



The Proposed Upgrade and new Construction related to the Development of the Swaziland Rail Link Project for the Davel to Nerston section Mpumalanga  
Environmental Management Programme

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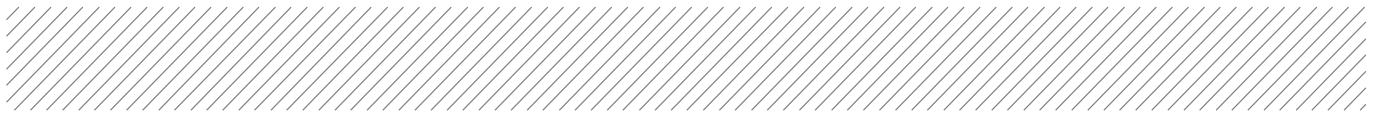
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# Contents

<b>1</b>	<b>CONTEXT AND INSTITUTIONAL MATTERS</b>	<b>1</b>
1.1	Background to the project	1
1.2	Project locality	3
1.3	Purpose of this document	3
1.4	Legislative context	4
<b>2</b>	<b>ROLES AND RESPONSIBILITIES</b>	<b>9</b>
2.1	Environmental Control Officer	9
2.2	Engineer	9
2.3	Contractor	9
2.4	Contractor's Environmental Control Officer (CECO)	9
2.5	Organisational and Institutional arrangements	11
2.6	Monitoring and auditing framework	11
<b>3</b>	<b>COMMITTEES TO BE ESTABLISHED</b>	<b>13</b>
<b>4</b>	<b>DESCRIPTION OF ACTIVITIES</b>	<b>15</b>
4.1	Pre-construction and construction phase	15
4.2	Rehabilitation	16
<b>5</b>	<b>SUMMARY OF IMPACTS AND ASSOCIATED MITIGATION MEASURES</b>	<b>17</b>
<b>6</b>	<b>PRE-CONSTRUCTION AND CONSTRUCTION ENVIRONMENTAL MANAGEMENT</b>	<b>18</b>
<b>7</b>	<b>MATERIALS</b>	<b>30</b>
<b>8</b>	<b>WASTE</b>	<b>34</b>
<b>9</b>	<b>SURROUNDING LAND</b>	<b>37</b>
<b>10</b>	<b>FLORA AND FAUNA</b>	<b>39</b>
<b>11</b>	<b>AIR QUALITY</b>	<b>44</b>
<b>12</b>	<b>WATER</b>	<b>45</b>
<b>13</b>	<b>NOISE</b>	<b>47</b>
<b>14</b>	<b>SOCIAL</b>	<b>48</b>
<b>15</b>	<b>ARCHAEOLOGICAL AND HERITAGE SITES</b>	<b>51</b>
<b>16</b>	<b>PLANNING AND ENGINEERING</b>	<b>54</b>
<b>17</b>	<b>OPERATIONAL &amp; MAINTENANCE ENVIRONMENTAL MANAGEMENT</b>	<b>Error! Bookmark not defined.</b>
<b>18</b>	<b>REHABILITATION</b>	<b>58</b>



## Figures

Figure 1: General layout of the entire Swaziland Rail Link from Davel to Nsezi. The Davel Rail Yard is to the left of the figure, indicated as the Proposed New Rail Yard	2
Figure 2: Proposed organisational and reporting structure	11

## Tables

Table 1: Impacts and mitigation table	18
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# 1 CONTEXT AND INSTITUTIONAL MATTERS

## 1.1 Background to the project

AURECON South Africa (Pty) Ltd, a leading consulting engineering and environmental firm both locally and internationally, was appointed by Transnet to assist in the compilation of the required Environmental Management Programme (EMPr) and to submit the programme to the Department of Environmental Affairs (DEA) for acceptance after which it will form part of the environmental obligations of Transnet and its appointed contractors during the construction phase of the project.

