# TRANSMISSION SERVICES


# ENVIRONMENTAL MANAGEMENT PLAN
# CONSTRUCTION

# Mercury Substation EMP

**February 2008**

# ENVIRONMENTAL MANAGEMENT PLAN FOR THE UPGRADE OF THE MERCURY SUBSTATION

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## EXECUTIVE SUMMARY

For development projects such as substation expansion, an Environmental Management Programme is demanded by standards of World Best Practice. An Environmental Management Programme must be relevant and it must integrate broadly, all reasonable measures required to manage identified risks.

The Environmental Management Programme herein serves as a reference of Environmental Aspects, Impacts and Mitigation measures. Simply put, it provides information to the contractor that he/she might pre-empt risks associated with the identified Environmental Aspects.

This Environmental Management Programme (EMP) is prepared as a requirement of the Record of Decision (RoD) issued by the Department of Environment Affairs & Tourism (DEAT) Project Ref: 12/12/20/433, issued 2nd March 2007 (see copy attached). This EMP has been amended to comply with requirements by DEAT dated October 2007.

It is a legal document – on completion of induction of the Contractor Manager/Director by the Client Environmental Control Officer, mandatory performance of the Contractor will be measured against its requirement contents.

It is a working document based on the plan, do, check and act model of work system flow. The structure of the Environmental Management Programme is recurring for each Aspect identified –

- **Communication for Success identifying role/s and responsibility**, a
- **Summary table of Reasonable Measures to Mitigate Impacts associated with the highlighted Aspect**;
- **Golden Rules providing overarching actions leading to compliance;** and
- **Description of what is to be monitored to objectively decide whether or not the requirements of the Environmental Management Programme are being met**.

Furthermore, each Aspect highlighted includes a checklist/tickbox for the contractor to tick off his/her consideration of the risk and potential mitigation measure that he has considered and implemented. Essentially the checklist forms the table of contents for that specific aspect within the Environmental Management Plan and goes a long way in moving those who will tender forward toward meeting compliance for site documentation and records as required by the Client.

Golden Rules have been captured for each Aspect to draw the contractors attention to critical actions and knowledge that must be taken into account toward averting incidents, accidents and Safety, Health and Environmental risk. The checklists and Golden Rules are imperatives, reminders and prompts to aid day-to-day planning and management by the project management team.

Specialists input from Ecological and Archaeological perspectives indicate that, provided the recommendations made are adhered to, environmental risk is low. However, due caution is required near the wetland area on site. Furthermore, care should be taken during excavation not to disturb potential archaeological artefacts. If a new discovery is made, construction at that place must be halted and a specialist archaeologist brought to site top assess the find. Adhering to the Ecological and Archaeological recommendations herein is crucial to the success of the project.

The Client is accountable for contractor non-compliance hence the detailed nature of this document and the need for the Contractor to implement it and use it and the ECO to facilitate it and police it.

**NOTE: About this document**

This document is an Environmental Control document. Its purpose is to aid in the management of the substation construction expansion project by identifying Environmental aspects and to direct reasonable measures that should be employed to mitigate them.

Early on, the document identifies the Roles, Relationships and lines of Communication that are deemed necessary for the success of the project. Please use the following table to identify the players in the project team and community within which the project is to be implemented. Full details completed prior to construction.

| ROLE DESCRIPTION | Contact details |
|---|---|
| **Client - Contract Manager:** Ultimate decision maker | **Name:**<br>**Tel:** |
| **Client - Project Manager:** Smooth running of the project | **Name:**<br>**Tel:** |
| **Authorised Environmental Authority:** Environmental Management of project | **Name:**<br>**Tel:** |
| **Client – Environmental Control Officer (ECO)**<br>Communicate EMP – induction; Police EMP – monitoring & reporting; Communication in advance with landowner; Appraisal of crop & environmental damage | **Name:**<br>**Tel:** |
| **Contractor Environmental Liaison Officer (ELO)**<br>Internal environmental performance; Communication in advance with landowner; Punctual and amicable solutions to site environmental problems | **Name:**<br>**Tel:** |
| **Contractor -Site Manager**<br>Oversees site works<br>Abides by SHE Golden Rules | **Name:**<br>**Tel:** |
| **Contractor – Appointed H&S Officer**<br>Monitors H&S against Golden Rules | **Name:**<br>**Tel:** |
| **DEAT – Assigned Project Officer** | **Name:**<br>**Tel:** |
| **Provincial Office – Extension Officer** | **Name:**<br>**Tel:** |

| ROLE DESCRIPTION | Contact details |
|---|---|
| **SAHRA – Area Representative** | **Name:**<br>**Tel:** |
| **Landowner** | **Name:**<br>**Tel:** |
| **Local Fire Protection officer** | **Name:**<br>**Tel:** |
| **Local Security Service Provider** | **Name:**<br>**Tel:** |
| **Local Social Services NGO** | **Name:**<br>**Tel:** |
| **Local General Trading Store or Co-op** | **Name:**<br>**Tel:** |
| **Local Parks Board Wildlife Protection Officer** | **Name:**<br>**Tel:** |

**CONTENTS**



*Note: Unfortunately the aerial photographs in Dwgs 323-G-006 and 323-G-006a are not of high quality, but they give an overall impression of landuse and location of the main site features and proposed infrastructure.*

## 1.0 INTRODUCTION

The construction, refurbishment or upgrading of Substations can have a major impact on the environment. Construction of a new substation and upgrading of an existing facility are regulated by legislation under the Environment Conservation Act, 73 of 1989 and more recently under the amendments to the National Environmental Management Act, 107 of 1998. Numerous risks require consideration and management intervention during the construction phase of a development project. This Environmental Management Programme serves to highlight and pre-empt those risks by introducing imperatives for implementation by construction personnel to protect, conserve and sustain the environment associated with the construction project.

This Construction Environmental Management Programme shall be included as part of the contract and supplementary to Eskom's specifications for the contract. Its contents are enforceable under the general conditions of contract and the contractor must ensure that the tender price submitted covers all costs of compliance with it. It is a working document. It will be implemented throughout the duration of the project and necessarily amended as the responsibility for environmental management is fulfilled, adapted and amended and again fulfilled.

### Challenges during different phases of the project

The main challenge of the expansion project will be the maintenance of harmonious relations between the project players – Client (Eskom), Landowner and Contractor. The tables below serve to draw the attention of the contractor to real issues that there is a strong probability that may need to be addressed. These each impact on the project schedule and thus require particular consideration and ongoing initiative and resourcefulness in maintaining excellent customer relations.

### Pre-construction

| Challenge | Potential Solution |
|---|---|
| 1. Landowners will see the construction period as interference with their daily activities<br>2. Landowners are always apprehensive toward changes they do not control and strangers on their properties | • Client Environmental Control Officer to communicate project plan, starting date and sequence of events well in advance to the landowner in a specifically scheduled landowner induction meeting – minutes of landowner queries to kept and addressed! |

**During Construction**

| Challenge | Potential Solution |
|---|---|
| 1. Due to the current security situation Landowners are not comfortable when strangers come on to their properties<br>2. They will look for reasons to interfere with the construction process and may therefore cause delays in the process that can be very costly to Eskom and the Contractor<br>3. Illegal collection of firewood or use of private amenities can cause problems with Landowners and communities that may lead to disruptions of the construction process<br>4. Damage to fences, gates and other infrastructure may occur at any time<br>5. The use of private roads for construction purposes always leads to damage due to heavy equipment and frequent use - especially during the rainy season | • Engage landowner on his/her security arrangements. Adjust operational plan to fit.<br>• Adequately define roles and in the induction carefully explain the SHE standard required by the contractor. The landowner is behold unto the standard every time he/she visits the site. Keep a site visit register.<br>• Clearly communicate Golden Rules to all construction site personnel and agree on fines for breach of rules prior to site establishment.<br>• Have all construction site personnel sign off on formal SHE induction.<br>• Ensure that a road repair team is designated and equipped – draft into emergency plans the role of the road repair team to attend to rapid repair of roads and a roster for responsibility after hours.<br>• Record of road condition prior to commencement of construction |

**3. Post Construction**

| Challenge | Potential Solution |
|---|---|
| Fire Hazard | • Plans to manage the threat of fire must begin once the tender has been awarded to the contractor.<br>• It is in the interest of both Eskom and the Landowner to engage early on to work together to understand and implement a plan of action to use fire to manage vegetation and guard against wild fire threat. The Client Environmental Control Officer must facilitate this process early on. |

## 1.1 Accountability

Eskom is ultimately accountable for the completion of the project according to the requirements of the Environmental Management Programme. As an organization it seeks to partner with the Contractor to realize the successful implementation of Environmental Management Programme and ultimately completion of the expansion project.

## 2.0 PROJECT SCOPE

Mercury substation is being expanded to meet both foreseeable and future demands. The new 765kV yard was planned to be an extra 1100m x 400m (44ha) extension to the existing 400kV yard (as per the original EIA). However, Eskom has reviewed the extent of the extension given local environmental sensitivities and is now proposing a 20ha extension. This excludes contractors yard and stockpile areas which would be temporary areas within the original 44ha extension area. The proposed site layout is provided as Drawing 0-WT-557 as a fold out at the end of this document (Appendix 7.2).

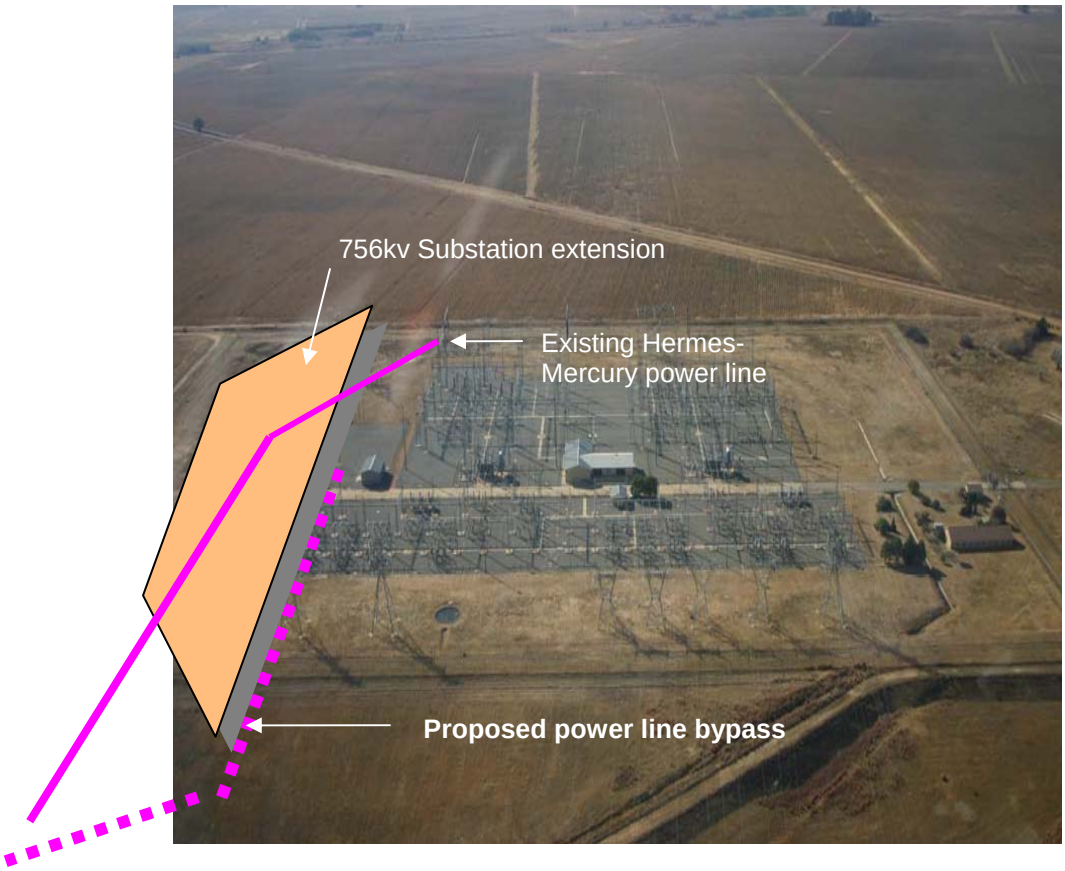


**Figure** Area for expansion is to the left of the existing substation as orientated on the left of this photograph

Although the local environment is generally imprinted by agricultural practice, features with ecological significance such as the presence of a wetland in close proximity to the construction site and the site soils have been given careful consideration. Mitigation measures to prevent and limit ecological damage are discussed in greater detail under the heading ecological survey report.

Similarly, the construction site itself holds some archaeological significance and this will require special care particularly during the excavation of foundations. More detail on this aspect is discussed under the heading archaeological survey report.

Site fauna is particularly diverse with stocked game farms in the general vicinity and with riverine habitat nearby site personnel will need to be educated on the importance of preserving the biodiversity of this resource.

## 3.0 COMMUNICATION

### 3.1 Relationships - Organization of Responsibility and Lines of Communication

Good working relationships and open lines of communication are essential for the success of any project. Eskom Transmission must appoint a Client Environmental Control Officer (ECO) for the duration of the construction and rehabilitation period. The role of the ECO is pivotal in ensuring a clear understanding of the EMP by the contractor and it's complete implementation, monitoring and reporting. Furthermore, the ECO must ensure that landowner-contractor working relationships remain open and intact. **Above all, the ECO must ensure that all project players have received a complete induction covering all aspects identified within this EMP**.

It is incumbent on the Lead Contractor to appoint a **Contractor Environmental Liaison Officer (ELO)**. Relating with the ECO and Contractor Site Manager, it is the role of the ELO to manage the relationship between the Contractor and the Landowner – making requests in advance and in-line with the EMP and reporting on any incidence. This role substitutes for the ECO when that person is not available.

| **ECO Key Performance Indicator** | **Performance Expectation** |
|---|---|
| Communicate fully the Site Safety, Health and Environmental Management Programme | 40%<br>Sign-off by all players including Landowner and all site personnel on induction performed and understood |
| Monitoring and enforcement by fine of all Environmental Aspects | 25%<br>Monthly audits and daily impromptu site walks |
| Attendance and minute weekly Health & Safety meetings | 25%Submission of weekly minutes to Project Manager |
| Monthly reporting on Environmental Performance | 2.5%Reports submitted to the Regional Environmental Advisor: |
| Keep detailed notes and photographic records of the project progress as well as any non-compliances | 2.5%Monthly reporting on compliance with Site Safety, Health and Environmental Management Programme |
| Keep all affected parties in the loop on any changes to the project programme | 5%<br>Regular telephonic communication and |

| | |
|---|---|
| | confirmations of discussions via email |
| Maintain good relations | 1. No project delays as a result of poor communication<br>2. No claims from the Landowner or communities<br>3. All claims investigated and settled within one month<br>4. No litigation due to unsettled claims |

The Contractor site manager has full responsibility for the operational implementation of the project. This role is required to monitor Environmental as well as Health and Safety performance as they happen and with reference to the checks against the contents of this document. The Contractor Appointed Health and Safety Officer has the crucial role of monitoring Health and Safety performance as it happens.

| **Contractor Site Manager Key Performance Indicator** | **Performance Expectation as a function of time spent and tangible evidence** |
|---|---|
| Communicate and enforce throughout the duration of the project the Site Safety, Health and Environmental Management Programme | Negative response <5%<br>Quick reaction to landowner complaints<br>*Record/copy of all landowner agreements and communication |
| Administer disciplinary action for offenders who do not comply | <10%<br>Records of staff performance, formal counselling and written warnings |
| Create and Administer files and records in accordance with the check lists set out herein | 30%<br>Record monitoring and audit findings<br>Minutes of all meetings |
| Ensure the smooth running of the project according to the project schedule | 5%<br>Monitor progress against project plan or Gantt – available on site |
| Enforce all Construction Site Golden Rules as set out herein | 50% |
| Maintain Landowner/community complaints/compliments register | 2.5%<br>Report on register contents at weekly meeting |
| Maintain good relations | No project delays as a result of poor communication |

***** All negotiations for any reason shall be between the ECO, the affected parties and the Contractor. NO verbal agreements shall be made. All agreements shall be recorded in writing and all parties shall co-sign the documentation.

| **Contractor Appointed Health and Safety Officer** | **Performance Expectation** |
|---|---|
| Influence Construction Site Health & Safety Performance | 50%<br>Evidence of Health & Safety File and well kept stores – PPE, Chemical & fuel store, correct use of PPE enforced on site |
| Chair Health and Safety meetings | 5%<br>Enforce improvements |
| Maintain PPE inventory | 2.5%<br>Immaculate store kept under lock and key |
| Maintain records of machinery technical inspections | 5% |
| Enforce health & safety Golden Rules | 40% |
| | |

In addition, the Contractor having engaged with the landowner, will need to establish contact local services networks and to further initiate working relations.

