacts identified in the Basic Assessment process.

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## 1. INTRODUCTION

This document contains project specific conditions which are drawn from the findings of the Basic Assessment undertaken and applicable to the following national road upgrades:

***Proposed capacity upgrades to the N2 (Solomon Mahlangu to south of Umgeni Rd I/C), including expansion of EB Cloete and Solomon Mahlangu Interchanges, and the N3 (EB Cloete to Paradise Valley), including provision of temporary access for construction below Westville and Paradise Valley Viaducts, eThekweni Metropolitan Municipality, Kwazulu-Natal.***

This document is to be read with the South African National Roads Agency SOC Limited (SANRAL) Environmental Management Plan.

In addition, the following Appendices to this EMPr are to be complied with:

- EMPr Appendix A1: N2/N3 Sensitive Areas<sup>1</sup> Rehabilitation Plan (with plant rescue, plant translocation, alien invasive plant control, erosion control and soil management guidelines).
- EMPr Appendix A2: Paradise Valley Viaduct Rehabilitation Plan (with plant rescue, plant translocation, alien invasive plant control, erosion control and soil management guidelines).
- EMPr Appendix A3: Westville Viaduct Rehabilitation Plan (with plant rescue, plant translocation, alien invasive plant control, erosion control and soil management guidelines).
- EMPr Appendix A4: Umhlatuzana Viaduct Rehabilitation Plan (with plant rescue, plant translocation, alien invasive plant control, erosion control and soil management guidelines).
- EMPr Appendix B: Wetland and Riparian Areas Rehabilitation Plan.
- EMPr Appendix C: Erosion and Soil Management Plan
- EMPr Appendix D: Storm Water Management Plan
- EMPr Appendix E: Noise Management Plan
- EMPr Appendix F: Transportation and Traffic Management Plan

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<sup>1</sup> This also covers the area for realignment of a section of Transnet Fuel Pipeline to the south east of the Solomon Mahlangu I/C.

## **2. ENVIRONMENTAL MANAGEMENT PLANNING, DESIGN & BUDGET CONSIDERATIONS**

These considerations must be taken into account by SANRAL during the design stage. Where applicable, provision must be made in the tender documents for any aspects to be taken forward by the contractor.

### **(a) River and wetland crossings**

- The river and wetland crossings should be designed to ensure that flow patterns along the stream/river channel or wetland are not altered or diverted which could potentially result in stream bed and bank erosion and instability.
- Drains and culverts must be designed in conjunction with relevant experts to the correct invert levels to prevent damming of flows or draining of wet areas. Culverts should be designed to prevent concentration of flows, and to maintain natural flows as free flowing as possible.
- Design of the Paradise Valley Viaduct piers in the uMbilu River Channel at the Paradise Valley Viaduct must be carefully considered by hydrologists and design engineers in order to avoid the problem of the channel becoming blocked with major volumes of vegetation during floods and causing damage up and downstream. Engineers must also investigate the optimum shape of the base of the existing piers to minimise the trapping of flood debris.
- Paradise Valley Nature Reserve management requests that SANRAL carefully consider the design and control of stormwater off the N3 down into the uMbilu River in the nature reserve, as it is currently contributing to erosion. Adequate storm water controls and energy dissipaters must be provided at the end of drainage structures coming from the N3 highway towards the uMbilu River.

### **(b) Informal Settlements**

- Where informal settlements are very near to and/or encroaching over the road reserve boundary, there is a high risk of increased settlement prior to construction taking place. If these areas have not already been fenced off by SANRAL to prevent further encroachment, they will need to be fenced off as a matter of urgency.

### **(c) Pedestrian Access**

- There are certain areas on the national roads which have formal pedestrian access (e.g. bridge over Westville Viaduct, near Chesterville) that will be disrupted during construction. SANRAL (or their appointed engineers) must, in the planning stage, identify these areas and ensure that alternative and practical access can be made available prior to closure of pedestrian access ways during construction. The affected pedestrian access must be reinstated post construction.
- The above applies to any disruption of pedestrian access through Chesterville and Paradise Valley, which is affected by construction and use of the Westville and Paradise Valley Viaduct access roads.