Transnet SOC Limited (hereafter referred to as Transnet) is a government (state) owned company (SOC) and is the custodian of South Africa's railway, ports and pipelines, thereby responsible for delivering reliable freight transport and handling services that satisfy customer demand.

As such, Transnet in collaboration with Swaziland Railway identified the construction and upgrade of the railway line between Davel in Mpumalanga and Richards Bay in KwaZulu-Natal, connecting via the Swaziland rail network, as a strategic project (Figure 1). The aim of the project is to unlock the potential of a multinational strategic rail corridor and divert general freight traffic off the dedicated heavy haul Richards Bay coal line which runs from Ermelo through rural KwaZulu-Natal to Richards Bay.

The project activities for the upgrading and new construction of the Davel to Nerston section of the Swaziland Rail Link project will consist of various works, including the upgrading of existing railway sections (including re-building certain sections and the construction of an entirely new railway line from Lothair to Nerston. All existing railway line sections (Davel to Lothair) will require upgrading in the form of track and formation rehabilitation, easing of curves and gradients as well as realignment or deviations outside of the rail reserve to achieve the objective.

The line will thus be upgraded from the Davel Yard through to Breyton, Breyton to Buhrmanskop and from Buhrmanskop to Lothair. The new rail link will commence in Lothair and travel to the Swaziland border (Nerston). This EMPr therefore covers activities related to both the upgrading of the existing line from Davel to Lothair and the construction of the new rail link from Lothair to the border.