A column is provided in the responsibility matrix table that follows where contact details of people assigned these roles may be captured for reference and use.

**Table** Responsibility matrix for Mercury substation construction

| ROLE DESCRIPTION | Contact details |
|---|---|
| **Client - Contract Manager:** Ultimate decision maker | **Name:**<br>**Tel:** |
| **Client - Project Manager:** Smooth running of the project | **Name:**<br>**Tel:** |
| **Authorised Environmental Authority:** Environmental Management of project | **Name:**<br>**Tel:** |
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| **DEAT – Assigned Project Officer** | **Name:**<br>**Tel:** |
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| ROLE DESCRIPTION | Contact details |
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| **Local Fire Protection officer** | **Name:**<br>**Tel:** |
| **Local Security Service Provider** | **Name:**<br>**Tel:** |
| **Local Social Services NGO** | **Name:**<br>**Tel:** |
| **Local General Trading Store or Co-op** | **Name:**<br>**Tel:** |
| **Local Parks Board Wildlife Protection Officer** | **Name:**<br>**Tel:** |

If the ECO is not on site the Contractor should keep the affected parties informed. The contact numbers of the Contractor and the ECO shall be made available to the affected parties. This will ensure open channels of communication and prompt response to queries and claims.

All contact with the affected parties shall be courteous at all times. The rights of the affected parties shall be respected at all times.

**The ECO shall convey the contents of this document to the Contractor site staff and discuss the contents in detail with the Client Project Manager and Contractor Site Manager.**

**Eskom requires a commitment from the Contractor to consider the following:**

- The legal rights of the individual Landowner, Communities and Eskom Regional staff.
- Professional etiquette on and off site.
- Ensure quality in all work done, technical and environmental.
- Immediate resolution to problems and claims arising from damage thus ensuring smooth flow of operations.
- To underwrite Eskom's Environmental Policy at all times.

- To use this Environmental Management Programme for the benefit of all involved.
- To preserve the natural environment by limiting any destructive actions on site.

**No work shall commence until permission is granted from the Environmental Advisor from Transmission Engineering and the ROD from DEAT has been obtained. The Project Manager shall ensure that all conditions in the ROD are fulfilled before the Contractor occupies the site.**

### 3.2 Monitoring and Reporting Roles

The ECO shall keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage should be directed to the ECO for appraisal. **A register shall be kept of all complaints from the Landowner or community. All complaints will be acknowledged in writing by the ECO within 48 hours of record in the register, and the ECO shall inform the complainant of the process that will follow. All claims shall be handled immediately to ensure timeous rectification / payment by the responsible party.**

Eskom shall be held liable for all unnecessary damage to the environment, both on and off-site. Where such damage is due to Contractor negligence or accidental damage will be a matter between Eskom and the Contractor. All matters with landowners and other third parties will be addressed directly by an Eskom representative, typically the ECO.

The standard Eskom site documentation shall be used to keep records on site. All documents shall be kept on site and be available for monitoring purposes. Site inspections by an Environmental Audit Team may require access to this documentation for auditing purposes. The documentation shall be signed by all parties to ensure that such documents are legal. Regular monitoring of site works by the ECO is imperative to ensure that all problems encountered are solved punctually and amicably. When the ECO is not available, the Contract Manager / Site Supervisor shall keep abreast of all works to ensure no problems arise.

### 3.3 Frequency and Content of Reporting

**Two-weekly environmental compliance reports shall be forwarded to the Transmission Engineering Environmental Advisor (appointed per project) with all information relating to environmental matters.** The following **Key Performance Indicators** must be reported on a two-weekly basis by the ECO:

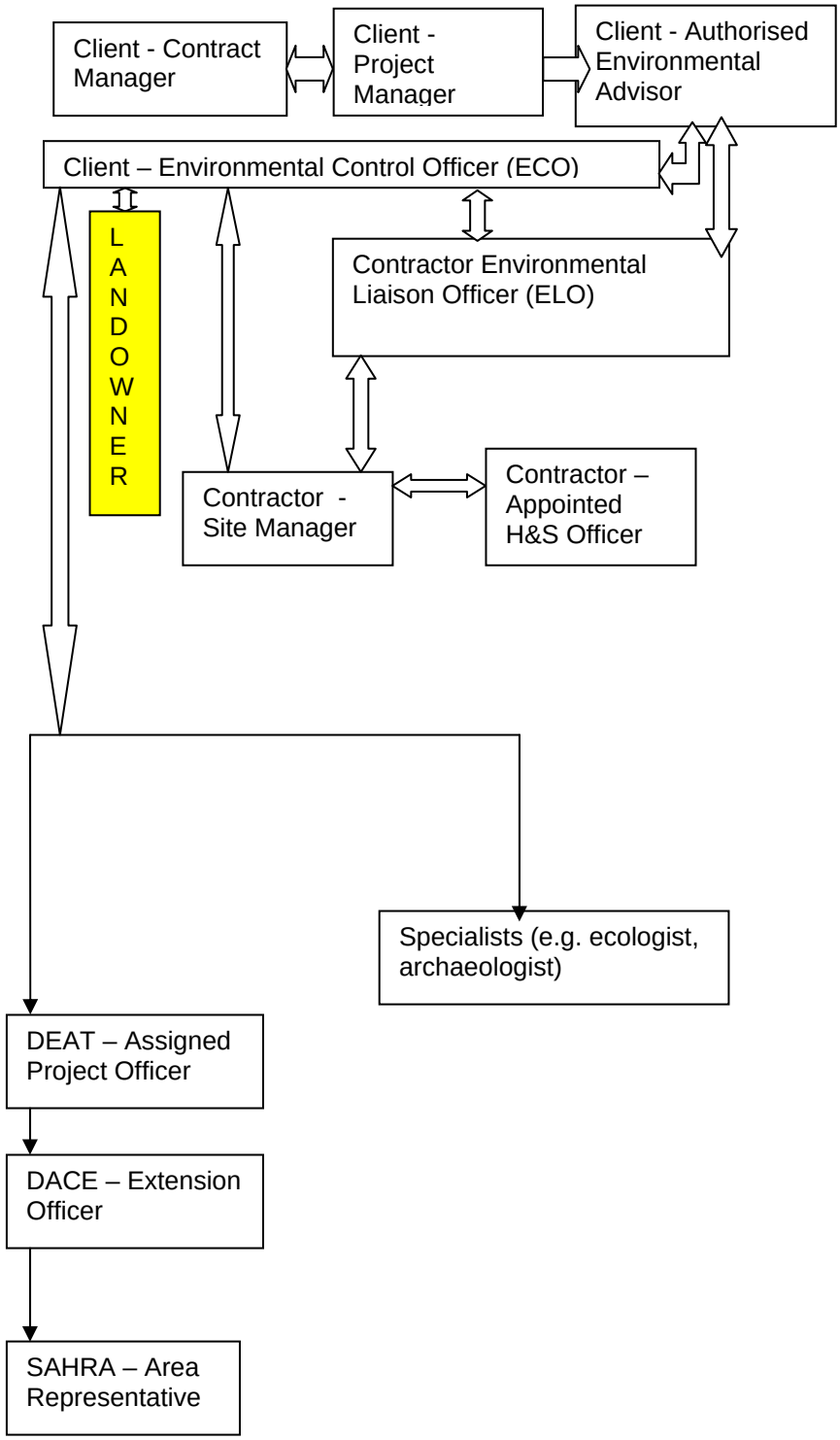
1. Complaints received from affected parties and actions taken.

2. Environmental incidents, such as oil spills, etc. and actions taken.
3. Incidents possibly leading to litigation and legal contraventions.
4. Environmental damage that needs specialised rehabilitation measures to be taken.

**The following documentation shall be kept on site by the ECO:**

1. Site daily dairy
2. Complaints register
3. Records of all remediation/rehabilitation activities
4. Copies of bi-weekly reports to the Transmission Engineering Environmental Advisor for auditing purposes
5. Copy of the Environmental Management Programme
6. Minutes of site meetings including discussions on environmental issues

## 3.4 ORGANIZATIONAL STRUCTURE: ROLES & REPONSIBILITIES FOR SUBSTATION/LINE CONSTRUCTON

| RELATIONAL FLOW | ROLE DESCRIPTION |
|---|---|
|  | **Client - Contract Manager:** Ultimate decision maker (CCM)<br>**Client - Project Manager:** Smooth running of the project (CPM)<br>**Client Authorised Environmental Advisor:** Environmental Management of project (AEA) |
| | **Client – Environmental Control Officer (ECO)**<br>Communicate EMP – induction; Police EMP – monitoring & reporting; Communication in advance with landowner; Appraisal of crop & environmental damage |
| | **Contractor Environmental Liaison Officer (ELO)**<br>Internal environmental performance; Communication in advance with landowner; Punctual and amicable solutions to site environmental problems |
| | **Contractor -Site Manager**<br>Keep finger on the pulse of all works<br>Monitors Environmental Aspects against Golden Rules<br>**Contractor – Appointed H&S Officer**<br>Monitors H&S against Golden Rules |
| | **Specialists** – on call to assess any specific environmental issue that may arise during construction |
| | **DEAT – Assigned Project Officer** |
| | **DACE – Extension Officer** |
| | **SAHRA – Area Representative** |

## 4.0 ENVIRONMENTAL ASPECTS AND THEIR CONTROL

This section conveys information relating to the identified aspects, their impacts and specific actions necessary and/or prompts to mitigate them. It is necessary and useful to site personnel involved with moment-by-moment decision-making too improve safety, health and environmental performance during the construction phase of the project.

### 4.1 Site establishment

#### 4.1.1 Communication for success

Prior to the contractor moving on to site and establishing the construction camp a crucial meeting is required between the key role players, including Eskom Project Manager, Lead Contractor and ECO. The purpose of the meeting is induction of the key role players on SHE and their responsibilities for the duration of the construction phase of the project. It is the responsibility of the Project Manager and ECO to fully describe the project plan, including responsibilities, schedule and convey all information and answer questions relating to the identified aspects, their impacts and specific actions necessary and/or prompts to mitigate them.

In a meeting to follow this, It is envisaged that the key role players will meet with the landowner(s) to inform him/her/them of the project plan. All responsibilities will be clarified for the landowner(s), the project schedule and all relevant information will be conveyed to the landowner(s) and any questions answered. Contact details will be left with the landowner(s) or, as necessary, a copy of the EMP.

A third meeting with all site personnel including decision makers, ECO and Project Manager, Lead Contractor and subcontractors will be arranged for the purpose of a general induction of all contractor staff to the scope of the project and the workings of the SHE programme. This is where golden rules relevant for mitigation of site Health, Safety and Environmental Aspects will be set out. Most importantly all site contractor personnel's attention will be drawn to the site access plan where each aspect and its relevant mitigation measure and performance criteria highlighted.

### 4.1.2 Summary checklist of reasonable measures mitigating Impacts associated with site establishment and relevant performance criteria

| Impact | Mitigation measure ☒ | ✓ | Performance criteria ☒ | ✓ |
|---|---|---|---|---|
| 1. Disruption to landowner activities and access due to overlap of use of facilities<br>2. Existing client facilities<br>3. Noise<br>4. Dust<br>5. Waste<br>6. **Additional identified impact/s?** | ✓ **Agreement on which facilities for ablutions and which roads for access**<br>✓ **Agreement on responsible use of Eskom housing and ablution facilities if available**<br>✓ **Agreement on environmentally responsible use of water**<br>✓ **Agreement on mitigation of noise nuisance – when work will cease?**<br>✓ **Arrangements for dust from road traffic to be suppressed by regular application of drawn water – Not Municipal Water!!!**<br>✓ **Deliver chemical toilet to site prior to arrival of personnel**<br>✓ **Arrangement with either Landowner or registered Municipal Landfill for receipt of construction site waste**<br>✓ **Set-up Waste Bins – Paper, Plastic, Glass, Metal & parts, Rubber** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ | ✓ **Minutes of meetings**<br>• Landowner, Contractor and ECO<br>• Landowner, Contractor and ECO & key staff members<br>• All site personnel including decision makers, the Landowner, ECO and Project Manager<br>✓ **Confirmation of Receipt of induction signed by all project personnel – Landowner, Construction Site Manager, ECO and all construction site staff**<br>✓ **Agreements on facility and road-use and condition signed by landowner and client and filed for reference under section Project Landowner/Client Agreements**<br>✓ **Records of disposal of hazardous waste including defunct electrical equipment**<br>✓ **Observed evidence of orderly approach and set-up of all amenities before main workforce arrives on site**<br>✓ **Construction site camp fenced and gated with lock and key by Construction Site Manager prior to arrival of workforce** | ☐<br>☐<br>☐<br>☐<br>☐ |

Site establishment shall take place in an orderly manner and all amenities shall be installed before the main workforce move onto site. **A method statement is required from the Contractor at tender stage that includes the layout of the camp, management of ablution facilities and wastewater management**.

The Contractor camp shall have the necessary ablution facilities with chemical toilets where such facilities are not available at commencement of construction. The Contractor shall supply a wastewater management system that will comply with legal requirements and be acceptable to Eskom. Where Eskom facilities are available the Contractor shall make use of such facilities where it is viable and possible. The Contractor shall inform all site staff to the use of supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at a registered waste dump. A certificate of disposal shall be obtained by the Contractor and kept on file.

Where a registered waste site is not available close to the construction site, **the Contractor shall provide a method statement with regard to waste management. Under no circumstances may solid waste be burned on site unless a registered/permitted incinerator is available.**

### 4.1.3 Golden Rules

#### 4.1.3.1. Does everyone know?

- Has the site access plan been communicated fully – do's and don'ts

#### 4.1.3.2. Housekeeping

- Aspects – Waste including sewage reticulation, Dust & Noise

### 4.1.4 Monitoring

Monitoring will be performed by the ECO against the performance criteria listed in the table above. The ECO will be present throughout the site establishment period as this is a critical period in which compliance against the Safety, Health and Environmental Management Programme is initiated. The ECO will take photographs of any non-compliance and have the situation rectified immediately with assistance from the Contractor Site Manager.

## 4.2 Health and Safety

### 4.2.1 Communication for success

It should be recognised that above all, valuing human life and prevention of injury is key to the success of the project. If ecosystem health is the sustainable integration of social, environmental and economic agendas then ensuring the safety of all project personnel should be the starting point of all development projects.

It is strongly recommended that the approach to enforcement of health and safety on site is behavioural based. This means that it is incumbent on all site personnel – those with and without rank, to draw each other's attention to the safety of each and every operational task entered into at the construction site. A very good idea, if no Best Practice Description is on hand is to hold group risk assessments prior to the operation – this type of assessment should involve the Site Construction Manager and the Appointed Health and Safety Officer. In addition, the ECO should add-value from an Environmental perspective.