### **(d) Unlawful structures in the road reserve**

- It will be necessary to remove existing unlawful structures in the road reserve where widening is to take place. Property owners will not be compensated for the loss of unlawful buildings or structures in the road reserve. The owner will be responsible for the cost of demolition or removal of these structures. It is recommended that adjacent property owners

finding themselves in this situation contact Mr I Ramklown (033 392 8100) at SANRAL Eastern Region offices as soon as possible.

**(e) Noise reduction**

- Noise levels already exceed regulated standards, generally within about 300 m either side of the national road investigated in this project. With increasing traffic loads over time, noise will increase. SANRAL must, therefore, build noise reduction measures into the road design (mainly road surfacing and where feasible, barrier walls).

**(f) Vibration control**

- Vibrations experienced by close neighbours to the national roads must be taken into account in road design, to ensure that the risk of undue vibration is minimised<sup>2</sup>.

**(g) Funding for rehabilitation of natural habitat/biodiversity**

Widening of the N2 and N3 will negatively affect numerous areas which are valuable in terms of their protected area status, their biodiversity priority and/or as ecological linkages within the Durban Metropolitan Open Space System (D'MOSS). Sufficient funds are to be set aside for rehabilitation of these areas post construction, to help limit the impacts of road widening. Sensitive areas may have additional rehabilitation and/or offset requirements. Refer to Appendices A of this site specific EMP, for site specific rehabilitation measures.

**(h) Funding for alien plant control**

- Linked to (g) above, sufficient funds are to be set aside to ensure that alien plants are properly controlled for a sufficiently long period after the contractor has left the site<sup>3</sup>, because without repeated follow-up operations, alien plant control as part of rehabilitation is unlikely to be successful. Follow up operations at 3 month intervals should be done after the initial clearance. This will give the natural vegetation a chance to take over and keep the alien vegetation out (time and effort to do this should decrease as time goes on, if done correctly). It is likely that a 2 year period will be required overall.

**(i) Potential Protest Action**

It is becoming increasingly common for large construction projects to be delayed as a result of protest action, often concerning the lack of employment opportunities provided for members of local communities as well business forums. In addition, protest by disaffected contractors (usually smaller and emerging contractors) is an eventuality arising from mistrust in procurement processes. In the event of protests occurring, there may be costly project delays due to lost days, as well as potential for violent confrontation, destruction of project and non-project related infrastructure and equipment, and ultimately injuries and/or fatalities. In addition, protest action is likely to result in road closures which will compound disruptions to traffic and the associated impacts such as increased commuter time. The informal settlements adjacent to the N2 are of particular concern as, if not dealt with correctly, there could be significant opposition raised by these communities which is likely to result in project delays. The potential for protest action and how it may affect construction contracts, is an issue which needs to be considered very carefully in SANRAL's planning. SANRAL should conduct open and transparent procurement in accordance with procurement policies, and encourage appointed contractors to make use of local sub contractors (or elsewhere in the country, if the requisite skills are not available locally).

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<sup>2</sup> Roads are constructed on a stable platform, which should not pose a vibration problem. This is taken into account in design.

<sup>3</sup> SANRAL's routine maintenance team generally undertakes ongoing alien plant control

### **3. ENVIRONMENTAL AUTHORISATIONS AND PERMITS**

#### **(a) Environmental Authorisation**

- The application process for Environmental Authorisation, in terms of the 2014 Environmental Impact Assessment (EIA) Regulations under the National Environmental Management Act (Act No 107 of 1998) has been undertaken by SANRAL. The Environmental Authorisation (EA) is to be appended to this EMPr and relevant conditions of the EA are to be included in the project specific conditions to be adhered to by the Contractor.

#### **(b) Heritage – destruction permits for Umbilo Waterworks**

- The Umbilo Waterworks is a Listed Grade II Heritage Site in terms of Section 27 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999). It is situated in the Paradise Valley Nature Reserve near the N3 Paradise Valley Viaduct. Following consultation between the Heritage Specialist and the design engineers, it was ascertained that structures associated with the Umbilo Waterworks can be cordoned off and protected so that no structures of this site need be destroyed during construction. Should this situation change, SANRAL must apply for a destruction permit from Amafa to destroy any part of the site.