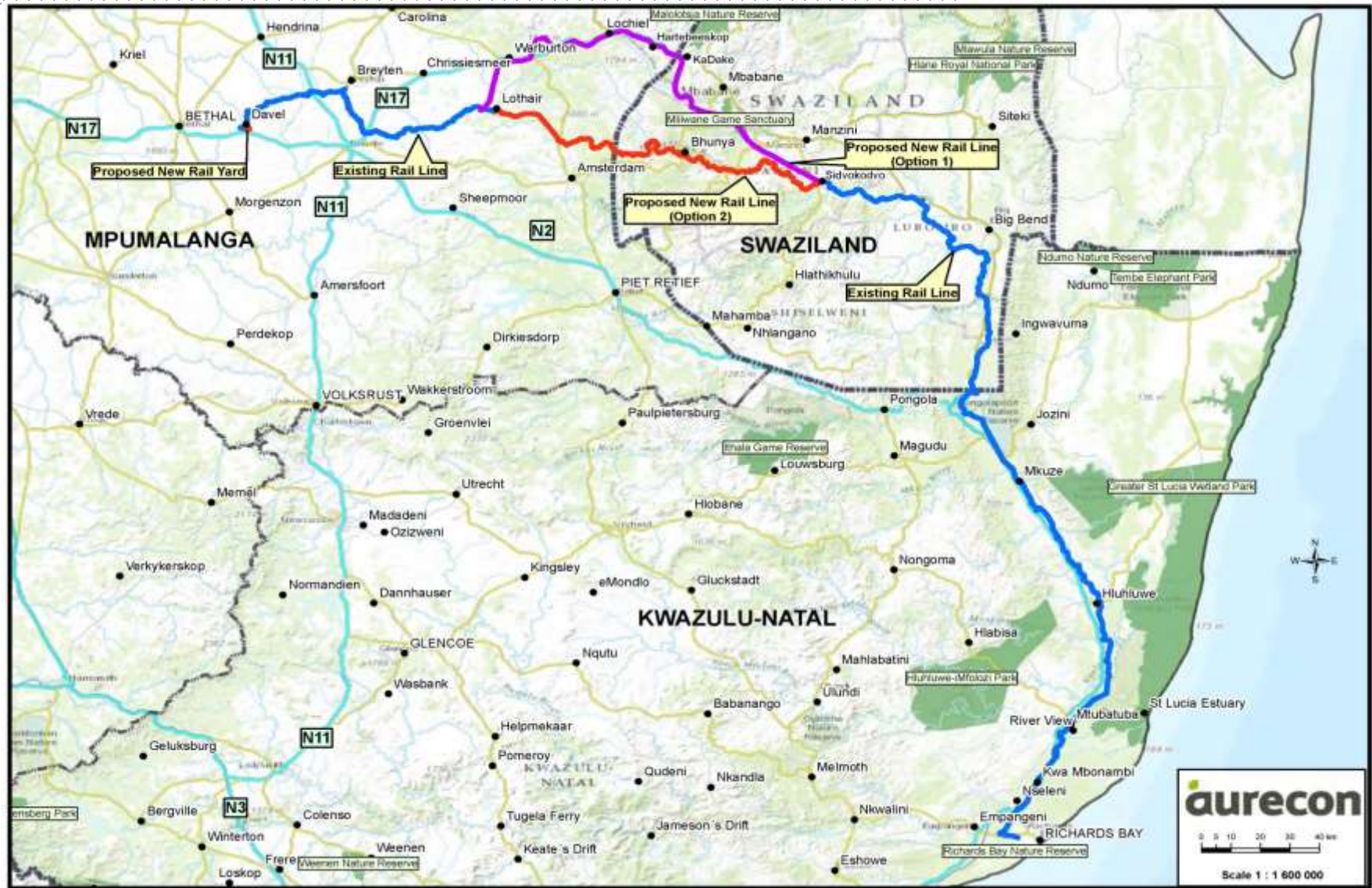


Figure 1: General layout of the entire Swaziland Rail Link between Davel to Nsezi.

## 1.2 Project locality

The project runs along the existing Transnet railway line from the Davel yard to Lothair and from there along a new corridor to the Swaziland border as described above. The alignment is proposed within the jurisdictional boundaries of the Msukuligwa and Mkhondo municipalities.

Figure illustrates the section from Davel to Nerston, including the additional route alternative as proposed by the Lothair farmers during the Scoping Phase. This alternative was assessed as part of the specialist assessments during the EIA phase.