It is recommended that an every-day spoken term be used to draw attention to the type of attitude and behaviour demanded on site that will relate to successful H&S performance. The term "Sharp-sharp" denotes being awake and aware – it is an endearment of all site personnel to each other for their responsibility and commitment to upholding the requirements of Health & Safety on and off site. The term should be used to summarize the following:

**Sharp-sharp**

- Behavioural based Health & Safety
- Zero Tolerance Target Zero – no incidents or accidents – do not pass an unsafe situation without alerting/warning those involved
- SHE is Everybody's business
- Site/task based risk assessments and record thereof, prior to implementation involving Contractor Site Manager, Contractor Health & Safety Officer and Environmental Control Officer
- Record in writing and file - H&S file available on site

### 4.2.2 Summary checklist of reasonable measures mitigating Impacts associated with health & safety and relevant performance criteria

| Impact | Mitigation measure ☒ | ✓ | Performance criteria ☒ | ✓ |
|---|---|---|---|---|
| 1. Accidents/down time due to lack of diligence<br>2. Accidents/down time due to lack of training<br>3. Accidents due to poor/lack of machinery and equipment maintenance<br>4. No record of correct procedure of operating instruction<br>5. Lack of responsibility, policing and record keeping<br>6. Use behavioural based approach to positively influence landowner and landowner personnel<br>7. Lack of reminders<br>8. Lack of adequate rest<br>9. Lack of thorough checks by technical personnel<br>10. **Additional identified impact/s?** | ✓ **Proof of valid current workman compensation insurance**<br>✓ **Identify roles & responsibilities**<br>✓ **Identify line of communication – record of appointment of site H&S Officer as required by the Health & Safety Act**<br>✓ **Have and make available site access plan**<br>✓ **Work flow plan**<br>✓ **Health & Safety Policy**<br>✓ **Site specific SHE plan**<br>✓ **Emergency plan for accident and injury**<br>✓ **H&S Golden Rules**<br>✓ **Induction plan and procedure**<br>✓ **Toolbox/green area meetings**<br>✓ **Record near-miss/incidents/accidents**<br>✓ **Minute Toolbox/green area meetings**<br>✓ **Report on H&S performance**<br>✓ **PPE use and storage**<br>✓ **Task specific risk assessments**<br>✓ **Equipment and Machinery manufacturer operating procedures**<br>✓ **Task/best practice descriptions**<br>✓ **Trained operators and proof thereof**<br>✓ **Communication of H&S Golden Rules**<br>✓ **Housekeeping**<br>✓ **Medical fitness and identification records**<br>✓ **Correct & visible signage** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ | ✓ **Copies of emergency procedures:**<br>• **Fire hazard**<br>• **Lightning**<br>• **Snake bite**<br>✓ **Medical emergency**<br>✓ **Current certificated proof of First Aid trained staff and availability**<br>✓ **Signed proof of appointment of H&S Officer**<br>✓ **Record of weekly H&S meeting minutes**<br>✓ **Record of near-miss/incidents & accidents**<br>✓ **PPE* inventory and under lock and key**<br>✓ **Record of safe equipment/machinery by technical inspector**<br>✓ **Sign-off on H&S Golden Rules by all site personnel**<br>✓ **Proof of operator competence and training**<br>✓ **Proof of drivers licenses**<br>✓ **Proof of knowledge of H&S Golden Rules by site personnel**<br>✓ **Correct storage of hazardous chemicals and fuels**<br>✓ **Correct Safety signage**<br>✓ **H&S file available on site**<br><br>(*Personal Protection Equipment) | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ |

### 4.2.3 Golden Rules

**Working at heights**

- Scaffold plan and inspection records
- Trained operators, PPE (Personal Protection Equipment) including approved harnesses and roping

**Lockout/Machinery isolation**

- In an emergency how does is the equipment/machinery shut down?
- Proof of equipment/machinery maintenance schedules
- Proof of compliant electrical installations

**Hazardous substances**

- Keep record of Material Safety Data Sheets (MSDS) for all hazardous chemicals used on site
- Store in isolated, bunded and ventilated structure

**Fire**

- What is the emergency procedure in the even of wild fire?
- How will the construction site be safely evacuated?

**Lightning**

- Cease work and find shelter in vehicle/s or roofed cover – keep way from tall metal structures
- Lie flat on the ground if at a distance from suitable cover

**Emergency procedures**

- Medical Emergency – First Aid Response, Emergency Service Response
- What to do in the event of snake bite – emergency procedure for medical emergencies
- Visibility - Compulsory wearing of safety vests and hard hats on site
- What arrangements are in place protecting operators from drowning if attending to equipment to temporarily draw water from dams and/or rivers?

**PPE**

- Inventory of all necessary PPE relating to the scope of works of the project
- Record of audits of PPE
- Hard hats, safety boots, cotton overalls, safety glasses, ear protection, disposable dust masks, safety vests and that relevant for safe operation or assembly of equipment

**No liquor/drugs on site and no working under the influence**

- No liquor will be allowed on site during and after hours. Functions where liquor is allowed will be conducted off site and in with permission of the necessary decision maker.

**The workforce shall also be sensitised to the effects of sexually transmitted diseases, especially AIDS. General health issues shall be brought under the attention of the site staff and condoms shall be supplied on site.**

### 4.2.4 Workshop and Equipment Storage Areas

Where possible and practical all maintenance of vehicles and equipment shall take place in a workshop area. During servicing of vehicles or equipment, a suitable drip tray shall be used to prevent carbon spills onto the soil, especially where emergency repairs are conducted outside the workshop area. Leaking equipment shall be repaired immediately or be removed from site to facilitate repair. All potentially hazardous and non-degradable waste shall be collected and removed to a registered waste site.

Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and re-mediated to the satisfaction of the ECO. **To this end a method statement is required from the Contractors, tendering for the project, to show procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillage**. The Contractor / Regional staff shall be in possession of an emergency spill kit that must be complete and available at all times on site.

The following shall apply:

- All contaminated soil / yard stone shall be removed and be placed in containers. Contaminated material can be taken to one central point where bio-remediation can be done.
- Smaller spills can be treated on site.
- A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material is not available on site.
- All spills of hazardous substances must be reported to the appointed Transmission Engineering Environmental Advisor or alternatively to the Regional Environmental Advisor **(Tx Key Performance Indicator requirement)**.

### 4.2.5 Storage of hazardous substances

All hazardous substances shall be stored in suitable containers and storage areas shall be bunded and security controlled. This includes all carbon substances like fuel and oil as well as herbicides and battery acid. **The bunded volume should be sufficient to contain the full volume of stored hazardous substance + 20%.** A register shall be kept on all substances and be available for inspection at all times. Areas shall be monitored for spills and any spills shall be contained, cleaned and rehabilitated immediately. Any leaking containers shall be repaired or removed from site (See above for actions after spills).

Storage areas shall display the required safety signs depicting “No smoking”, “No naked lights” and “Danger”. Containers shall be clearly marked to indicate contents as well as safety requirements. **The contractor shall supply a method statement for the storage of hazardous materials at tender stage.**

#### 4.2.6 Monitoring

In this case, the Contractor Site Manager and Appointed Health and Safety Officer shall check that personnel are using the appropriate PPE. Furthermore, prior to commencement of any construction activity they shall lead personnel in considering all H&S risks associated with the intended activity. Operation of equipment will be measured against manufacturer operating procedure. Any unsafe situation shall be halted immediately and safe measures instigated. A written record will be kept of any unsafe situation, incident or accident and reported on a monthly basis.

### 4.3 Security

#### 4.3.1 Communication for success

It is strongly recommended that the contractor make a firm commitment to working closely with the landowner/district existing security network. Such network may take the form of a community policing initiative, services of a local security company or involvement of the local police department. The contractor must not only take responsibility for his own personnel’s movement on site, but for any unidentified persons accessing the site/s where construction is progressing.

It is in the hands of the contractor to engage with the landowner on the issue of security, find out the landowners requirements and ensure that that those are kept. The Contractor Environmental Liaison Officer (ELO) and Site Contractor Manager are responsible for establishing and maintaining construction site security in accordance with the wishes of the Landowner.

### 4.3.2 Summary checklist of reasonable measures mitigating Impacts associated with Security and relevant performance criteria

| Impact | Mitigation measure ☒ | ✓ | Performance criteria ☒ | ✓ |
|---|---|---|---|---|
| 1. Theft, damage to property and injury, loss of life<br>2. Lack of control - break down in local security and compromising of project deadline through delays<br>3. **Additional identified impact/s?** | ✓ **Administer strict controls via key personnel**<br>✓ **Identify line of communication**<br>✓ **Have and make available site access plan**<br>✓ **Site personnel identification register, patrols and records of incidence**<br>✓ **Landowner agreements and written permission**<br>✓ **Establish responsibilities in existing local networks and extend coverage to include project requirements**<br>✓ **Site register, patrols and records of all site personnel**<br>✓ **Emergency procedures**<br>✓ **Substance abuse** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ | ✓ **Proof of security procedures covering issues including:**<br>o **Gates & Key Responsibility**<br>o **Emergency response contact numbers**<br>o **Guard placement and duty description**<br>o **Full inventory of site equipment and machinery including vehicles and registrations**<br>✓ **Confirmation of Receipt of induction relating to security procedures signed by ELO & Construction Site Manager**<br>✓ **Documentation of proof of receipt of landowner gate keys** | ☐<br>☐<br>☐ |

### 4.3.3 Golden Rules

#### 4.3.3.1. Emergency Procedures

- What to do in the event of suspicion, an accosting, break-in or theft – an emergency procedure must detail how such situations should be handled within the context of the locality of the construction site.

#### 4.3.3.2. Landowner agreements and written permission

- Access?
- Movement of vehicles and personnel?
- Afterhours movements?
- Area for recreation?

#### 4.3.3.3. Administer strict controls via key personnel

- Who keeps sets of keys?
- Who keeps a register of equipment and personnel?

#### 4. Carry Identification

- The contractor shall have on record and available on site the identities of all construction staff.

### 4.3.4 Monitoring

Close liaison will take place between the Contractor and the Landowner on this issue. It is incumbent on the Contractor – whilst on site, to be the eyes and ears of the landowner and to report any suspicious activity directly to the landowner or the nominated security service provider.

After hours the construction site camp is to be padlocked and no personnel will be allowed to be on site at this time. The contractor should make arrangements to post a guard or have the security service provider undertake regular patrols to the site.

The contractor shall keep a record of his duty to be responsible for any keys that belong to access gates through which access is allowed by the landowner.

## 4.4 Access

### 4.4.1 Communication for success

It is evident that the construction site is isolated. Thus, the Site Contractor Manager must make provision for emergency in the event of a delivery vehicle getting lost. It is incumbent on the contractor to inform those making deliveries how to get to the site. Critical will be ensuring that deliveries do not arrive after hours (17.00hrs) – such events are known to be nuisance incidents and if not managed can impact negatively on the client/landowner relationship.

In addition, roads that approach the site are all gravel/dirt and thus susceptible to deterioration, especially during the wet season and through repeated use by heavy vehicle traffic. Direct access to the expansion site is on cultivated farmland and the conditions are sandy and may become difficult, particularly for heavy articulated vehicles. The Contractor may need to consider the construction of a roller compacted loop road to allow access for heavy vehicles. Road drainage will be critical and any new route should have adequate road drainage humps that direct runoff water away from the road. Erosion it appears should be negligible. **It will be important that any new access routes need to be agreed with affected landowners and environmental impacts to be considered by the ECO (see 4.4.4 below).**

Vehicles getting stuck in the sand and mud are seen to areas for pre-emptive management action. Consideration must be given by the contractor to an emergency procedure for assisting vehicles that have become stuck as a result of poor weather and road conditions.

Permits for the transport of extra heavy goods on public roads are the responsibility of the Contractor to arrange, or as agreed with the Eskom Project Manager.

### 4.4.2 Summary checklist of reasonable measures mitigating Impacts associated with gaining access to the construction site via landowner property and relevant performance criteria

| Impact | Mitigation measure ☒ | ✓ | Performance criteria ☒ | ✓ |
|---|---|---|---|---|
| 1. Deterioration in condition of existing roads<br>2. Security/speed breach<br>3. **Additional identified impact/s?** | ✓ Landowner agreements and written permission<br>✓ Have and make available site access plan<br>✓ Use clear signage<br>✓ Emergency procedures for road deterioration e.g. flooding etc.<br>✓ As far as possible carry out heavy construction during the dry season<br>✓ Keep to normal working hours viz. Monday to Friday, Saturday till 1300hrs<br>✓ Set speed limit | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ | ✓ **Copy of landowner/client agreement on how the contractor is to travel and gain access to the site construction camp**<br>✓ **Availability of vehicle/tractor for towing in case of emergency**<br>✓ **Road maintenance equipment such as tractor drawn scraper and roller or agreement by landowner to regularly maintain the road surface quality and road drainage**<br>✓ **Adherence to the speed limit (40Km/hr)**<br>✓ **Agreement on condition of access road/s before and after construction based on photographic evidence**<br>✓ **No claims from Landowners due to damage on existing access roads**<br>✓ **No erosion visible on access roads three months after completion of construction**<br>✓ **No loss of topsoil due to runoff water on access roads**<br>✓ **No interference with the natural flow of water**<br>✓ **No damage to fences and subsequent complaints from Landowners**<br>✓ **All gates kept locked at all times to limit access to construction staff** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ |

### 4.4.3 Golden Rules

**Landowner agreements and written permission**

- Access through cultivated lands.

- After completion – ripping to alleviate compaction
- The movement of vehicles during times of the week and day e.g. no deliveries to site on the weekends or after hours
- Use of landowner equipment and vehicles
- Speed limit

**Emergency procedures**

- Who will respond when/if a vehicle gets stuck – the farmers' tractor to pull out the low-bed delivering tower structures?

**Speed Limit**

- Generally a speed limit of no greater than 40km per hour should be imposed

**Gated and locked**

- All access route gates will be closed after access
- The construction site camp should be gated and locked after hours

### 4.4.4 Access planning and design

Planning of access routes to the site for construction purposes shall be done in conjunction with the Contractor, Eskom and the Landowner. All agreements reached should be documented and no verbal agreements should be made. The **normal Eskom site documentation** will be sufficient for this purpose. The Contractor shall properly mark all access roads. Roads not used shall be marked with a " **NO ENTRY** " sign.

Where new access roads are constructed, this must be done according to **design and contract specifications**. Drainage channels shall be suitably designed to ensure erosion does not occur, especially at the outflows. The new access road shall be designed to allow for the natural flow of water where required. Crossing of dongas and eroded areas on access routes to new substation sites shall be thoroughly planned and installed according to design and contract specifications. All areas susceptible to erosion shall be protected with suitable erosion control measures from the onset of the project. Prevention is the total aim as restoration is normally very difficult and costly.

The crossing of rivers, streams or wetlands is subject to the necessary permit from the Department of Water Affairs and Forestry. This will include any works to river or steam banks.

Where necessary suitable measures shall be taken to rehabilitate damaged areas next to the newly constructed roads.

### 4.4.5 Construction Site Fencing Requirements

The site shall be fenced to prevent any loss or injury to persons or livestock during the construction phase. All Eskom gates shall be fitted with locks and be kept locked at all times during the construction phase, especially when works are stopped during weekends and holidays. All claims arising from gates left open shall be investigated and if at fault, settled in full by Eskom. Any claims from the Contractor will be between Eskom and the Contractor. If any fencing interferes with the construction process, such fencing shall be deviated until construction is completed. The deviation of fences shall be negotiated and agreed with the landowner in writing.

It is expected that the construction working area will need to be no wider than 5m beyond the final security fence line around the substation. Hence there should be no damage to property or the environment beyond this point. It is recommended that all sensitive areas be fenced off with wire fencing, with fence posts and fencing standards painted in bright colours for high visibility. Should there be a need to go beyond this area (eg for temporary spoil or topsoil storage), the requirement should be first approved by the ECO who will look for a suitable site. The use of red and white bunting (tape) outside of the secured construction area is discouraged, as bunting may be hazardous to livestock.