#### **(c) Water Use Authorisations**

- The required submissions to the Department of Water and Sanitation for the following water uses (in terms of Section 21 of the National Water Act No 36 of 1998) will be undertaken by SANRAL on the Contractors behalf:
  - (a) taking water from a water resource
  - (c) impeding or diverting the flow of water in a water-course
  - (i) altering the bed, banks, course or characteristics of a watercourse
- No construction is to commence until the relevant authorisations have been issued by the Department of Water and Sanitation.
- The Contractor is to abide by the conditions of the above water use licenses/ general authorisations and registrations.

#### **(d) Protected indigenous plants and trees - application for permits**

- The Contractor is to ensure that the required permits are obtained prior to vegetation clearance.
- Where construction/operation may impact on plants designated as specially protected under the Natal Nature Conservation Ordinance (15 of 1974), an application must be submitted to EKZNW to clear or translocate these plants as part of the plant rescue operation (refer to Appendices A).
- Where construction/operation may impact on plants listed as threatened or protected species (TOPS) under the National Environmental Management Act: Biodiversity Act, 2004 (10 of 2004), an application must be submitted to EKZNW to translocate these plants as part of the plant rescue operation (refer to Appendices A).
- Where construction/operation may impact on natural forests or individual trees protected in terms of the National Forests Act, 1998, an application must be submitted to the Department of Agriculture, Fisheries and Forestry (DAFF).
  - For this application process, once an Environmental Authorisation (and BAR and EMPr), and final access routes/footprints are confirmed, a botanist/ecologist will need to quantify the number, species and characteristics of protected trees affected, and complete an application form (no payment to DAFF required). The

applicant's representative will need to sign the form and provide a copy of their identify document. Once the application has been submitted, the relevant DAFF official will then arrange a site visit, if necessary. Generally, the permit processing timeframes are about 3 months, and the permit is generally valid for a period of 2 years from the date of issue.

(e) **Waste - permits in terms of regulations under the National Environmental Management: Waste Act, 2008 (Act No.59 of 2008)**

- No activities requiring permits with respect to the storage or disposal of waste are proposed.

(f) **Emissions- permits in terms of regulations under the National Environmental Management: Air Quality Act (Act No 39 of 2004)**

- No activities requiring permits with respect to air emissions are proposed.



#### **4. ENVIRONMENTAL MANAGEMENT PRE-CONSTRUCTION**

##### **(a) Scheduling**

- Earthworks associated with river crossings should take place in the winter months as this is the driest period for this region. It is acknowledged that this is not always practically achievable but should be accommodated as far as possible in construction scheduling. (Note that working in river channels during summer can be dangerous due to sudden flooding following thunder storms upstream in the catchment. Construction personnel need to be aware of this risk.)
- The presence and the breeding status of the Crowned Eagle pair near Paradise Valley Viaduct must be determined well before construction commences and during the construction period. In order to minimise impacts on the successful breeding of the crowned eagle pair, construction in the vicinity should ideally be scheduled to commence between February and June<sup>4</sup>. If novel disturbance is introduced when the eagle is incubating or with a young chick (July-November) this will cause breeding failure. If however, new disturbances begin from February-June of any year, the previously fledged juvenile can adjust to these changes.
- The Contractor must consult with the management of Paradise Valley Nature Reserve to ensure that schedules take into account any of their concerns and issues are timeously handled. This will include notification of the public to closure of parts of the reserve.
- The Contractor must consult with the management of Giba Gorge Nature Reserve and Giba Gorge Business Park and Mountain Bike Park to ensure that schedules take into account any of their concerns and issues are timeously handled. This will include notification of the public to closure of parts of the nature reserve and closure of mountain bike and hiking/running trails.

##### **(b) Employment creation for local people**

- Ensure that, wherever possible, labour is sourced locally.
- Sub-contractors should be sourced locally and nationally where the requisite skills exist.
- Wherever feasible, employ local service providers.

##### **(c) Plant rescue and relocation prior to construction**

- It is the Contractor's responsibility to ensure that plant rescue is undertaken under the direction of an ecologist/botanist prior to construction, in accordance with the guidelines provided in the Plant Rescue and Rehabilitation Plans (Appendix A). Areas of particular importance for plant rescue are:
  - Solomon Mahlangu Interchange (applicable to both roadworks and realignment of a section of Transnet Fuel Pipeline).
  - Westville Viaduct
  - Paradise Valley Nature Reserve
  - uMhlatuzana Viaduct
- Note that because the visibility of herbaceous plants varies depending on flowering season, an ecologist/botanist should visit the site during spring and summer to identify any additional plants of high conservation value, so that these plants can be marked and transplanted prior to construction commencing.