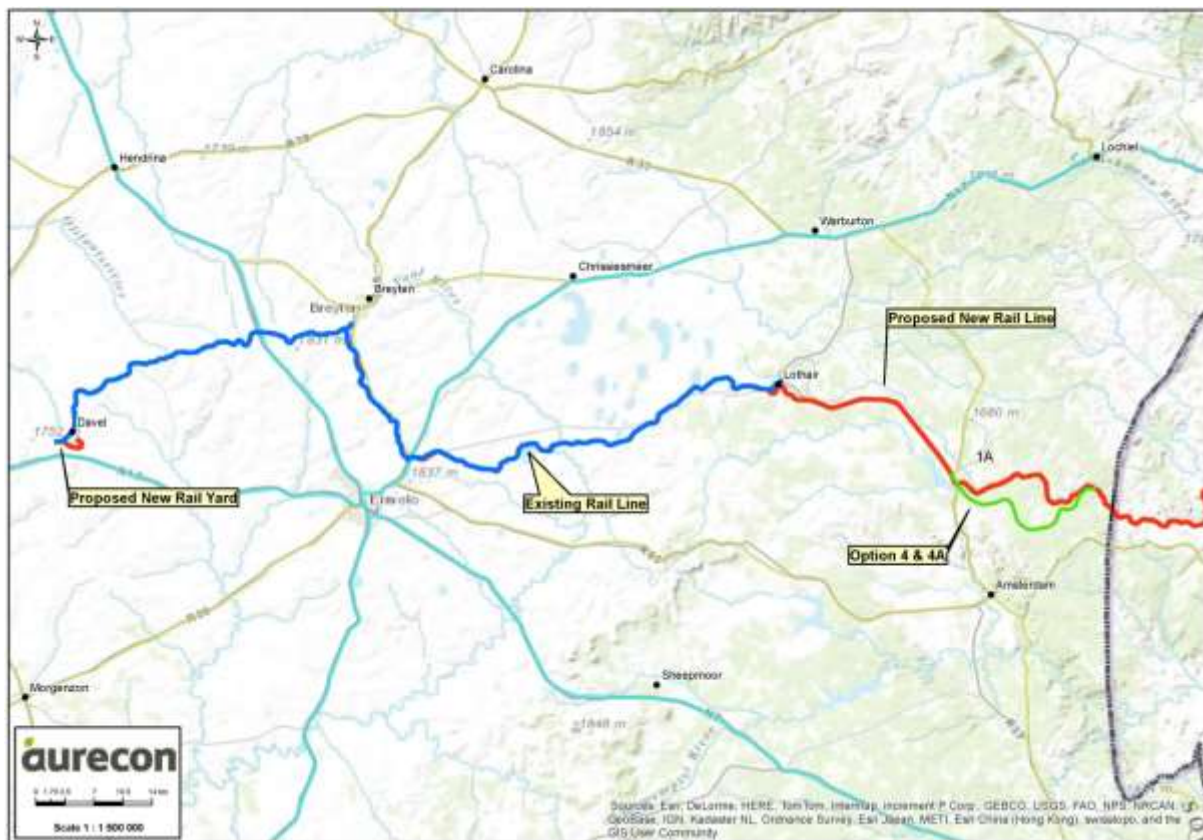



Figure 2: The proposed rail upgrade (blue line) and new rail link (red line) section from Davel to Nerston. The green line indicates the new proposed route alignment also assessed in the EIA.

## 1.3 Purpose of this document

The purpose of this document is to provide guidelines for environmental best practice to the Proponent and its Contractor commissioned to construct the proposed railway line. This document shall be seen as part of the contract. **The EMPr will thus be part of the enquiry document to make the recommendations and constraints, as set out in this document, enforceable under the general conditions of contract.**

**The EMPr has a long-term objective to ensure that:**



- 
- 1) Environmental Management considerations are implemented from the start of the project,
  - 2) Precautions against damage and claims arising from damage are taken timeously, and
  - 3) The completion date of the contract is not delayed due to problems with Landowners arising during the course of construction.

**Transnet requires a commitment from the Project Manager and Contractor on the following issues:**

- 1) *Take into consideration the surrounding Landowners as the railway line traverses private property.*
- 2) *Always behave professionally on and off site.*
- 3) *Ensure quality in all work done, technical and environmental.*
- 4) *Resolve problems and claims arising from damage immediately to ensure a smooth flow of operations.*
- 5) *To underwrite Transnet's Environmental Policy at all times.*
- 6) *To use this EMPr for the benefit of all involved.*
- 7) *To preserve the natural environment by limiting destructive actions on site.*

**Environmental input into tender drafting and adjudication:**

It must be ensured that relevant environmental management specifications as contained in the EMPr are incorporated into the tender and contract documentation. Relevant payment items must be incorporated into the bill of quantities. During the tender evaluations, the ability of the possible contractors to adequately manage the environmental issues must be assessed.

## **1.4 Legislative context**

### **1.4.1 National requirements**

This EMPr has been compiled in terms of the EIA Regulations, published in accordance with Section 33 of the Environmental Impact Assessment Regulations, promulgated in GN R543 of 18 June 2010, which provides a framework for the content and intent of an EMPr. The provisions of the Transnet Capital Projects Environmental Management: Construction Environmental Management Plan (CEMP) has been incorporated into the EMPr. The EMPr also follows the rationale of the ISO 14001: Environmental Management System international standard in that it addresses and differentiates between *Activity, Aspect, Impact, Mitigatory Measures, Performance Indicators, Responsibility, Resources and Time Schedule*.