### 4.4.6 Monitoring

Access to the construction site will be monitored against the site access plan. Alternate access will not be tolerated and fines imposed on the Contractor Site Manager by the ECO where the rules are breached.

## 4.5 Fire Hazard

### 4.5.1 Communication for success

Wild fire is major contributor to power outages throughout the country. In conjunction with a countrywide initiative to reduce the risk of wild fires and their negative impact on electricity assets as well as the wider impacts affecting commerce and the public associated with wild fire induced outages, the opportunity exists to involve landowners in the management of fire risk. According to the Veld & Forestry Act it is incumbent on landowners to protect their own land from the threat of wild fire through applying fire management tools such as burning of firebreaks. Furthermore, as a landowner is liable for damages due to fire emanating from his/her property, it is highly advisable that landowners form organized communities to deal with wildfire on an ongoing basis. Fire protection Associations should be formed and landowners organised to facilitate the protection of property from wild fire threat.

Similarly, as the owner of the substation site, Eskom will be responsible for any fires originating from the site, or fires due to contractor’s negligence. Eskom will ensure the Contractor adheres to

a strict no smoking policy during construction. Additionally, no cooking fires should be lit and any potential fire hazard activities (eg arc welding) should be carefully managed. The Contractor should hold fire-fighting equipment on site during the construction phase.

The nub of the mitigation for this particular environmental aspect is that the contractor must engage the landowner on procedure for handling wildfire threat. In addition, the contractor must engage and network with the local fire protection officer and abide by the protocol set out by the Act.

### 4.5.2 Summary checklist of reasonable measures mitigating Impacts associated with Fire Hazard and relevant performance criteria

| **Impact** | **Mitigation measure** ☒ | ✓ | **Performance criteria** ☒ | ✓ |
|---|---|---|---|---|
| 1. Loss of economic benefit – livestock/grazing production<br>2. Damage to property and risk of loss of life<br>3. Project delays – especially during fire season<br>4. Power outages and associated negative economic knock-on<br>5. Opportunity to network to facilitate maintenance of asset once substation/line is commissioned<br>6. **Additional identified impact/s?** | ✓ Identify roles & responsibilities<br>✓ Emergency plan<br>✓ Accredited training in fire fighting<br>✓ Properly maintained equipment<br>✓ Readiness<br>✓ Fire management programme to protect the asset from damage<br>✓ Safe herbicide use<br>✓ Monitoring | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ | ✓ **No veld fires started by the Contractor's work force**<br>✓ **No claims from Landowners for damages due to veld fires**<br>✓ **No litigation**<br>✓ **Proof of certification in basic fire fighting of at least 5 staff members**<br>✓ **Necessary serviced and ready fire fighting equipment including:**<br>• **Water tanker, tank and fire fighting hose**<br>• **Backpack sprayers**<br>• **Torch**<br>• **PPE**<br>✓ **Availability of contact details for local fire officer**<br>✓ **Evidence of fire protection as recommended by the ECO e.g. mowing or firebreaks** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ |

### 4.5.3 Golden Rules

**Landowner Agreement**

- Engage with the landowner specifically on his procedure for managing wild fires
- Fit-in with the requirements of the local Fire Association following protocol with respect training, equipment to adhering to procedure for management burns.
- Fire management programme

**Identify roles & Responsibilities**

- Especially during fire season, ensure that equipment is ready and trained personnel can man equipment in the case of a wild fire emergency – consider roster system for off-duty days.

**Fire management programme**

- Engage with the landowner regarding a suitable time to burn firebreaks to protect the construction site camp and eventually the entire substation from wild fire threat.

**Safe herbicide use**

- Ensure that a trained operator applies tracer lines, that herbicide application information is captured and that the hazardous chemical is stored in the hazardous chemical store.

**Health & Safety**

- Cotton overalls
- Fire resistant boot soles
- Calibrated herbicide applicator
- Rubber gloves
- Goggles
- Fume mask

**No open fires shall be allowed on site**

- Under no circumstance (The Forest Act, No 122 of 1984) are fires to be lit on site. All cooking shall be done with gas in demarcated areas that are safe and cannot cause runaway fires. The Contractor shall have operational fire-fighting equipment available on site, especially during the winter months.

### 4.5.4 Monitoring

The ECO will check to ensure that emergency plans are in place and if not facilitate relationships such that assets are protected. If the contractor is to use fire as a tool to protect assets, the ECO will ensure that the personnel involved have received the necessary recognized training in basic fire fighting skills. Furthermore, that the necessary network is place including contact established with the local Fire Protection Officer and/or agreement with the landowner to handle the aspect of fire hazard and protection.

## 4.6 Waste & Housekeeping

### 4.6.1 Communication for success

The Contractor shall dispose of all excess material on site in an appropriate manner and at a registered landfill. The ECO is to police the general cleanliness of the site and raise and housekeeping and waste management issues at weekly Health, Safety and Environment meetings where non-compliance will be raised and instructions given through the Contractor Site Manager.

All packaging material shall be removed from site and disposed of and not burned on site. A negotiated landfill may be used but when it is closed up, the rubble shall be compacted and there shall be at least 1m of soil covering the waste material. No landfill may be used without the consent from the Landowner. No non-biodegradable materials shall be disposed of in any unregistered waste site unless it is inert (eg soil, rubble, etc.). **A method statement regarding management and disposal of construction rubble shall be included in the tender documents by the Contractor.**

No material shall be left on site that may harm man or animals. Broken, damaged and unused spares such as porcelain, glass, nuts, bolts and washers shall be picked up and removed from site. Surplus concrete may not be dumped indiscriminately on site, but shall be removed from site and disposed of in registered landfill areas. Concrete trucks shall not be washed on site after depositing concrete into foundations. Any spilled concrete shall be cleaned up immediately. It strongly suggested that all mixing be carried out on shuttering and never directly on the soil surface.

### 4.6.2 Summary checklist of reasonable measures mitigating Impacts associated with waste and general housekeeping and relevant performance criteria

| **Impact** | **Mitigation measure** ☒ | ✓ | **Performance criteria** ☒ | ✓ |
|---|---|---|---|---|
| 1. General contamination<br>2. Unsightliness<br>3. Risk of litigation<br>4. **Additional identified impact/s?** | ✓ Use environmentally sound disposal facility<br>✓ Communicate the need for housekeeping and a neat and tidy work environment<br>✓ Link Housekeeping with Health & Safety Awareness | ☐<br>☐<br>☐ | ✓ **No construction rubble left lying around on site**<br>✓ **Hand mixing to be carried out on metal shuttering**<br>✓ **Unused mixed concrete to be disposed of off site**<br>✓ **No incidents of litigation**<br>✓ **No complaints from Landowners**<br>✓ **Recycling to be actively practiced including – oil & grease, metal parts, rubber, paper, plastic & glass**<br>✓ **A clean well kept site with everything in its place**<br>✓ **Availability and proof of training for use of spill kits**<br>✓ **Necessary bunding and storage facilities for fuels and hazardous chemicals**<br>✓ **Emergency procedure for spill**<br>✓ **Register of disposals at registered site if used** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ |

### 4.6.3 Golden Rules

**Housekeeping**

- Keep the working area tidy
- Collect all waste on a daily basis
- Provide safe storage bins at key locations to facilitate easy waste collection

**Environmentally sound disposal**

- Protect against rain and wind dispersal of waste
- Empty waste collection areas weekly
- Dispose of all waste at registered waste disposal sites
- Hydrocarbons and hazardous materials need to be disposed of at registered sites

**Recycling**

- Recycle material where possible within the construction process
- Investigate recycling collection centres in local municipalities

### 4.6.4 Monitoring

Daily evidence of a neatly kept construction site as well as presence of disposal bins for recycling is sought. Records of disposal at registered site are to be kept and will be checked by the ECO.

## 4.7 Water resources

### 4.7.1 Communication for success

Eskom must ensure that the Contractor, through enforcement by the Contractor Site Manager and monitoring, feedback and reporting by the ECO, will protect water resources in the immediate vicinity of the site.

On surveying the site it is clear that the wetland to the west of the construction site camp is to be afforded protection. As a result of the wetland conditions that are seen to exist close to the expanded area of the substation (see figure below), the substation footprint has been reduced. Wetland delineation has been conducted and is attached (Refer to Appendix 7.5) and water use permit application has also be submitted to DWAF.

The revised layout for the extended substation is seen to impact on part of the seasonally saturated wetland environment and not the permanently saturated zone. The only permanently saturated area that will be directly affected by the substation footprint will be the wetland that has been artificially created by the drainage outfall of the existing substation, and this will be only the very edge of this area.

The seasonally saturated areas are the result of hill slope drainage. The main impacts and mitigation are set out in Appendix 7.5 and summarised in brief below:

- Increased risk of erosion in the artificial permanent wetland due to increased concentrated runoff discharging at this point. Mitigation is possible through engineered outfall with erosion protection.
- Interruption of hill slope seepage by the footprint of the development, with resulting impact on the ecologically important flows in the permanent wetland area. Mitigation is possible through engineered outfalls and cut-off drains directing seepage around the substation.
- Pollution during construction – rubble, oils, cement, etc. Mitigation is possible through waste control and fuel storage points to be kept at least 100m from wetland. Construction operations to be kept further than 50m from the wetland, except where substation footprint is in wetland area where a 5m working buffer is proposed. Establish emergency procedures for accidental spillage.
- Compaction of wetland and hill slope soils around substation site, thereby affecting hill slope seepage over a wider area than the substation itself. Mitigation is possible through confining vehicle operations around the site within 5m of the substation footprint, unless agreed with ECO.
- Loss of habitat. Mitigation is limited unless an off-set area is established as a new wetland, of rehabilitate (off-site) downstream stream and wetland areas where erosion has occurred.

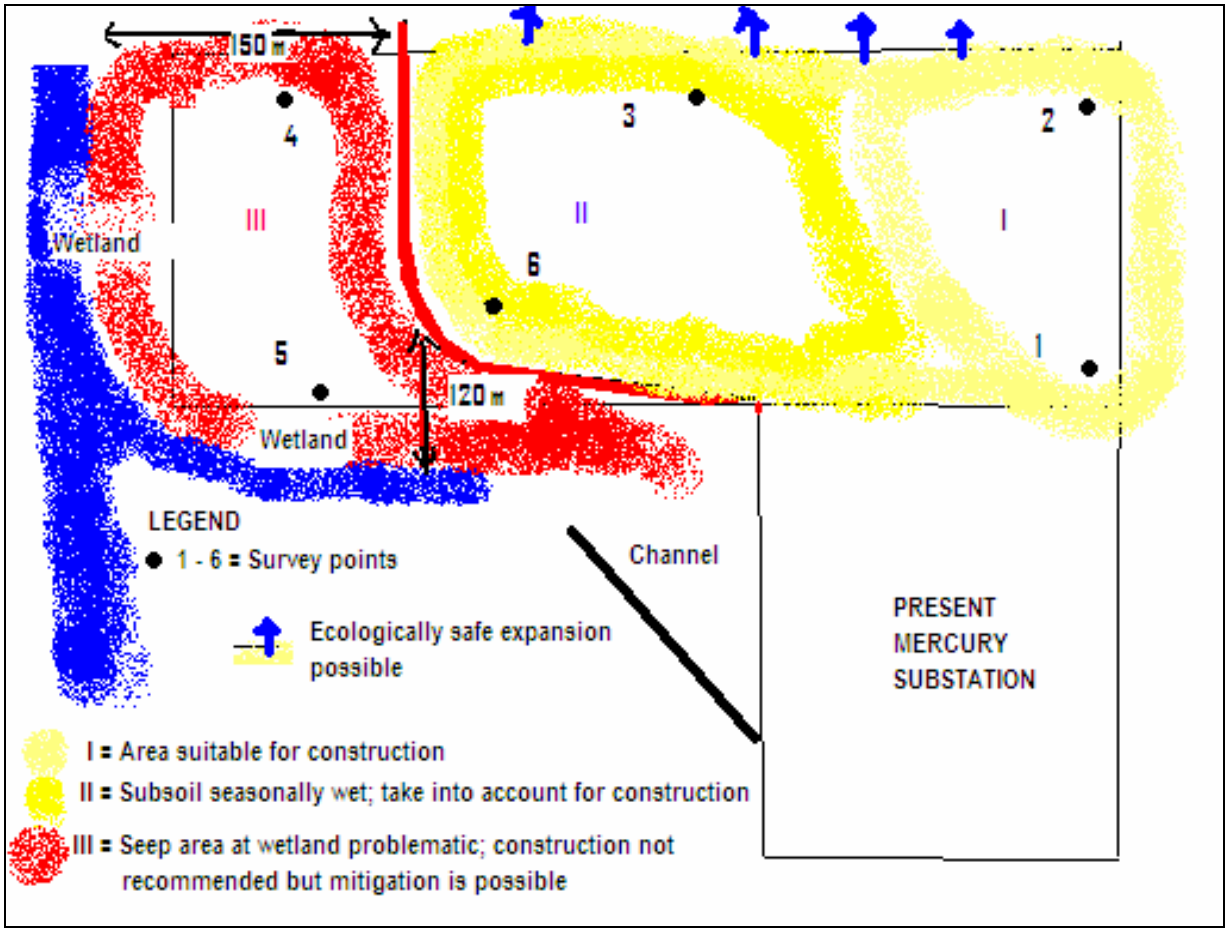
It is important that construction within 100m of the wetland may not start until the necessary permit has been obtained form the Dept. Water Affairs & Forestry.

**Drainage during construction:**

Location of fuel storage areas, hazardous materials (oils, chemicals, cement), concrete batching plants, washing areas, waste storage areas, ablution and latrine areas, and any other potentially polluting activities, should be at least 100m away from the wetland or stream. These areas should have drainage management features that will prevent polluted runoff entering the natural watercourse. Such features will include bunding (or berms) placed around hazardous liquid and fuel storage areas, settlement ponds below any washing areas or batch plants, etc., and it is recommended they have sufficient capacity to contain the 1-hour, 1 in 10year point rainfall event. All these facilities should have controlled access to limit the risk of accidental spillage. Additionally, areas of exposed ground greater than $50m^2$ should be provided stormwater runoff berms on the downslope to trap sediment during the wet season.

Water for construction and construction crew consumption will need to be imported to site by tanker (or similar). Water may not be extracted from the nearby stream/wetland without DWAF authorisation.

**Figure** Schematic layout of construction indicating areas of ecologically safe expansion in relation
site water resource/s




Substation drainage is a critical part of the water resources and wetland protection of the site. This is addressed in 4.7.4.4.

Towards preserving the hill slope seepage, Eskom proposes installing a cut-off drain around the extended substation, the outfall located to the north of the site (see Drawing 0-WT-557). In order to prevent the creation of another artificial wetland and to limit the risk of erosion at the outfall, it is recommended that a French drain (or filter drain) is installed at the outfall to encourage seepage flow. This is in line with the recommendations of the wetland specialist report.

Protection of the wetland from construction activities will require close involvement of the ECO and Contractor. A working area within the wetland area should be no more than 5m beyond the footprint of the substation. However, there may be local areas where additional vehicle movement is required and this should be assessed and agreed by the ECO before commencement with these activities. The remaining wetland area should be fenced off with wire fencing and fence poles painted in a bright colour to ensure visibility.