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<sup>4</sup> However, this will need to be balanced practically against construction schedules and construction activities involved. It may be necessary to proceed with certain construction activities. To stop work completely for a five month period would result in substantial costs being incurred due to an extended program.

- The contractor must make provision in his schedule, for the time required by the specialist to come out and demarcate or mark up any vegetation requiring relocation, and to effect the relocation (and required permits) prior to vegetation clearance on site.
- eThekweni Municipality Environmental Planning Department must be contacted as part of the plant rescue planning (Greg Mullins Tel: +27 31 322 4560). Refer to the Plant Rescue and Rehabilitation Plans in Appendix A.

**(d) On site plant**

- The Environmental Authorisation for this project does not make any provision for onsite plant. No plant may be established on site. Should the Contractor require plant for asphalt, concrete batching etc, he shall be responsible for identifying and procuring land on which to establish the plant and for obtaining all the required legal permits and environmental authorisations prior to commencement of construction.

**(e) Materials, quarries and borrow pits**

- The Environmental Authorisation for this project does not make any provision for mining of any nature. The Contractor shall acquire material from legal commercial sources.

**(f) Contractors camp and stockpile areas**

- Contractor's camps and stockpile areas are to be sited within existing disturbed areas and at least 100 m from areas of sensitive natural vegetation, wetlands, streams and river banks.
- No staff may be housed on site. Only security guards may remain on site at night.
- Open fires are not permitted anywhere on site.

**(g) Planning for disposal of demolition rubble**

- The Contractor will be dealing with large volumes of demolition waste and must ensure the disposal is properly planned for. Demolition rubble from bridges, pavements, parapets etc (inert waste) may not be disposed of on site, unless it is used as fill. Inert material should be re-used on SANRALs road contracts as far as possible. Excess must be disposed of at an authorised landfill site or may be sold to outside parties provided it is used for fill.

## 5. ENVIRONMENTAL MANAGEMENT DURING SITE ESTABLISHMENT AND CONSTRUCTION

### (a) Site access and working areas

- Activities must cover as small a working area as is feasible to minimise disturbance of vegetation on site. Demarcated buffers must be established around open water, aquatic habitats, riparian and wetland vegetation and riparian banks that are not within the footprint of the works.
- Special conditions of site access and working areas may apply within the Paradise Valley Nature Reserve. These must be determined during consultation with reserve management.
- Special conditions of site access and working areas may apply within the Giba Gorge Nature reserve as well as within the Giba Gorge Mountain Bike Park. These must be determined during consultation with reserve and park management.
- The Contractor shall use existing roads for site access.
- In the exceptional cases where construction of additional access tracks or widening of existing access tracks is required (e.g. the access to the Westville, Paradise Valley and uMhlatuzana Viaducts), the following applies:
  - Adequate drainage (mitre drains) is to be constructed at regular intervals, in accordance with the local topography, to minimise the potential for soil erosion. Alien plant control must also be undertaken along these access tracks.
  - Soil compaction is to be minimized by keeping vehicle and construction plant access ways and parking areas to a minimum, and making use of existing compacted/hardened surfaces wherever possible.
  - Where drainage line or stream or crossings are unavoidable along the temporary access routes, drains and culverts must be designed in conjunction with relevant experts to the correct invert levels to prevent damming of flows or draining of wet areas. Culverts must be designed to prevent concentration of flows, and to maintain natural flows as free flowing as possible.
  - Where water for construction is to be sourced from local water bodies, then this must occur at existing disturbed sites, due to potential damage caused by temporary access roads and water tankers.
  - Temporary access tracks are to be rehabilitated as quickly as possible after construction ceases by removing excess imported material, ripping compacted soils, reinstating natural ground levels, implementing soil erosion controls and re-establishing a dense cover of indigenous vegetation appropriate to the plant community in which the road is located.
- When clearing/working in riparian and wetland zones:
  - The Contractor must supply a method statement, with input from an ecologist, outlining the intended approach to site clearance at riparian and wetland crossings, in accordance with the specifications below.
  - Work is to be timed for the winter low flow period (for riparian zones) where practically possible.
  - The width of temporary crossings is to be reduced to the bare minimum required for construction.
  - Where dewatering of silt laden water is required at excavations, this water must not be pumped directly into streams and natural water bodies. Separate collection areas/sumps should be created in existing disturbed areas where this water can infiltrate into the surrounding soil.