The following legislation is applicable to the Swaziland Rail Link project:


- Constitution of the Republic of South Africa (Act No. 108 of 1996)
- National Environmental Management Act (Act No. 107 of 1998)
  - National Environmental Management Act (Act No. 107 OF 1998) Environmental Impact Assessment Regulations (Notice No. R543 of 2010)
  - National Environmental Management Act (Act No. 107 of 1998) Listing Notice 1: List of Activities and Competent Authorities Identified in Terms of Sections 24(2) and 24D (Notice No. R544 of 2010)

- National Environmental Management Act (Act No. 107 of 1998) Listing Notice 2: List of Activities and Competent Authorities Identified in Terms of Sections 24(2) and 24D (Notice No. R545 of 2010)
- National Environmental Management Act (Act No. 107 of 1998) Listing Notice 3: List of Activities and Competent Authorities Identified in Terms of Sections 24(2) and 24D (Notice No. R546 of 2010)
- National Environmental Management: Biodiversity Act (Act no 10 of 2004)
- National Heritage Resources Act (Act No. 25 of 1999)
- National Water Act (Act No. 36 of 1998)
- Subdivision of Agricultural Land Act (Act No. 70 of 1970)
- National Forests Act (Act No. 84 of 1998)
  - Notice of List of Protected Tree Species under the National Forests Act 84 of 1998 (Published under Government Notice 817 of 2007 (in Government Gazette 30253 of 7 September 2007))
- Conservation of Agricultural Resources Act (Act No. 43 of 1983)
- National Environmental Management: Waste Act (Act No. 59 of 2008)
  - National Environmental Management: Waste Act (Act No. 59 of 2008) List of Waste Management Activities That Have, or are Likely to Have a Significant Detrimental Effect on the Environment (Published under Government Notice 718 in Government Gazette 32368 of 3 July 2009)
- National Environmental Management: Air Quality Act (Act No. 39 of 2004)
  - National Environmental Management: Air Quality Act (Act No. 39 of 2004) List of Activities which Result in Atmospheric Emissions which Have or May Have a Significant Detrimental Effect on the Environment, Including Health, Social Conditions, Economic Conditions, Ecological Conditions or Cultural Heritage (Published under Government Notice 248 in Government Gazette 33064 of 31 March 2010)
- Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)
- Environment Conservation Act (Act No. 73 of 1989)
  - Regulations in terms of section 25 – Noise Control (Published by Government Notice R154 in Government Gazette 13717 of 10 January 1992)
- Planning Development Act (Act No. 200 of 1993)
- National Land Transport Act, (Act No. 5 of 2009)

## 1.4.2 Permit requirements

### 1.4.2.1 Heritage notification and/or approval

The National Heritage Resources Act (Act No. 25 of 1999) Section 28 requires that for certain developments, for example linear developments or barriers exceeding 300 m in length (railway lines), the applicant must at the very earliest stages of initiating the development, notify the responsible



heritage resources authority and provide it with details regarding the location, nature and extent of the proposed development.

The heritage resources authority may require the applicant to undertake a Heritage Impact Assessment process, although Section 38 (8) states that if heritage issues are adequately dealt with in the EIA this may not be required. However, it is the consultant's opinion that a Heritage Impact Assessment will need to be undertaken.

If there are any protected heritage resources encountered along the route, a heritage permit may be required. This allows the holder to perform specified actions in relation to particular categories of protected heritage resources.

#### **1.4.2.2 Water use license**

A Water Use Licence may be required in terms of the National Water Act (Act No. 36 of 1998) section 21, where water use (relevant to this project) is defined as:

- a) abstracting water from a water resource;
- c) Impeding or diverting the flow of water in a watercourse;
- i) Altering the bed, banks, course or characteristics of a watercourse;
- f) discharging waste or water containing waste in a manner which may detrimentally impact on a water resource; and
- g) disposing of waste in a manner which may detrimentally impact on a water resource.


#### **1.4.2.3 Consent from the Minister of Agriculture**

The subdivision of Agricultural Land Act (Act No. 70 of 1970) states that the subdivision, lease for 10 years or longer, sale or development of agricultural land may not take place without the written consent of the national Minister of Agriculture, in consultation with the premier of the province in which the development takes place. Consent has been obtained for this proposed development.