**4.7.2 Summary checklist of reasonable measures mitigating Impacts associated with Water and relevant performance criteria**

| **Impact** | **Mitigation measure** ☒ | ✓ | **Performance criteria** ☒ | ✓ |
|---|---|---|---|---|
| 1. Water quality<br>2. Biodiversity<br>3. Drainage/soil erosivity<br>4. Quality for Human consumption and Agricultural use<br>5. **Additional identified impact/s?** | ✓ **Meeting requirements of DWAF regarding water usage**<br>✓ **Landowner agreement on use of water**<br>✓ **Identify roles & responsibilities**<br>✓ **Identify line of communication**<br>✓ **Have and make available site access plan**<br>✓ **Emergency plan**<br>✓ **Safe herbicide use**<br>✓ **Monitoring of water quality against SABS standards for human and agricultural use**<br>✓ **Reporting of incidence/accidents**<br>✓ **Storage of hazardous chemicals and fuels**<br>✓ **Safe waste disposal facilities**<br>✓ **Sealed and bunded fuel and hazardous chemical storage areas**<br>✓ **Construction site drainage to mitigate erosion and contamination** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ | ✓ **Landowner agreement for drawing of water including position**<br>✓ **License for drawing of water**<br>✓ **Dry toilet – regular maintenance**<br>✓ **Correct storage of hazardous chemicals and fuels – sealed and bunded**<br>✓ **Correct site drainage – no evidence of erosion or poor drainage**<br>✓ **Monitored/recorded use of herbicides by trained personnel**<br>✓ **Spill emergency plan**<br>✓ **Evidence of waste management implementation and recycling**<br>✓ **No damage to natural drainage channels**<br>✓ **No damage to river and stream banks**<br>✓ **No visible erosion scars on embankments once construction is completed**<br>✓ **Evidence of drainage safe vehicle and machinery service area – use of drip trays**<br>✓ **No evidence of suspended load in water resource, linked to borrowing** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ |

### 4.7.3 Golden Rules

**Legislative Requirements and Landowner Agreements**

- Does the landowner have riparian rights – is water use registered?
- If necessary, from where will water be drawn?
- Where will waste be disposed of?

**Storage of hazardous chemicals, fuel and location of ablution and latrine facilities**

- A fuel and hazardous chemical depot will be established with correct bunding, labelling and signage.
- Storage areas should be a minimum of 100m from the wetland edge or drainage lines.
- Storage areas should be secured against uncontrolled access with proper wire fencing with fence poles clearly marked (bright paint) to ensure visibility.

**Emergency Plan**

- Trained personnel will know how to and have necessary equipment and materials to respond to a fuel or chemical spill into a local water resource.

**Proper Waste Disposal**

- Ensure disposal of potentially hazardous materials, and liquids in particular, at registered disposal sites.

**Drainage**

- Designed to protect water resource/s from contamination by silt and or contaminant emanating from the construction site.
- Areas of exposed ground greater than 50m$^2$ should be provided stormwater runoff berms on the downslope to trap sediment during the wet season.
- All access roads on slopes greater than 5% to have cross berms every 30m to manage stormwater runoff.

### 4.7.4 Ecological Survey (See Appendix 7.3 for complete report)

**4.7.4.1 Construction camp position in relation to water resource** (Refer figure on construction site layout in relation to water resource/s above)

The construction camp may be located anywhere except within 100m from the wetland areas. Any permanent structures (if applicable) need to take into account the seasonal fluctuation in water table. A dry toilet system is recommended due to the poor drainage below 300m to 500mm from soil surface at the midslope or crest/midslope ecotone. Green water discharge should be monitored and controlled.

#### 4.7.4.2 Potential water point

There is a dam in the wetland (upstream, 400m from survey point 4), presently used to provide water to the cattle grazing in the area. The quantity of water required or available was not investigated in this study. **Water for construction should not be drawn from this dam without further investigation and obtaining any necessary permits.**

#### 4.7.4.3 Access road

The access road should preferably on the east, extending north from the existing access road to substation. The soils are deeper and the water table deeper than on the west, therefore further away from the wetland. Sufficient provision should be made for water drainage away from the road into the wetland in case a road is envisaged on the west. Seepage under the road, from the crest to the wetland, should also be taken into account.

#### 4.7.4.4 Site Drainage

Under no circumstances shall the contractor interfere with any watercourses in the vicinity of the site. Should deviation of such watercourses be required as part of the contract design specification, the specifications shall be adhered to strictly. The ECO shall ensure that all watercourses are adequately protected to prevent downstream siltation due to erosion on site. Rubble from the construction process shall be removed from site and may under no circumstances be dumped into any natural drainage channels. The normal flow of runoff water must not be impeded, as this will enhance erosion.

Substation drainage is an important aspect of the environmental management of the site. The substation rests on a concrete base with much of the yard area filled with stone chippings. There is very limited surface runoff from the substation as most of the rainfall infiltrates the stone chippings. The substation drainage comprises two separate systems: one for the main area of the site that is free from potentially polluting operations (rainwater drains through stone chippings into the drainage network), and the other that drains the areas around the transformers where risk of oil spillage needs to be managed.

The clean water drains discharge at a number of points along the western boundary of the site. Some of these will discharge directly into the seasonal wetland area. Eskom proposes to spread stormwater runoff at this point over an area protected by geocells and regrassed with kikuyu. While it is recommended the kikuyu is replaced with water tolerant indigenous grass (preferably scavenged from the local area), the principle of spreading the point discharge is supported. This will encourage infiltration and help sustain the hill slope seepage that is characteristic of the site. However it may be necessary to provide an attenuation pond at each outfall to reduce the rate of

flow. This would be a shallow depression at the point of outfall, unlined and regrassed with local grass sods.

The greatest pollution risk is in the form of transformer oil leakage or spillage. As part of the emergency response to accidental spillage of transformer oil, a dedicated drainage system is provided for the transformer bays and this discharges to a Transformer Oil Holding Dam (see Drawing 0.54/3754). The dam is designed to hold a minimum of 120% of the capacity of largest transformer oil on site. In areas of high sensitivity the outlet of the oil dam can be fitted with an emergency shut off valve, thereby adding additional protection. It is recommended that at this location, a shut off valve is provided. The location of the oil dam is shown on the site layout in Drawing 0-WT-557. It is presently 70m from the wetland. It is recommended that it be moved back to be 100m from the wetland edge (ie a shift of only 30m back from its proposed position).

### 4.7.5 Monitoring

The ECO is to monitor for chemical contamination against the SABS standards for Human Consumption and Agricultural Use. An accredited laboratory will be used to test water samples that are drawn prior to site establishment as a benchmark and subsequently on a monthly basis. Samples will be drawn from the same position at the water resource under threat. A final sample will be drawn post site dis-establishment. Sample analyses results will be compared against initial benchmark samples.

Soil erosion and siltation will be monitored during the construction process. Any siltation in the wetland or downstream dam will be removed by manual labour during the rehabilitation of the site. Any proposal for mechanical silt removal or rehabilitation activity in the wetland must first be approved by the ECO.

## 4.8 Soil

### 4.8.1 Communication for success

As with water, the responsibility for site soil protection rests with Eskom who, through the Contractor (co-ordinated by the Contractor Site Manager) and monitoring, feedback and reporting by the ECO, will ensure a minimum of damage to soils around the site.

The risk of significant impact is considered to be low. Site reconnaissance revealed that the area intended for expansion is largely flat to gently sloping and associated with deep yellow-brown apedal soils. Seasonal wetness is to be expected between 500mm and 800mm below surface. The mid-slope and foot-slope areas on the western part of the study area would be more problematic for construction, with moist conditions closer to the soil surface. Practically, direct access to the

construction site will need to be compacted for heavy vehicle use and a loop access road is suggested for entrance and exit into the construction site area.

Design of the substation drainage needs to take into account soil conditions immediately around the site. Unattenuated storm flows from the substation may result in erosion gulleys forming downstream of the site (See 4.7.4.4 above).

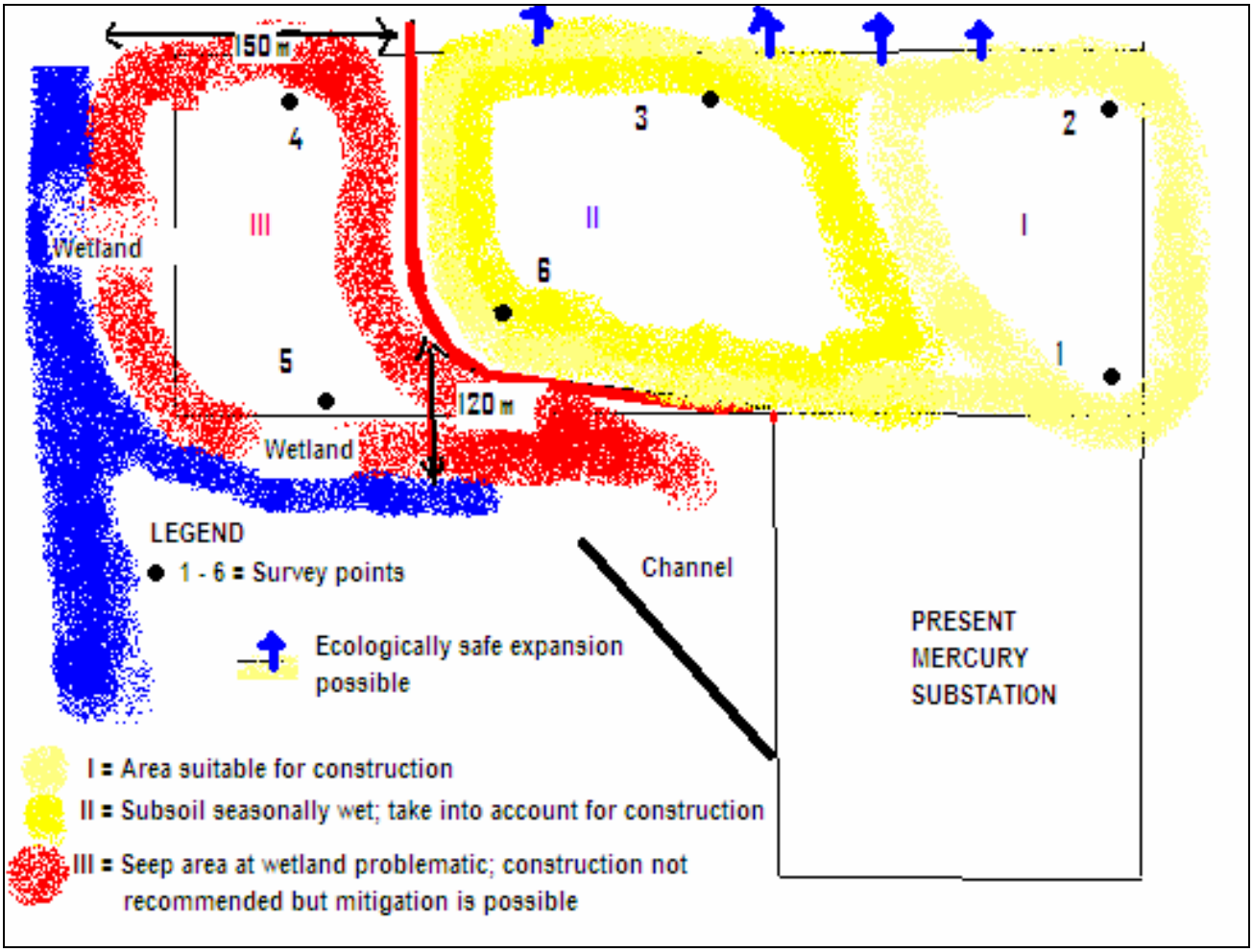



**Figure** Schematic layout of construction site indicating areas of ecologically safe expansion in relation to soil (drawing not to scale)

### 4.8.2 Summary checklist of reasonable measures mitigating Impacts associated with Soil and relevant performance criteria

| Impact | Mitigation measure ☒ | ✓ | Performance criteria ☒ | ✓ |
|---|---|---|---|---|
| 1 Soil contamination<br>2 Export of soil resource<br>3 **Additional identified impact/s?** | ✓ **Landowner agreements – borrow pits, environmentally safe disposal of waste**<br>✓ **Use clear signage**<br>✓ **Designated area trapping oil and grease for service and maintenance of vehicles, machinery and equipment**<br>✓ **Sealed and bunded fuel and hazardous chemical storage areas**<br>✓ **Trained personnel**<br>✓ **Emergency procedure for spills**<br>✓ **Monitoring against standards for environmentally safe agricultural soils if contamination occurs**<br>✓ **Environmentally sound disposal of waste including recycling and use of registered landfill sites where possible**<br>✓ **Use of danger tape to cordon-off areas of high erosivity**<br>✓ **Portable toilet facilities** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ | ✓ **No evidence of soil erosion or contamination**<br>✓ **Evidence of properly designed and engineered drainage**<br>✓ **Correct location of roads according to recommendations**<br>✓ **No visible erosion scars once construction is completed**<br>✓ **All disturbed areas successfully rehabilitated** | ☐<br>☐<br>☐<br>☐<br>☐ |

### 4.8.3 Golden Rules

**Landowner agreements**

- Agreement and access to proper disposal facilities either controlled by landowner or use of registered waste disposal site.
- Agreement and access to borrowed soil for construction purposes.

**Emergency Procedures & Training**

- Provision of spill kits near fuel and potentially hazardous liquid storage areas within the construction camp.
- Personnel trained in the proper use of spill kit.

**Housekeeping**

- All domestic waste must be disposed of in pre-agreed areas that either make use of correct landowner disposal facilities or registered facilities offsite. At the very least waste must be disposed into bins marked plastics, glass, metal/machinery parts and paper. Servicing, greasing of vehicles and machinery must take place at a designated safe area where there is little or no risk of contaminant entering the sites natural drainage.

**Signage**

- Areas for storage of hazardous chemicals, fuels and areas for servicing and maintenance of equipment and vehicles must be clearly sign posted (an indication of signage advised is addressed in the section under site Health & Safety).

### 4.8.4 Ecological Survey Report (See Appendix 7.3 for complete report)

#### 4.8.4.1 Construction camp position in relation to soil resource (Refer figure on construction site layout in relation to water resource/s above)

The ecological impact envisaged is low on most parts, but medium on lower lying areas close to the wetland system on the west of the study area. Mitigations on midslope or wetland ecotone areas are necessary to allow natural underground seepage towards the drainage lines and the seasonal vertical fluctuation of water between 300mm and 500mm at the midslope below soil surface closer to the wetland and 500-800mm on higher lying crest and midslope/crest areas of the study area..

The construction camp area is proposed for the north-east area of the site. This is considered the most suitable location as it is on flatter slopes and is greater than 100m from the wetland areas. Any permanent structures (if applicable) need to take into account the seasonal fluctuation in water table. Green water discharge should be monitored and controlled.

#### 4.8.4.2 Site soils description

Soils are sandy and on the flatter crest area. Yellow-brown apedal subsoils, underlain by a soft plinthic layer (Avalon soil form), are found at a depth of 800mm below soil surface. The water table at the gently sloped midslope area is closer to the surface indicated by the soft plinthic layer between 300mm and 500 mm (soil forms Avalon on midslope and Westleigh, found on midslope closer to wetland). Seasonal fluctuation of the water table can therefore be expected. The valley bottom on the western side of the substation and the footslope and ecotone towards the midslope are characterized by grey sandy subsoils with a sandy clay loam soft plinthic layer (the soil form is Longlands) between 300mm and 600mm from soil surface. These areas are more sensitive than

the yellow-brown sandy soils found on the higher lying parts of the catena due to higher clay content of the subsoils.

#### 4.8.4.3 Access road in relation to soils

The access road should preferably on the east, extending north from the existing access road to substation. The soils are deeper and the water table deeper than on the west, therefore further away from the wetland. Sufficient provision should be made for water drainage away from the road into the wetland in case a road is envisaged on the west. Seepage under the road, from the crest to the wetland, should also be taken into account.

#### 4.8.4.4 Sewage Reticulation

A dry toilet system is recommended due to the poor drainage below 300m to 500mm from soil surface at the midslope or crest/midslope ecotone. Risk of pollution of the wetland will also require a portable toilet system. Latrine facilities should be situated at least 100m away from the edge of the wetland.

#### 4.8.4.5 Soil Conservation - Topsoil

A topsoil stockpile area is designated in the north-east area of the construction site. This is seen to be the most suitable location for the stockpile. The stockpile needs to be surrounded by a berm to assist managing erosion and stormwater runoff during the wet season.