- Temporary crossings are to be rehabilitated as quickly as possible:
  - Temporary coffer dams or diversion works<sup>5</sup> must be carefully removed from the riparian zone once construction is complete.
  - For riparian crossings, the original profile and cross-section of the channel is to be restored, so as not to interfere with the hydrology of the downstream environment.
  - For wetlands, to maintain the hydrological regime and physio-chemical properties of wetland soils, the original topography and soil profile must be carefully restored. No unnatural depressions or hummocks of soil should remain.
  - Natural re-colonisation of hydromorphic soils is usually rapid; however, where this process needs to be sped up, replanting can be done with locally occurring hygrophilous reeds, sedges and hygrophilous grasses.

**(b) Communication with affected landowners/occupiers and conduct with respect to private property**

- The Contractor shall ensure that he is provided by SANRAL, with all relevant contact details of the adjacent affected property owners/occupiers well in advance of construction commencing.
- The Contractor shall ensure that affected property owners/occupiers are informed with prior notice as to when construction will start.
- The Contractor will not enter into communication with illegal squatters (informal settlements). The Contractor must notify SANRAL, who must advise, after agreement with the eThekweni Department of Human Settlements, on suitable procedures.
- The extent of the project boundary must be clearly demarcated to ensure that no work spills over onto private property that has not been acquired by SANRAL for the road reserve.
- Private property outside of the works area shall be regarded as a No Go area.
- The Contractor is to ensure that construction teams are clearly identified by wearing uniforms and/or wearing identification cards that should be exhibited in a visible place on the body.
- The Contractor shall ensure that affected property owners/occupiers are informed with prior notice of any activities that may occur outside of normal working hours and/or activities which may result in excessive noise (e.g. blasting).
- The Contractor shall ensure that all staff are briefed, as to conducting themselves with due consideration and respect for people and property.
- The Contractor must maintain good communication with affected landowners/occupiers throughout the project lifecycle.

**(c) Communication with public road users**

- The Contractor will notify the public regarding construction activities, by way of construction contract boards posted on either end of the road section under construction. The boards will also list the details of the project, the start and end dates as well as the relevant contact numbers for the traffic Safety Officer. Should there be specific closures, demolition, blasting or other activities, these will be communicated via media advertisements as well as additional construction information boards.

**(d) Services and infrastructure in and adjacent to the road reserve**

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<sup>5</sup> Note that a water use license from Department of Water Affairs may be required for diversions and coffer dams.

- Existing fences /walls between the N3 and neighbouring properties are to be protected from construction damage.
- Where existing fences/walls need to be removed, the Contractor is to provide a new fence/wall to the same standard.
- Any affected banks in and adjacent to the road reserve must be stabilised to the required geotechnical standard.
- Relocation of services will be undertaken as per agreements with the service providers.
- Demolition of unlawful structures may be required and should be discussed with the owner beforehand. SANRAL will not compensate for structures illegally located in the road reserve.

**(e) Safety and Security**

- Property boundary fences are to remain in place during construction and, thus, provide a barrier between properties and construction activities.
- Where boundary fences have to be moved, they must be reinstated prior to the commencement of construction, or temporary fencing (or other contingency measures e.g. guards) arranged until the permanent structure can be put in place.
- Construction teams must be clearly identified by wearing uniforms and/or wearing identification cards that should be exhibited in a visible place on the body.
- The Contractor is to prosecute any staff caught in criminal activities of any kind.
- Inform local law enforcement agencies of the possibilities of increased criminal activity in the area.
- Urban nature reserves are conduits for crime and contractors will need to be mindful of security on site at all times.

**(f) Prevention of potential protest action**

- As far as possible, employ labour locally.
- Employ a community liaison representative to ensure the free flow of information between the project team and local communities and local sub-contractors.
- Ensure informal settlements are dealt with in accordance with an agreed plan of action between SANRAL and the Human Settlements Department at eThekweni Municipality.

**(g) Road Safety & Traffic Management Plan**

- A Traffic Management Plan must be adhered to. Refer to Appendix F. When the contract is awarded, the Contractor is to submit a detailed and finalised road traffic management plan to the Engineer for approval.
- The Contractor must ensure that provision is made for access by emergency vehicles if required.
- Notification regarding the demolition dates for the Thames Road footbridge must be posted well in advance.
- The Traffic Management Plan is to include specifications for the management of pedestrian access.