#### **1.4.2.4 Biodiversity permits/licenses**

When carrying out a restricted activity involving specimens of listed threatened or protected species, a permit may be required in terms of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA). This could include the damaging of, disturbance to or destroying of plant or animal species during the clearing of the site. Permits may also be required under Provincial Nature Conservation Ordinances or the National Forests Act (for destruction of a protected tree species).

The NEMBA provides for the protection of ecosystems that are threatened or in need of protection. In terms of Section 52 (1)(a) the Minister may, by notice in the Gazette, publish a national list of ecosystems that are threatened and in need of protection.



The following categories of ecosystems may be listed in terms of subsection (1):

- (a) critically endangered ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;
- (b) endangered ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;
- (c) vulnerable ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; and
- (d) protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed in terms of paragraphs (a), (b) or (c).

If the activity undertaken involves the damaging of or disturbance to these ecosystems, a permit will be required in terms of NEMBA.

#### **1.4.2.5 Waste management license**

The National Environmental Management: Waste Act (Act No. 59 of 2008) may require a waste management licence for waste-related activities. A provision in the Environmental Impact Assessment Regulations states that any activity which requires a licence in terms of the generation or release of emissions, pollution or effluent will trigger a scoping and Environmental Impact Reporting process, provided that it does not require a Basic Assessment (in terms of Notice No. R544 of 2010) and is not included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.

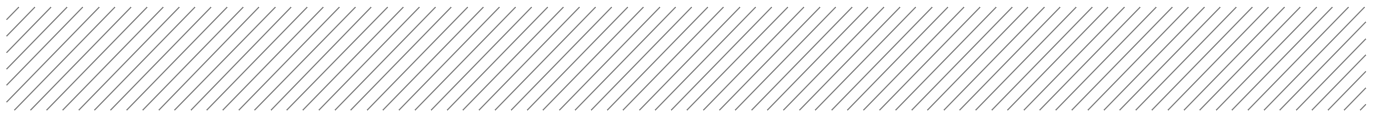
The waste management licence application and EIA must be submitted to different authorities, but the processes may be carried out concurrently.

Depending on the nature of maintenance requirements on the line, a waste licence is unlikely to be required for the operational phase. However, during the construction phase, if the temporary storage of waste (more than 90 days) is required, a licence will be required.

#### **1.4.2.6 Atmospheric emissions license**

The National Environmental Management: Air Quality Act (Act No. 39 of 2004) requires that an atmospheric emissions licence is required for certain activities resulting in emissions of various substances and applicable concentrations to the atmosphere.

Any activity which requires an atmospheric emission license in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) will require a scoping and Environmental Impact Reporting process, provided it does not require a Basic Assessment in terms of Notice No. R544 of 2010.



Given the need to establish a new refuelling facility, an atmospheric emissions license licence may be required.



## 2 ROLES AND RESPONSIBILITIES

### 2.1 Environmental Control Officer

The Environmental Control Officer (ECO) is the independent person responsible for monitoring of the implementation of the EMPr. The ECO must be suitably qualified in the environmental sciences and management and have adequate construction site experience of monitoring and auditing the implementation of an EMPr. The ECO may not be appointed by the Contractor, and will report to Transnet and DEA only. The ECO has the authority to stop any works if, in his/her opinion, there is or may be a serious threat to or impact on the environment; caused directly by the contractor's actions or activities during the construction phase. In all such work stoppage situations the ECO is to inform the Contractor of the reasons for the stoppage within 24 hours. All ECO reports will be sent on a monthly basis to Transnet to keep abreast of compliance on site. The project's environmental authorisation may require that ECO reports be provided to the DEA.

Upon failure by the Contractor, or his employees, to show adequate consideration to the EMPr, the ECO may recommend to the Project Manager to have the Contractor's representative or any employee(s) removed from the site, or work suspended until the matter is resolved.