Where terracing is required, topsoil shall be collected and retained for the purpose of re-use later to rehabilitate disturbed areas not covered by yard stone. Such areas include terrace embankments and areas outside the high voltage yards. Where required, all sloped areas shall be re-vegetated and stabilised to ensure proper rehabilitation is effected. These areas can be stabilised using design structures or vegetation as specified in the design to prevent erosion of steep embankments. The contract design specifications and Environmental Impact Report (EIR) recommendations shall be adhered to and implemented strictly.

The retained topsoil shall be spread evenly over areas to be rehabilitated and suitably compacted to effect re-vegetation of such areas to prevent erosion. If the residual topsoil material does not have any toxic substances, it can be used by the surrounding farmers. If the residual topsoil is toxic it should be removed and taken to a licensed landfill site. Any surplus topsoil should be disposed of at a licensed landfill site unless an alternative local disposal site is identified by the Contractor. Such site should be evaluated and approved by the ECO, giving consideration to environmental risks at that site. The process of off-site topsoil removal must be clearly documented showing location, description of end use, quantities date and time, and ECO and landowner/landfill operator signatures.

#### 4.8.4.6 Earthworks & Spoil Stockpiles

A spoil stockpile area is designated in the north-east area of the construction site. This is seen to be the most suitable location for the stockpile. The stockpile needs to be surrounded by a berm to assist managing erosion and stormwater runoff during the wet season.

The extended substation yard will be terraced and substantial earthworks will be required though it is understood it is the intention that cut and fill requirements will be balanced on site requiring little import or disposal of material. However, if necessary, the Contractor will determine the source of any additional fill material required for the terracing, and will also identify the location for any disposal of excess spoil. Eskom will remain responsible for the environmental management of this process and will need to approve all borrow sources and disposal locations. No borrow pits are included in this EMP and should any borrow pit be required, then Eskom will need to approach DEAT for authorisation. To avoid this process it is recommended that fill material be obtained from licensed commercial sources. Disposal of surplus spoil should similarly be to licensed landfill operators.

### 4.8.5 Monitoring

The site needs to be continuously monitored for accidental spillages, uncontrolled discharges and erosion due to stormwater runoff. In the event of a spill the contaminated area should be contained to prevent the spread of pollutant. Dependent on the pollutant, the contaminated soil may need to be removed and disposed of off-site, proof of disposal obtained and the area rehabilitated/revegetated using borrowed soil.

All spillages, but particularly those near the wetland area need to be inspected and recorded by the ECO, including photographic record and remediation measures.

## 4.9 Flora

### 4.9.1 Communication for success

Responsibility for protection of site flora is in the hands of the Site Construction Manager and ECO.

Site reconnaissance revealed that construction would not pose a threat to local vegetation, **though it is important to limit the construction footprint to not more that 5m beyond the final security fence boundary unless approved by the ECO (see 4.4.5 above)**. However, it is strongly recommended that arrangements be made by the appointed construction company to work with local landowners in alleviating seasonal wild fire risks including protection of construction site assets and preventing occurrence of wild fires (Review section on Fire Hazard).

In addition, upon construction site dis-establishment, all denuded areas will be re-vegetated and temporary roads deep ripped to alleviate compaction.

With the exception of the areas to be excavated within the footprint of the substation, there is no need to excavate, or scrape with a grader, any area around the footprint. Any approved vehicle movement outside the footprint should be over existing grass that should be allowed to re-establish without reseeding after construction. Any reason for scraping access roads outside the footprint should first be approved by the ECO.

Vegetation re-establishment in areas damaged during construction need to be evaluated by a specialist botanist prior to rehabilitation. Re-establishment of veld grasses must take into consideration the location of the site and previous grassland mix. Automatic reseeding with the likes of *eragrostis sp.* is not recommended, and no exotic species such as kikuyu should be used on this site.

It is recommended that prior to rehabilitation the ECO contacts the following specialist botanist to assess the extent of any damage and will advise on soil and vegetation rehabilitation as appropriate:

**Mr S.F. de Wet of EnviroPulse cc, cell: 0824628563.**

### 4.9.2 Summary checklist of reasonable measures mitigating Impacts associated with Flora and relevant performance criteria

| Impact | Mitigation measure ☒ | ✓ | Performance criteria ☒ | ✓ |
|---|---|---|---|---|
| 1. Reduce biodiversity<br>2. Exposure of soil to soil loss in runoff<br>3. Damage to property<br>**4. Additional identified impact/s?** | ✓ **Landowner agreements – borrow pits, use of fire to protect assets and fire threat emergency procedure, transplanting of trees in the way construction**<br>✓ **Identify roles and responsibilities**<br>✓ **Identify line of communication**<br>✓ **Have and make available site access plan**<br>✓ **Use clear signage and danger tape to cordon off identified protected plant species**<br>✓ **Trained personnel in the use of herbicide to control vegetation particularly for defining tracer lines in the establishment of fire breaks**<br>✓ **Safe storage of hazardous chemicals**<br>✓ **Emergency procedure for spills**<br>✓ **Monitoring against standards for environmentally safe agricultural soils** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ | ✓ **Only vegetation cleared as required for site construction purposes**<br>✓ **No vegetation interfering with structures and statutory requirements upon completion of the contract**<br>✓ **No de-stumping of vegetation on river and stream embankments**<br>✓ **No visible erosion scars three months after completion of the contract due to vegetation removal**<br>✓ **No visible damage to the vegetation outside the site one year after completion of the contract due to herbicide leaching**<br>✓ **No litigation due to unauthorised removal of vegetation**<br>✓ **No unnecessary damage to natural features**<br>✓ **Vegetation rehabilitated according to ecologists recommendations in shortest possible timeframe to prevent soil erosion** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ |

### 4.9.3 Golden Rules

**Landowner engagement agreements regarding fire hazard**

- It is extremely important that the appointed contractor know his responsibility regarding fire protection and management. Preferably, the contractor should arrange with the landowner/farmer to burn firebreaks around the construction site camp to protect assets.

**Site access plan and signage**

- Protected vegetation should be clearly marked and totally avoided.

**Herbicide application**

- Trained and certified competent staff should apply herbicide for purposes of vegetation control.

**Fire as a Management Tool**

- If the contractor is to engage in the use of fire to manage vegetation in and around the construction site camp, he should do so via consultation with landowner, fire protection officer and knowledge of importance of the geographically specific Fire Danger Index. The contractor staff should be properly trained and equipped to handle wild fires.

**Emergency procedures and correct PPE**

- Hazardous chemicals should be clearly labelled and correctly stored. Competent operators should use the correct PPE and an emergency procedure should be practiced and available in the event of accidents and wild fire.

### 4.9.4 Ecological Survey Findings (See Appendix 7.3 for complete report)

**4.9.4.1 Construction camp position in relation to ecological resource** (Refer figure on construction site layout in relation to water resource/s above)

The vegetation is not as sensitive as expected, with most of the area overgrazed and with the past disturbance the Veld Type 48 (*Themeda-Cymbopogon* grassland-) character was lost. Veld condition is generally poor with signs of overgrazing. Vegetation is also disturbed closer to the wetland.

However, scraping (blading) the site to clear the area should be avoided as much as possible. Rather mow the grass within the construction camp area, and drive over the grass where temporary access roads are required.

#### 4.9.4.2 Site vegetation description

Vegetation is typically overgrazed and disturbed grassland with invasion of Bankrotbos, *Stoebe vulgaris*, which is dominant in certain parts of the study area. Acocks' Veld Type, *Cymbopogon-Themeda* veld (Southern variation of VT48) is therefore not represented with this grassland due to the past disturbance and present overgrazing. Grasses such as *Cynodon dactylon, Eragrostis lehmanniana, Digitaria eriantha, Eragrostis curvula and Aristida spp* are abundant on the higher lying parts of the terrain with *Digitaria eriantha* and *Cynodon dactylon* as dominant species. *Andropogon eucomis* and *Cynodon dactylon* are dominant on the wetland ecotone areas. Grass cover is reasonable to poor on the crest and midslope areas (typically 4 to 5 cm tuft distance between grass tussocks).

#### 4.9.4.3 Access road in relation to vegetation

The access road should preferably on the east, extending north from the existing access road to substation. Sufficient provision should be made for water drainage away from the road into the

wetland in case a road is envisaged on the west. Seepage under the road, from the crest to the wetland, should also be taken into account.

Avoid scraping temporary access roads. Rather cut the grass and drive over it.

#### 4.9.4.4 Rehabilitation

Vegetation cover needs to be restored as quickly as possible due to the potential risk of stormwater and wind erosion. A realistic target would be to restore grass tuft distance to a minimum of 3cm.

The soil needs to be prepared and the grassland rehabilitated afterwards.

800 to 900 grams of topsoil needs to be sampled each, on the crest, gentle midslope and steeper midslope and wetland ecotones. These should be analysed chemically, in order to follow specific amelioration guidelines for the restoration of grass cover and its production potential. The next stage would be to prepare the soil, in order to initiate the amelioration process. This would involve the physical ripping and mixing of the soil material with organic and inorganic substances. The chemical and physical soil properties will therefore be addressed by enriching the soil. Prescribed quantities of organic material and inorganic substances need to be worked into the soil. Sowing of grass seed will be the next stage. Grass seed should be planted in not deeper than 1 cm layer of soil. Once sown the grass seed can be covered by sweeping a brush or branch of a tree over the sown area. The timing of the sowing process should co-inside with the rainy season. Grass seed should preferably not be *Eragrostis curvula.* This species becomes moribund if not regularly grazed or burned and will become a fire hazard in the long run. Tall grass species such as *Hyparrhenia hirta* invade in follow up successional stages and also pose a fire risk and also negatively impact grass cover and on plant diversity in the long run. This tall Thatching Grass is very stable and once established needs physical interference to allow other grasses to establish. Weeping Love Grass (*E. curvula*) is similar in this respect. Grass species that are shorter and provides better cover will also enhance plant species diversity in the long term. *Digitaria eriantha* and *Cynodon dactylon* are recommended, together with the annual *Eragrostis tef.*

It is recommended that prior to rehabilitation the ECO contacts the following specialist botanist to assess the extent of any damage and will advise on soil and vegetation rehabilitation as appropriate:

**Mr S.F. de Wet of EnviroPulse cc, cell: 0824628563.**

#### 4.9.4.5 Clearing of vegetation

Vegetation clearing to allow for site establishment as well as construction purposes will sometimes be required. Vegetation can be cleared mechanically with a bulldozer where terracing is required,

but should be cleared by hand on other areas. All alien vegetation shall be eradicated from site during the project. Indigenous vegetation that does not pose any risks to the operation of the substation upon completion of the contract should be retained for esthetical purposes.

- **Such vegetation shall be identified during design and clearly indicated on the site plans.**
- **No clearing of vegetation beyond 5m from the final security fence will take place during construction unless specifically approved by the ECO.**
- **No protected or endangered species of plants shall be removed without a PERMIT from Nature Conservation.**

Where such species have to be removed due to interference with structures, the necessary permission and permits shall be obtained by the ECO prior to commencement of site works. Search, rescue and replanting of indigenous, valuable and protected species is highly recommended where possible and viable.

The use of herbicides shall only be allowed after a proper investigation into the type to be used, the long-term effects and the effectiveness of the agent. Eskom's guidelines regarding the use of herbicides (TRR/S91/032) shall be adhered to strictly. Application shall be under the direct supervision of a qualified technician. All surplus herbicide shall be disposed of in accordance with the Supplier's specifications.

**The Contractor for vegetation clearing shall comply with the following parameters:**

- **The contractor must have the necessary knowledge to be able to identify different species.**
- **The contractor must be able to identify declared weeds and alien species that can be totally eradicated.**
- **The contractor must be in possession of a valid herbicide applicators licence.**
- **The Contractor shall supply a method statement regarding vegetation clearing at the tender stage**.

**NATURAL FEATURES SHALL BE TAKEN INTO CONSIDERATION DURING DESIGN AND WHERE POSSIBLE THESE SHALL BE PROTECTED UNLESS THEY WILL INTERFERE WITH THE OPERATION OF THE SUBSTATION.**

### 4.9.5 Monitoring

Vegetation biomass is to be measured in the vicinity of the substation – in particular the vegetated area directly representing the 30m swath of the perimeter surrounding the substation. This area will be managed during the operational phase to prevent fire hazard either through mechanical or fire. The ECO is to be inducted in the use of a disc metre to measure biomass and to keep baseline records at sire establishment, prior to mechanical control or burning of firebreaks.

## 4.10 Fauna

### 4.10.1 Communication for success

As regards fauna, The Site Construction Manager and ECO are responsible in ensuring that this resource remains protected throughout the duration of the project.

On approach to the substation construction site vervet monkeys and a mongoose were observed crossing the road. A critical consideration regarding the protection of fauna is not to disturb both fauna and habitat represented in the vicinity of the construction site. Therefore an essential golden rule will be to strongly prohibit poaching and breaching of access to areas out-of-bounds as indicated on the site access plan.

### 4.10.2 Summary checklist of reasonable measures mitigating Impacts associated with Fauna and relevant performance criteria

| **Impact** | **Mitigation measure** ☒ | ✓ | **Performance criteria** ☒ | ✓ |
|---|---|---|---|---|
| 1. Calving and lambing mortalities associated with construction disturbance<br>2. Electrocution of taller game species<br>3. Animal mortality related with tower structure<br>4. Power outage<br>5. **Additional identified impact/s?** | ✓ **Limit construction during calving & lambing season**<br>✓ **Limit or no disturbance during times of nesting**<br>✓ **Identify risk areas and install guards etc.**<br>✓ **No poaching or hunting**<br>✓ **Educate staff on local fauna – use posters to highlight specific species requiring protection** | ☐<br>☐<br>☐<br>☐<br>☐ | ✓ **Confirmation of engagement and agreement with landowner regarding claim arising from animal mortalities relating to electrical infrastructure**<br>✓ **Construction site properly fenced**<br>✓ **Site personnel awareness and action to protect fauna – if found nesting etc.**<br>✓ **Signage and areas requiring protection adequately fenced off**<br>✓ **No stock losses where construction is underway**<br>✓ **No complaints from Landowners and Communities**<br>✓ **No litigation concerning stock** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ |

| | | | | |
|---|---|---|---|---|
| | | | **losses and animal deaths** | |

In addition, the Contractor shall under no circumstances interfere with livestock without the Landowner or Community members being present. This includes the moving of livestock where they interfere with construction activities. Should the Contractors workforce obtain any livestock for consumption, they must be in possession of a written note from the owner. The transportation of meat for consumption shall take into consideration any legal requirements regarding the spreading of disease. No poaching shall be tolerated under any circumstances.

### 4.10.2 Golden Rules

**Communication - have and make available site access plan**

- Crucial to the success of the project in ensuring zero or limited environmental damage is ensuring that all site personnel know and understand the construction site layout. Site personnel need and must know where they can and cannot go and this must be policed. Knowledge on local fauna and avifauna must be communicated to all personnel in a manner that the need for their protection and conservation is fully understood.

**Clear Signage**

- Areas out-of-bounds should be clearly sign posted and if necessary, demarcated with construction/danger tape. A fence dropper/s may be necessary to demarcate a nesting site, however, to avoid unnecessary disturbance it should be placed away from the nest itself.

**Landowner Agreements**

- Access – no access to areas that have not been covered in written agreement/s.
- Culling for rations
- Fencing and injury of livestock by equipment relating to construction and line infrastructure

**No Hunting or Poaching**

- Unless by landowner agreement, hunting is totally prohibited

**Animal & Bird Protection**

- Speed Limit
- Prohibit construction during nesting times
- Adhere to the construction site/landowner property speed limit – be aware of animals crossing the road and birds feeding on carrion in the road.