**(h) Road safety**

- The Contractor is to submit the final detailed Road Safety & Traffic Management Plan to the Engineer for approval (see above) prior to construction commencing.

- All staff and visitors on site are to undergo a road safety briefing.
  - All staff and visitors on site are to wear suitable Personal Protection Equipment (PPE) at all times.
  - Suitable signage warning road users of construction activities is to be erected.
- (i) Preventing spread of disease**
- All construction staff must go through an HIV and AIDS education awareness programme as part of induction, prior to the project commencing.
  - Education material regarding general hygiene, HIV and AIDS, and sexually transmitted diseases should be readily available to staff.
  - Condoms should be readily available to staff.
- (j) Noise control**
- Noise control, noise monitoring and communication with affected receivers is to be undertaken in accordance with the Noise Management Plan in Appendix E.
  - The Contractor shall ensure that all site personnel have read and understood the Noise Management Plan.
  - Construction workers should be made aware that they are not to make excessive noise (e.g. shouting, hooting).
  - Normal working hours and working days are Mondays to Fridays 06:00 – 18:00; Saturdays 06:00 – 13:00. However, it is understood that some night work will be required and this must be timeously and clearly communicated to affected parties.
  - No machinery/equipment which may lend itself to creating noise nuisance, to be utilized on Sundays and Public Holidays.
- (k) Complaints register**
- The Contractor shall hold a complaints register on site, record any complaints received and forward such complaints to the ECO on a regular basis.
- (l) Vegetation clearance**
- Plant rescue is to precede clearance.
  - Clearance and cutting back of natural vegetation is to be kept to a minimum.
  - Where construction/operation may impact on protected plants, the necessary permits (refer to section 2c above) must be obtained.
  - Refer to Appendices A of this EMPr for a full description of specific sensitive areas and recommendations for plant rescue and rehabilitation of vegetation at these sites.
- (m) Protection of soils and control of soil erosion**
- Topsoil is to be removed separately to subsoil and be safely stockpiled for use in rehabilitation.
  - Topsoil stockpiles should not be handled/ moved, and should be kept free of alien invasive plants.
  - Exposed soils, cut and filled surfaces to be adequately safeguarded as per recommendations of the geotechnical report.
  - All new fill embankments are to be constructed to an appropriate stable batter to rule out the potential for large-scale instability and the associated environmental implications.

- The control of soil erosion and siltation associated with construction and operation is important at all locations on site, and particularly adjacent to wetlands, drainage lines and streams/rivers. Both temporary and permanent soil erosion control measures must be used during the construction and operation phases.
- Large sediment loads must be prevented from entering drains and watercourses.
- Where there is potential for erosion, energy dissipaters must be installed at the end of drainage structures associated with the upgraded highway to reduce the velocity and erosive force of the exiting water. Energy dissipaters could range from reno mattresses to stilling chambers through to planting of indigenous vegetation buffers which may be better able to diffuse high-velocity runoff.
- Any trenches associated with the upgrade are to be reinstated to a convex (as opposed to flat or concave) surface to prevent the channelling of any surface runoff as the soil settles/compacts over time.
- Any earth-worked areas, which may lay bare for extended periods, should be temporarily grassed.
- During rehabilitation, prompt and progressive reinstatement of bare areas is required. The topsoil layer is to be replaced on top during reinstatement.
- Bare surfaces should be grassed as soon as possible after construction to minimise time of exposure. Locally occurring, indigenous runner grasses should be used, for example *Cynodon dactylon*, *Dactyloctenium australe* and *Stenotaphrum secundatum*. Where runners cannot be locally sourced from natural areas within a 50 km radius, then a sterile variety of Couch Grass (*Cynodon dactylon*) can be commercially sourced and planted. Alien invasive grasses such as *Pennisetum clandestinum* (Kikuyu) must not be used.
- Erosion that takes place during rainfall events must be rehabilitated immediately.
- Soil erosion controls must be inspected and maintained on a regular basis during construction.
- Refer also to section 5 of the Rehabilitation Plans provided in Appendix A.