**Housekeeping**

- The construction site should be well kept at all times and waste disposed in bins designated paper, glass, plastic, rubber and metal/parts.

### 4.10.4 Monitoring

The ECO will conduct fence line checks to determine the state of fencing, particularly its ability to keep livestock out. Areas requiring repair shall be photographed – temporarily repaired and reported to the landowner immediately for more substantial repairs.

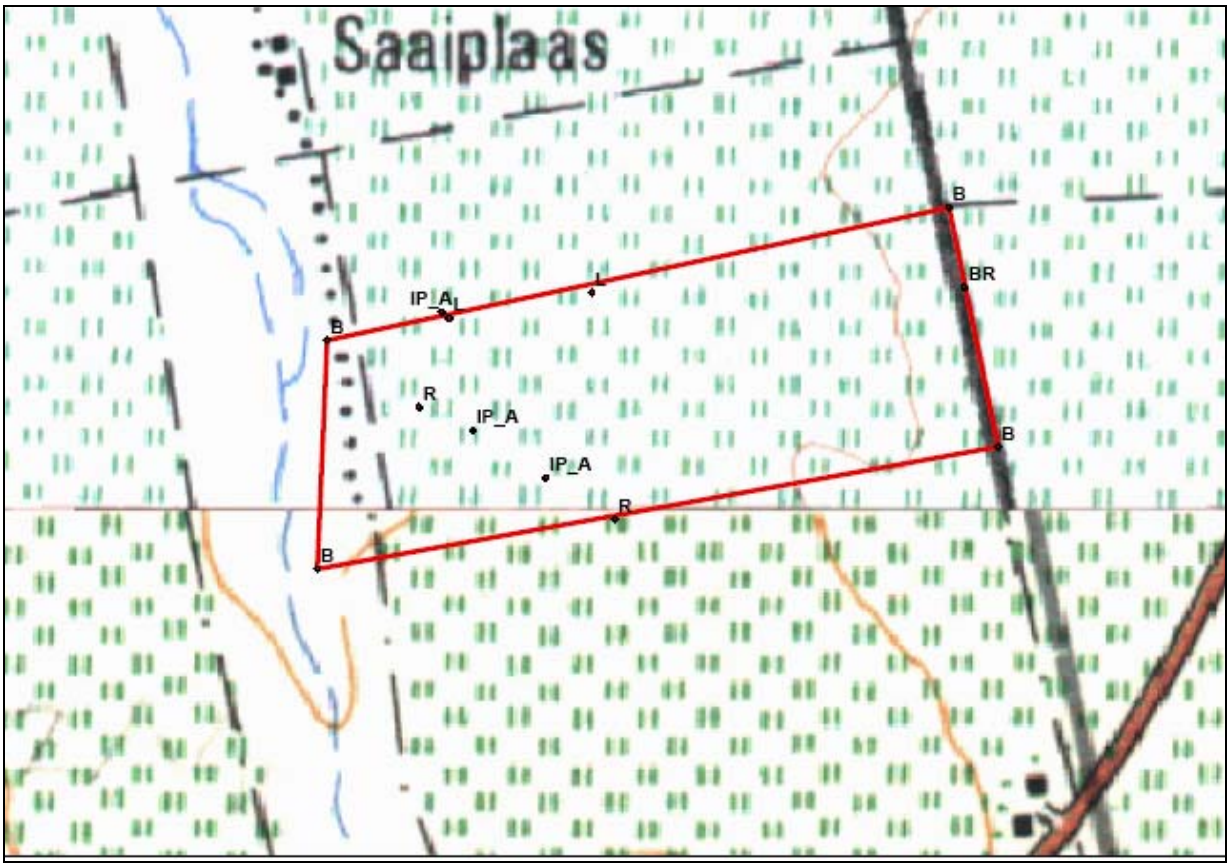
## 4.11 Archaeology (See Appendix 7.4 for Complete Report)

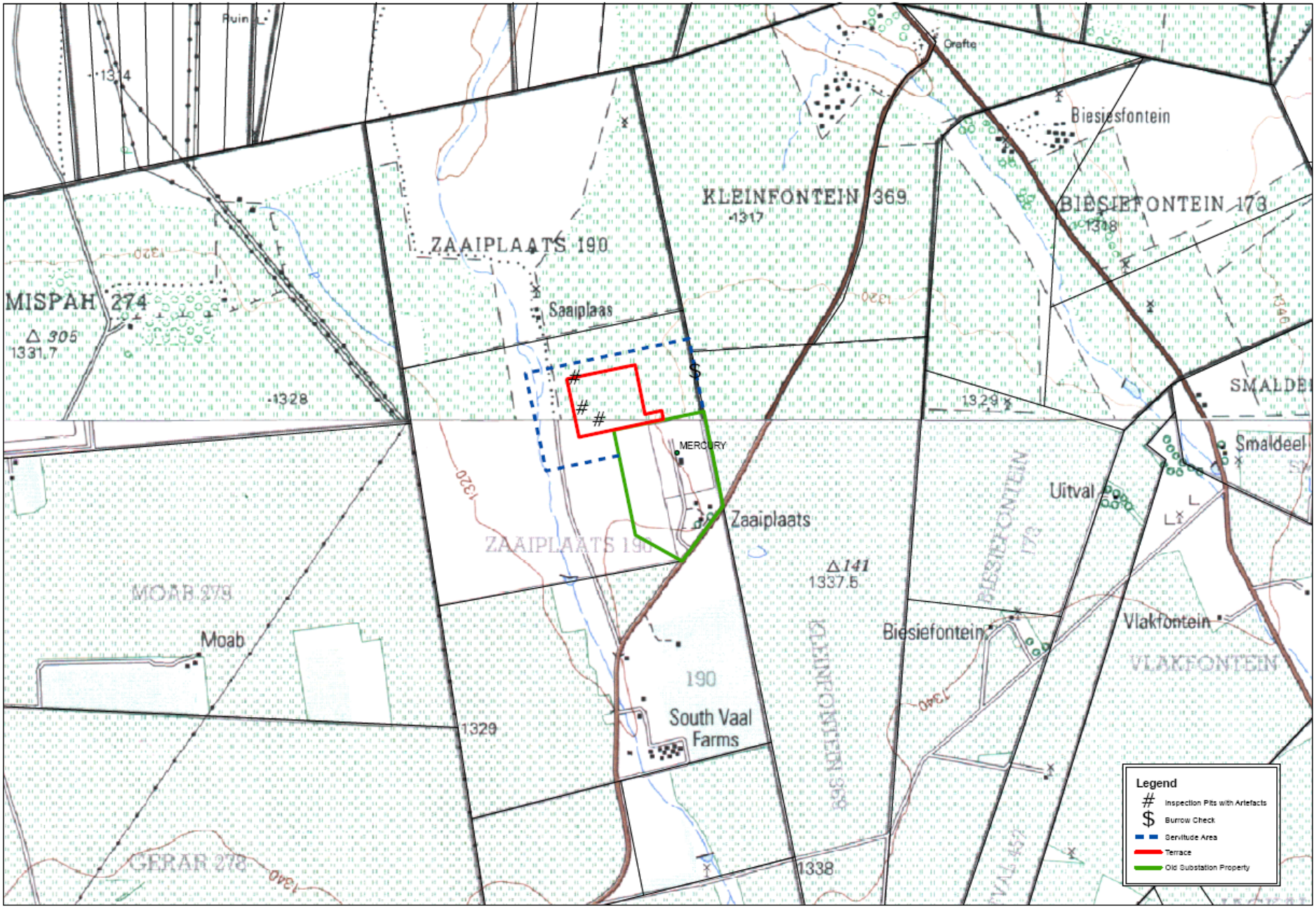
### 4.11.1 Communication for success

Responsibility lies with the Construction Site Manager, ECO and a registered Heritage Authority to ensure that any archaeological finding or existing resource remains protected to augment the national archaeological and heritage register.

The area of the proposed Mercury substation expansion was surveyed on foot. No sites were discovered, but lithic artefacts were discovered in the backfilled inspection pits on the western side of the surveyed area. It is recommended that shovel testing is undertaken to determine the nature of the artefact occurrence.

**Figure** Area surveyed and points where observations were recorded




Ruin
1314
Grafte
Biesiesfontein
KLEINFONTEIN 369
1317
BIESIEFONTEIN 178
1308
ZAAIPLAATS 190
Saaiplaas
MISPAH 274
△ 305
1331.7
1328
1329
SMALDEEL
MERCURY
Smaldeel
Uitval
Zaaiplaats
ZAAIPLAATS 190
△141
1337.5
MOAB 275
Moab
Biesiefontein
Vlakfontein
VLAKFONTEIN
190
South Vaal Farms
1329
1338
GERAR 278
1340
Legend
# Inspection Pits with Artefacts
$ Burrow Check
Servitude Area
Terrace
Old Substation Property

**4.11.2 Summary checklist of reasonable measures mitigating Impacts associated with Archaeological resource/s and relevant performance criteria**

| **Impact** | **Mitigation measure** ☒ | ✓ | **Performance criteria** ☒ | ✓ |
|---|---|---|---|---|
| 1. Damage to existing and newly discovered sites<br>2. Substation foundations may impact on artefact occurrence (depending on depth of both)<br>**3. Additional identified impact/s?** | ✓ **Create awareness amongst construction site personnel**<br>✓ **Archaeological investigation (shovel testpits) to determine significance of artefact occurrence.**<br>✓ **Permit required from SAHRA** | ☐<br>☐<br>☐ | ✓ **Induction of all construction project players on the significance of archaeology and new discoveries**<br>✓ **Proof of contact details of registered authority and local SAHRA representative**<br>✓ **Landowner/Client Agreement regarding protection and access to existing resources**<br>✓ **No destruction of or damage to known archaeological sites**<br>✓ **Management of existing sites and new discoveries in accordance with the recommendations of the Archaeologist**<br>✓ **No destruction of or damage to known sites**<br>✓ **Management of existing sites and new discoveries in accordance with legislation**<br>✓ **No litigation due to destruction of sites** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ |

**Figure** Stone artifacts recorded on site

### 4.11.3 Golden Rules

**Landowner agreements**

- No special conditions requested by land owner. Copy of signed agreement attached in appendix 7.6

**Have and make available site access plan**

- Having knowledge of the site, ensure that archaeologically sensitive areas are kept out-of-bounds and that this is communicated to all construction site personnel. The ECO will ensure that the Contractor and contract workers have been fully briefed about the sensitivity of the graveyard at the start of the contract and that frequent reminders are made in this regard.

**Use Clear Signage and demarcate sites out-of-bounds with fencing**

- Areas requiring protection and conservation should be sign posted and protected using fencing and fence droppers. Measures for marking can include large “Keep Clear” signs. Use of red and white bunting tape should be avoided as it poses a hazard to livestock.

**Regulations and permits**

- In the event of a new archaeological discovery during the process of construction, halt construction, and liase with the ECO to obtain a permit to continue. The ECO should contact the specialist archaeologist if specialist input is required:
    - Dr Zoë Henderson or Christelle Koortzen at the National History Museum, Bloemfontein, Tel:051 447 9609

**Use spotters**

- If a site, through previous survey, is known to have archaeological heritage, trained spotters must be used to act as the eyes for operators of plant such as bulldozer and TLB. This role requires strict adherence to the Safety Rule of being highly visible and a luminescent safety vest in recommended.

**4.11.4 Archaeological Survey Findings** (See Appendix 7.4 for complete report)

**4.11.4.1Construction camp position in relation to Archaeological resource/s** (Refer to Drawing 0-WT-557 and specialist archaeological report in Appendix 7.4)

The construction camp will be located on the eastern side of the site, more than 300m from the sites identified during the field survey. Hence the risk of impact on heritage resources is seen to be low. The main risk of any impact lies with the substation footprint itself, particularly in the western areas of the site.

The foundations of the substation (pylons and buildings) will have an impact on subsurface material, depending on the depth of the foundations and the material. It appears that there is subsurface material on the western side of the substation expansion area. The following recommendation is made: That shovel testing (under permit from SAHRA) is carried out in the south-western side of the proposed substation area. On the basis of the shovel test pits, further mitigation, or not, will be recommended. A small area of the inspection pit should be opened to reveal the profile of the pit, and the opened area can be extended slightly in order to understand the nature of the artefact occurrence.

It is relevant here that the archaeologist has rated the site as “Generally Protected B” which requires that, should shovel tests reveal further artifacts, the site should be recorded before destruction due to construction occurs. It is therefore considered unlikely that there will be any findings that will be prevent construction. It is, however, important that the shovel tests are carried out in good time for the construction programme.

*NOTE: Should the developer encounter any heritage resources, not reported on in this document, and as defined and protected by the NHRA (1999) during the course of development, the developer should immediately cease operation in the immediate vicinity and report the site to SAHRA or an ASAPA accredited CRM archaeologist (see contact above).*

### 4.11.5 Monitoring

All monuments and historical sites shall be treated with the utmost respect. Any graves shall be clearly marked and treated as no go areas. No destruction of any site shall be allowed. The graveyards will be fenced and a gate will be installed to allow access to family members.

- Trained spotters should be observing the process of construction excavation and must halt the process if the presence of any artefacts is realized. The spotter's should be trained by an accredited archaeologist (see contact details for the National History Museum, Bloemfontein).
- The ECO's reports should include reports on the heritage issues on site.

## 4.12 Receiving Society Infrastructure

### 4.12.1 Communication for success

Engagement with the landowner by the contractor regarding local service networks is crucial to facilitate integration of the Contractor project team – inclusive of all site personnel, into the local society for the duration of the project. The Contractor should use the following list as a starting point and from which relevant contact details should be obtained and arrangements made:

- Local NGO's – e.g. Famsa, conservation bodies and landowner associations
- Local Security Service providers
- Local Police Contact details
- Local Fire Protection Officer details
- Local General Supply Store or Co-op details

A development project of this nature may have some social impact. Within a National context of striving for ecosystem health, the positive impacts that development projects can bring into an area must be highlighted and used to uplift local communities. Some positive impacts would be:

- To enhance education of the local populace – ABET, Basic Money Management; to
- Improve community health through education about disease, particularly – HIV Aids and Tuberculosis; and
- Provide temporary employment.

A perceived negative impact associated with construction has always been increase in local crime levels. The above listed positive impacts plus diligent management of construction site security and personnel can offset this negative perception.

### 4.12.2 Summary checklist of reasonable measures mitigating Impacts associated with Receiving Society Infrastructure and relevant performance criteria

| Impact | Mitigation measure ☒ | ✓ | Performance criteria ☒ | ✓ |
|---|---|---|---|---|
| 1. Not paying a living wage and outcome of poverty stimulation including disease and crime<br>2. Damage to landowner income producing infrastructure and theft of equipment<br>3. HIV Aids & TB risks<br>4. Unwanted pregnancy<br>**5.** Increased exposure of lower income levels to credit risk and substance abuse<br>**6. Additional identified impact/s?** | ✓ **Paying living wages in line with the construction industry standards**<br>✓ **Education plans for health, handling money and Adult Basic Education and Training (ABET)**<br>✓ **Arrangements for construction site medical health including availability of condoms**<br>✓ **Inductions** | ☐<br>☐<br>☐<br>☐ | ✓ **No complaints from Landowners, Regional staff or Communities**<br>✓ **No damage to private property**<br>✓ **No unplanned disruptions of services**<br>✓ **No damage to any plant or installations**<br>✓ **No complaints from Authorities, Landowners and Communities regarding disruption of services**<br>✓ **No litigation due to losses of plant, installations and income**<br>✓ **Proof of educational arrangements for health, handling money and Adult Basic Education and Training (ABET) including schedule and contact details of local teacher/s** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ |

### 4.12.3 Golden Rules

**Landowner agreements**

- Agreement relating to existing landowner infrastructure and condition prior to construction establishment must be captured and agreed by the landowner and contractor.

**Education schedules**

- As part of general health and safety, the contractor shall provide a schedule of informative presentations on HIV Aids and Tuberculosis education and avoidance. Condoms will be made available to all construction site personnel. The contractor will provide and carry out a schedule on judicious management of personal finances including safe use of ATM banking facilities. Provide and implement an education schedule for basic literacy.

**Inductions**

- All construction site personnel must be completely familiar with the construction site layout and areas requested out-of-bounds by the landowner.

**Construction site personnel identification**

- The contractor shall have on record and available on site the identities of all construction staff.

### 4.12.4 Construction camp position in relation to Receiving Society Infrastructure

If and where the substation is close to any inhabited area, the necessary precautions shall be taken by the Contractor to safeguard the lives and property of the inhabitants. The Contractor shall under no circumstances interfere with the property of Landowners, Regional staff or nearby Communities.

No interruptions other than those negotiated shall be allowed to any essential services. Damage to infrastructure shall not be tolerated. The contractor shall rectify any damage immediately. A record of any damage and remedial actions shall be kept on site.

All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties. Speed limits shall be enforced in such areas and all drivers shall be sensitised to this effect.

Any possible disruptions to essential services must be kept to a minimum and should be well advertised and communicated to the Landowners and surrounding Communities. Care must be taken not to damage irrigation equipment, lines, channels and crops, as this could lead to major claims being instituted against Eskom and the Contractor. The position of all pipelines and irrigation lines in the vicinity of a site must be obtained from the Landowners or local Community and clearly marked. Where required such lines shall be deviated.

### 4.12.5 Monitoring

Site induction must be provided to all new recruits to the construction site. In addition to an introduction to the specific site development, induction should include; Health & Site Safety Procedures, AIDS awareness, Family Planning, Life Skills etc. Local NGO’s may be approached for their inputs in these endeavours.

## 4.13 Noise

### 4.13.1 Communication for success

The Contractor shall ensure that noise levels remain within acceptable limits, especially in built up areas. This applies especially after working hours and during the night.

### 4.13.2 Summary checklist of reasonable measures mitigating Impacts associated with construction site noise and relevant performance criteria

| **Impact** | **Mitigation measure** ☒ | ✓ | **Performance criteria** ☒ | ✓ |
|---|---|---|---|---|
| 1. Nuisance and negative influence on relations<br>2. Project delays<br>**3. Additional identified impact/s?** | ✓ **Engage with landowner regarding work times to ensure that they coincide with landowner work times**<br>✓ **Do not work outside of the agreed hours**<br>✓ **If an activity is reported to be too noisy – monitor it according to construction site standards and make the necessary arrangements to improve on lowering associated the decibel level** | ☐<br>☐<br>☐ | ✓ **Keep record of general complaints including noise or off-duty rowdiness of site personnel received from Landowner or community – show proof of arrangements to improve the situation**<br>✓ **No complaints from landowner or community**<br>✓ **No litigation**<br>✓ **No formal complaints or claims arising due to noise pollution** | ☐<br>☐<br>☐<br>☐ |

### 4.13.3 Golden Rules

**You are a guest – behave accordingly**

### 4.13.4 Monitoring

As this particular site is largely isolated the standard for noise tolerance will need to be negotiated between the Landowner and the Contractor Site Manager. A starting point would be to keep to normal working hours thereby mitigating the possibility of raised noise levels after hours. The contractor must give consideration to the very real possibility that the Landowner may entertain guests during the week and on weekends. Any after hours working is to be agreed with adjacent landowners. Furthermore efforts should be made to ensure that contractor site personnel are courteous and do not engage in raucous weekend parties.

## 4.14 Dust

### 4.14.1 Communication for success

The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the Landowner, neighbouring Communities or Regional staff at the substation. Watering of access roads is recommended, as this is normally the greatest cause of dust pollution. Speed limits can also be affected, especially on private dirt roads leading to the site. The Contractor shall attend to any complaints or claims emanating from the lack of dust control immediately.

### 4.14.2 Summary checklist of reasonable measures mitigating Impacts associated with construction site dust and relevant performance criteria

| **Impact** | **Mitigation measure** ☒ | ✓ | **Performance criteria** ☒ | ✓ |
|---|---|---|---|---|
| 1. Nuisance and negative influence on relations<br>2. Project delays<br>**3. Additional identified impact/s?** | ✓ **Engage with landowner regarding work times to ensure that they coincide with landowner work times**<br>✓ **Do not work outside of the agreed hours**<br>✓ **If an activity is reported to be too dusty – monitor it according to construction site standards and make the necessary arrangements to improve on lowering the associated decibel level** | ☐<br>☐<br>☐ | ✓ **Keep record of general complaints including noise or off-duty rowdiness of site personnel received from Landowner or community – show proof of arrangements to improve the situation**<br>✓ **No complaints from landowner or community**<br>✓ **No litigation**<br>✓ **No formal complaints or claims arising due to dust pollution** | ☐<br>☐<br>☐<br>☐ |

### 4.14.3 Golden Rules

**You are a guest – behave accordingly**

### 4.14.4 Monitoring

The ECO is to carryout spot checks on the operation of the water tanker – dust is to be wetted down regularly, particularly after road use by heavy vehicles and the dry winter months. If dust becomes a nuisance and complaints are received despite wetting the road/s, then dust monitoring of dust levels should be employed to prove to the Interested and Affected Parties that the levels are inside those deemed bearable for operators working on construction site and the general public.

## 4.15 House Keeping of Construction Site

### 4.15.1 Communication for success

It is said that if a construction site camp is neatly kept and all is kept in it's place, then generally, it reflects good site management. Furthermore, such an appearance generally reflects that the rules are understood and implemented and the project is running smoothly. Considering this, it is the responsibility of the Contractor Site Manager to enforce cleanliness of the construction site camp. The ECO will monitor, police and report on this performance requirement. Littering by the employees of the Contractor shall not be allowed under any circumstances.

The site shall be kept visually and aesthetically pleasing, especially in and around the Contractor camp. The ECO shall regularly inspect the site to ensure that it is neat and clean. Where required the campsite shall be screened by the Contractor to ensure that there is no unacceptable visual intrusion in the area of the site. Screening may be required in certain circumstances where visual impacts are sensitive, though these are not expected on this site.

### 4.15.2 Summary checklist of reasonable measures mitigating Impacts associated with construction site Housekeeping and general cleanliness and relevant performance criteria

| **Impact** | **Mitigation measure** ☒ | ✓ | **Performance criteria** ☒ | ✓ |
|---|---|---|---|---|
| 1. Nuisance and negative influence on relations<br>2. Project delays<br>**3. Additional identified impact/s?** | ✓ **Engage with landowner regarding work times to ensure that they coincide with landowner work times**<br>✓ **Do not work outside of the agreed hours**<br>✓ **If an activity is reported to be too dusty – monitor it according to construction site standards and make the necessary arrangements to improve on lowering the associated decibel level** | ☐<br>☐<br>☐ | ✓ **Keep record of general complaints including noise or off-duty rowdiness of site personnel received from Landowner or community – show proof of arrangements to improve the situation**<br>✓ **No complaints from landowner or community**<br>✓ **No litigation**<br>✓ **No formal complaints or claims arising due to poor house keeping**<br>✓ **No complaints from affected parties on or around the site**<br>✓ **Filed photographic record of non-compliance** | ☐<br>☐<br>☐<br>☐<br>☐<br>☐ |

### 4.15.3 Golden Rules

**You are a guest – behave accordingly**

### 4.15.4 Monitoring

The ECO shall demand a neatly kept construction site at all times and have the contrary rectified immediately by the Contractor Site Manager.

## 4.16 Sensitive Electrical Equipment/Assets

### 4.16.1 Communication for success

Once the contractor has received equipment for which the infrastructure is being built, it is his responsibility to keep it safe and in delivery condition until installed.

All equipment moved onto site or off site during a project is subject to the legal requirements as well as Eskom specifications for the transport of such equipment. Oil filled equipment such as CT's, VT's and capacitor cans have specific safety requirements regarding their handling, transport and storage. The Contractor shall meet these safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place.

It is understood there is no equipment planned for the site that contains PCBs (Poly Chloro-Biphenyls). However, old equipment removed from the site may contain PCBs and the Contractor will need to follow the requirements of Eskom Corporate Directive ESKADAAO3 REV 1.

**The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken in the event of an accident and shall supply a method statement to that effect.**

### 4.16.2 Summary checklist of reasonable measures mitigating Impacts associated with Sensitive Electrical Equipment/Assets and relevant performance criteria

| **Impact** | **Mitigation measure** ☒ | ✓ | **Performance criteria** ☒ | ✓ |
|---|---|---|---|---|
| 1. Damage to equipment in handling<br>2. Damage to equipment in storage prior to installation<br>3. Damage to equipment during installation<br>4. Removal of old equipment from site.<br>**5. Additional identified impact/s?** | ✓ **Eskom competent to supervise offloading**<br>✓ **Eskom competent to ensure safe storage**<br>✓ **Eskom competent to supervise installation**<br>✓ **Check for PCBs and hazardous substances** | ☐<br>☐<br>☐<br>☐ | ✓ **All equipment delivered to site intact**<br>✓ **No spillage of hazardous substances**<br>✓ **No litigation due to environmental pollution**<br>✓ **Safe transport of equipment** | ☐<br>☐<br>☐<br>☐ |

### 4.16.3 Golden Rules

**Sensitive Electrical Equipment/Assets are Eskom's property**

- Unless instructed in writing, the contractor shall have nothing to do with Sensitive Electrical Equipment/Assets

**Keep Sensitive Electrical Equipment/Assets Safe**

### 4.16.4 Monitoring

Eskom shall check its sensitive equipment stored on site and report any damage caused by mishandling at delivery, vandalism and curiosity during storage and breakage due to lack of experience during installation/erection.

## 4.17 Induction and Training

### 4.17.1 Communication for success

It is generally agreed that personnel who are afforded training perform their tasks better and this is a prerequisite for compliance to the Environmental Management Programme.

All site personnel are to undergo a full induction covering the contents of this document and primarily delivered by the ECO and Construction Site Manager.

The Contractor is to ensure that all site personnel are trained to fulfil their operational responsibilities. The ECO will check for proof of this requirement. In the case of training in:

- Basic Fire-fighting,
- Herbicide use, and
- Vegetation identification etc.,

There may be a necessity for training on the job. If this is the case then the Contractor must factor this into his training budget. The services of accredited trainers are to be engaged – preferably local, for on site training. Similarly, adult basic education and life skills training costs need to be taken into account by the contractor. Spotters for archaeological artefacts should undergo an induction by registered SAHRA representatives.

### 4.17.2 Summary checklist of reasonable measures mitigating Impacts associated with Induction and relevant performance criteria

| **Impact** | **Mitigation measure** ☒ | ✓ | **Performance criteria** ☒ | ✓ |
|---|---|---|---|---|
| No training = risk of non-compliance<br>**Additional identified impact/s?** | ✓ **All site personnel to receive a full induction on the contents of this document**<br>✓ **Unskilled individuals will be up-skilled**<br>✓ **Basic Life Skills will be taught throughout the duration of the project** | ☐<br>☐<br>☐ | ✓ **Proof of certification of personnel and operators**<br>✓ **Accredited trainer**<br>✓ **Proof of ABET, FAMSA & Basic Life Skills programme and implementation for the duration of the project** | ☐<br>☐<br>☐ |

### 4.17.3 Golden Rules

**All site personnel will undergo and induction and sign their receipt thereof**

### 4.17.4 Monitoring

Contractor Site Manager to supply proof on request of signed documentation proving existing and new staff have been operationally trained and have received an induction covering comprehensively the contents of this document

## 5.0 METHOD STATEMENTS FOR THE CONTRACT

The Contractor shall supply method statements for all works required as stated throughout this document **as per specific contract requirement**. All agreements regarding **extra works for environmental compliance** shall be in writing and well documented. Work shall only commence upon approval by Eskom.

The ECO shall ensure that all works are in accordance with method statements and contract specifications.

## 6.0 LEGAL & CLIENT GUIDELINE REGISTER

- Conservation of Agricultural Resources Act, Act 43 of 1983 and amendments
- Corporate directive for the management of PCB, ESKADAAO3 REV 1
- Environmental Impact Report
- Eskom Environmental Policy, ESKPBAAD6 REV 6
- Eskom Environmental Management Procedure, ESKPVAAZ1 REV 1
- Eskom Guidelines for Herbicide Use, TRR/S91/032
- Environment Conservation Act, Act 73 of 1989 and amendments
- National Environment Management Act, Act 107 of 1998
- Fencing Act, Act 31 of 1963 and amendments
- Forest Act, Act 122 of 1984 and amendments
- Hazardous Substances Act, 15 of 1973 and amendments
- Herbicide Management, ESKPBAAD4 REV 0
- Record of Decision – DEAT
- Standard passive fire protection for oil-filled equipment in High Voltage yards, TRMASAAQ8 REV4
- Standard for management of PCB, ESKASAAC2 REV1
- National Heritage Resources Act no. 25 of 1999

## 7.0 APPENDICES

7.1 *Pro forma* requiring contractor and Eskom Project Manager signatures
7.2 Site Drawings
Drawing 323-G-002: Location Plan (A3)
Drawing 323-G-006: Mercury Aerial View (A3)
Drawing 323-G-006a: Mercury Aerial of Site & Wetland (A3)
Drawing 0-WT-557: Mercury Site Layout (A3)
Drawing 0-WT-557: Mercury Site Layout (A0)
Drawing 323-G-009: Wetland Area (A3)
Drawing 0.54/3754: Oil Transformer Holding Dam (A3)
7.3 Ecology Specialist Report
7.4 Heritage Specialist Report
7.5 Wetland Delineation Report
7.6 DEAT Record of Decision

*Note: Unfortunately the aerial photographs in Dwgs 323-G-006 and 323-G-006a are not of high quality, but they give an overall impression of landuse and location of the main site features and proposed infrastructure.*

# APPENDIX 7.1

**PRO FORMA TO BE SIGNED BY THE CONTRACTOR AND ESKOM PROJECT MANAGER**

CONTRACT NAME: _____

CONTRACT NUMBER: _____

**ENVIRONMENTAL COMPLIANCE**

I_____ ON BEHALF OF _____(C)

I _____ ON BEHALF OF ESKOM

DECLARE AS FOLLOWS:

1. I AM AWARE THAT OPERATIONAL MAINTENANCE ACTIVITIES CAN HAVE A MAJOR IMPACT ON THE ENVIRONMENT.
2. I UNDERTAKE TO ADHERE TO THE REQUIREMENTS AS SET OUT IN THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND THE RECORD OF DECISION FROM DEAT.
3. I PLEDGE TO INFORM ALL SITE STAFF OF THEIR INVOLVEMENT IN MANAGING ENVIRONMENTAL IMPACTS ON SITE.
4. I COMMIT TO IMPLEMENTING ENVIRONMENTAL BEST PRACTISE ON SITE AT ALL TIMES DURING THE CONTRACT.

SIGNED: _____ DATE: _____

CONTRACTOR

SIGNED: _____ DATE: _____

ESKOM

# APPENDIX 7.2 – SITE DRAWINGS

Drawing 323-G-002: Location Plan (A3)
Drawing Indicating Terrace Area
Drawing 323-G-006: Mercury Aerial View (A3)
Drawing 323-G-006a: Mercury Aerial of Site & Wetland (A3)
Drawing 0-WT-557: Mercury Site Layout (A0)
Drawing 0-WT-557: Mercury Site Layout (A0)
Drawing 323-G-009: Wetland Area (A3)
Drawing 0.54/3754: Oil Transformer Holding Dam (A3)

# APPENDIX 7.3 – ECOLOGY SPECIALIST REPORT

# APPENDIX 7.4 – HERITAGE SPECIALIST REPORT

# APPENDIX 7.5 – WETLAND DELINEATION REPORT

# APPENDIX 7.6 –-DEAT RECORD OF DECISION