**(n) Control of stormwater**

- The Contractor shall submit a detailed stormwater management plan for approval by the engineer. Refer also to the Storm Water Management Plan in Appendix E.

**(o) Earthworks and crossings in riparian and wetland areas**

- On steep slopes draining towards the identified freshwater ecosystems, small-scale diversion berms should be constructed, to reduce the risk of the earthworks becoming a preferred surface runoff flow path which has the potential to result in erosion.
- “Trench-breakers”, which are in-trench barriers, should be installed within any trench excavations to minimise the interception and accumulation of surface runoff water from upslope areas.
- During earthworks, the top 50cm of the wetland/riparian topsoil must be removed and stockpiled during the construction period, to be replaced once activities have been completed. This is to maintain the existing seed bed and soil profiles as best as possible.
- Excavated soils should be placed on the upslope side, minimizing the risk of erosion and excess sediment entering the freshwater ecosystems.
- The construction footprint across the systems must be as narrow as practically possible. i.e. machinery must utilise the same route through the systems at all times so as to avoid unnecessary disturbance.

**(p) Protection of vegetation and fauna**

- Collection of medicinal plants, firewood, building wood, and poaching within areas of natural

vegetation is prohibited. Fishing must be strictly prohibited in and around the working areas.

- Clearing or pruning of indigenous vegetation at the site of activity must be kept to an absolute minimum. This must be done under the supervision of an appropriately qualified specialist or the ECO.
- Where clearing is required outside of earthwork/construction areas, vegetation should be brush-cut rather than cleared to speed re-establishment following site closure.
- No herbicides may be used on indigenous vegetation, particularly within proximity to wetland and riparian areas.
- Where protected or otherwise important fauna and flora are encountered and require removal, the ECO should be consulted and the individuals transferred to a nearby 'safe', similar habitat.
- Artificial embankments, depressions and holes created by the construction activity must be contoured/rehabilitated to minimise risk to, and death of, all fauna types - from large mammals to small invertebrates.
- If snakes are encountered, they are not to be killed. There are several snake experts who can be contacted to remove and relocate snakes (e.g. the Fitzimons Snakepark in Durban tel: 031 337 6456; or Byron Zimmerman, Highway / Hillcrest area: cell 082 894 6783).
- The presence and status of the crowned eagles is to be determined prior to construction, and are to be monitored during construction to determine whether they abandon their nest at any point during construction. Shane McPherson (specialist in crowned eagles in the highway area) should be informed if this occurs (033 260 5127)<sup>6</sup>.
- No project workers are permitted to catch, trap, poison, kill or disturb any animals present in the project areas.
- No disturbance of nesting or feeding sites and fauna habitat is allowed. Advice from the ECO should be sought if such sites are encountered in the work areas.
- Natural water bodies may not be used to wash out construction vehicles, concrete mixers, or for domestic ablutions.
- No dumping of solid waste or domestic ablutions is to occur on site and adequate serviced ablutions must be provided for staff.
- Adequate precautions must be taken to ensure that fires are not started as a result of the construction team's activities.

**(q) Control of Alien invasive plants**

- Alien invasive plants around any excavated areas/work areas and within the road reserve must be kept under control during both construction and operation in accordance with SANRAL's existing policy and the guidelines provided in the rehabilitation plans contained in Appendices A.
- Additional effort (follow ups) will be required in sensitive areas .Refer to the rehabilitation plans contained in Appendices A, for specific target areas.

**(r) Prevention of pollution of riparian and wetland areas**

- Fuel and hazardous material storage, handling and refuelling areas must not fall within 100 m of riparian / wetland habitat or within the stated buffer zones.
- All spills of foreign or hazardous materials or fluids must be cleaned up immediately, with all spills larger than 20 Litres being reported to the ECO immediately.
- Significant spills must be reported to the relevant section of the regional Department of Water and Sanitation.

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<sup>6</sup> Or Paradise Valley Reserve Management, should Mr McPherson no longer be available.



- A record must be kept of all spills and the corrective action taken.
- Vehicles should not be parked in or near sensitive areas, such as watercourses or drainage areas. Drip trays must be provided underneath standing plant.
- Natural water bodies must not be used to wash out construction vehicles, concrete mixers, or for domestic ablutions.
- Appropriate provision must be made for ablutions during construction. If chemical toilets are used, they must be well serviced, and must be placed on level surfaces well away from any water courses, drainage lines or seeps and any areas which may be subject to flooding. No spillage must occur during servicing and contents must be correctly removed from site.

**(s) Dealing with demolition rubble**

- No rubble may be temporarily stockpiled or dumped on vegetated areas, within no-go areas or within 32 m of the river channels and within 100 m of wetlands. Where possible, it should be stockpiled onto areas that are already surfaced with asphalt.

## **6. SITE REHABILITATION OF SENSITIVE AREAS**

### **(a) Site rehabilitation in sensitive areas along the N2 and N3**

- Refer to Appendices A1-A4 of this EMPr for a full description of specific sensitive areas and recommendations for rehabilitation of vegetation at these sites. This includes specifications for plant rescue, plant translocation and alien plant control.

### **(b) Site rehabilitation within the road reserve**

- eThekweni Environmental Planning and Climate Protection Department has requested that SANRAL beautify the road reserve by planting aesthetically pleasing indigenous species. Guidelines for planting of the road reserve are provided in Appendix A1 of this EMPr. The Contractor shall plant species that are allowed by SANRAL and will therefore submit a list to SANRALs environmental officer for approval, prior to planting.

### **(c) Site rehabilitation at river crossings and wetland areas**

- Revegetation of riparian and wetland areas must be in accordance with the Wetland and Riparian Areas Rehabilitation Plan (Appendix B of this EMPr).

## 7. ENVIRONMENTAL MANAGEMENT DURING DECOMMISSIONING

For this project, decommissioning applies to the following:

- Demolition of Thames Road Footbridge.
- Decommissioning and full rehabilitation of the temporary access roads for the viaduct construction.

### a) Thames Road footbridge

- Signage must be placed at both ends of the Thames Road footbridge well in advance of decommissioning (at least 4 weeks). Signage must indicate planned dates of demolition and which alternative bridges can be used to cross the N3 in that area once Thames Road footbridge is decommissioned.
- Ensure all demolition rubble from demolished structures is removed timeously and disposed of at an authorised landfill site.
- All disturbed areas are to be made good and all excavations are to be levelled, filled in and re-paved or re-vegetated as per the specifications of this EMPr.
- All applicable specifications for the construction team's general activities, as contained in this EMPr, are to be adhered to by SANRAL and the Contractor.

### b) Viaduct access roads

- Decommissioning and rehabilitation should occur as soon as the viaduct access road(s) are no longer needed, so as not to prolong disruption to the area.
- The land owners/managers involved are to be contacted and informed well in advance of decommissioning taking place, to confirm the desirability and feasibility of planned actions.
- All road pavement and associated road and drainage infrastructure must be removed. Decommissioning of the viaduct access roads will require the use of heavy plant and a construction team to break up and remove the road pavement and drainage structures, to loosen up the underlying soil, re-landscape/ensure suitable topography, replace topsoil and replant with indigenous plants.
- Drainage lines and river crossings must be restored to as close to their previous natural state as possible.
- Site specific specifications for rehabilitation and replanting of vegetation at the viaduct access roads are provided in Appendices A.
- All applicable specifications contained in this EMPr, pertaining to the construction team's general activities on site, are to be adhered to by SANRAL and the Contractor.

## **8. ENVIRONMENTAL MONITORING FOR THE CONSTRUCTION & DECOMMISSIONING PHASES**

The purpose of monitoring is to ensure that specified actions are undertaken timeously and that they achieve the desired results in terms of preventing or minimising the anticipated negative environmental impacts on the natural, social and socio-economic environments (including cultural heritage).

- The ECO shall monitor SANRAL's and its appointed Contractor(s)' compliance with the conditions of the Environmental Authorisation and with the specifications of the EMPr and associated appendices. These specifications are actions which aim to prevent or minimise the anticipated environmental impacts which have been identified via a rigorous environmental assessment process.
- The ECO shall monitor the impacts of the project on the natural, social and socio-economic environments.
- The ECO shall determine and set simple indicators and targets against which to monitor and manage these environmental impacts.
- The ECO shall ensure that any monitoring requirements specified in the appendices to this EMPr are implemented.
- The ECO shall, where required in order to effect optimal environmental management, consult with directly affected landowners and the management of nature reserves from time to time, via the resident engineer.
- The ECO shall guide the contractor on environmental management actions as required, based on the outcomes of monitoring.