### 2.2 Engineer/Project Manager

The Engineer/Project Manager responsible for the design of the railway lines and yard will be a Transnet appointment. It will be the responsibility of the Engineer to oversee the overall implementation of the project as well as the compliance of the EMPr and incorporate any potential environmental aspects mentioned into the design.


### 2.3 Contractor

As part of being responsible for the construction of the proposed railway line, the Contractor will also be responsible for the overall implementation of the EMPr. The Contractor will nominate a suitably qualified representative on site as his environmental representative, known as the Contractor's Environmental Control Officer (CECO). The contractor must issue site instructions to rectify any environmental non-compliance, based on the CECO's findings. The Transnet Site Manager can also issue site instructions.

The contractor must ensure all recommendations as stipulated in the Social Impact Assessment (done as part of the EIA) are adhered to, with special consideration given to the recruitment of labourers.

### 2.4 Contractor's Environmental Control Officer (CECO)

The CECO will be responsible, on behalf of the contractor, to ensure that the EMPr is implemented and complied with on site on a daily basis. The CECO will liaise with the ECO (see below) in all matters relating to the implementation of the EMPr. The CECO needs a certain amount of



environmental management experience in the field and preferably experience on large linear construction sites.

#### **2.4.1 Environmental awareness on site**

Prior to construction, all contractor teams involved in work on the project are to be briefed on their obligations towards environmental controls and methodologies in terms of this EMP. It is recommended that the briefings take the form of an on-site talk and demonstration by the CECO. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. All new employees arriving on site shall undergo this training. Environmental induction must be done according to the Contractors Environmental Management System, and must include all aspects of the site specific EMP.

Toolbox talks are to be used as a tool for continuous training of employees and must be conducted on a weekly basis. Toolbox talks must be conducted in an interactive way as to ensure the employees understand the content and purpose of the specific EMP requirements.

As construction continues, an effort must be made by the Contractor to assess the training needs of workers on site. Cognisance must be given to the specific work to be undertaken at the time and, if necessary, additional training on environmental requirements must be conducted to ensure all workers understand the risks involved as well as how to adequately implement mitigation measures.

A signed register documenting all employees' environmental training and awareness programmes must be kept on record for verification purposes.

#### **2.4.2 Record keeping**

The CECO is responsible for maintaining all records in relation to the EMP requirements on site. Such records must be made available to the ECO on request during the monthly audits, as well as at any time as requested by the ECO, auditor or project managers. Record keeping must be done in an orderly fashion with the intent of ensuring easy reference.

## 2.5 Organisational and Institutional arrangements

Any changes to the EMPr or conditional requirements of the EA must be communicated in writing to the DEA within the timeframes as stipulated in the Environmental Authorisation. A provisional reporting and communications structure is indicated in Figure 3 below.

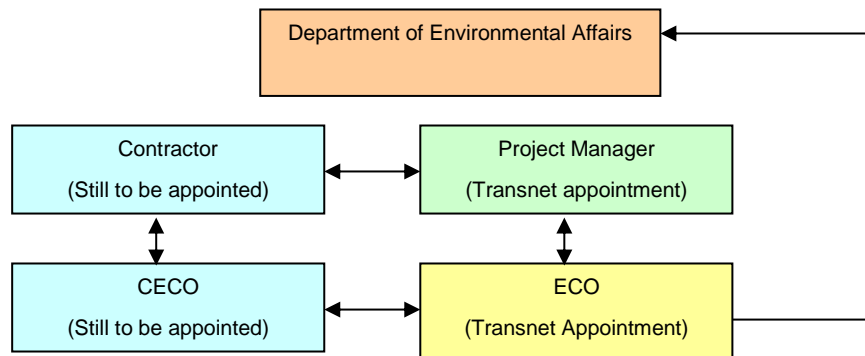


Figure 3: Proposed organisational and reporting structure

## 2.6 Monitoring and auditing framework

### 2.6.1 Monitoring programme

The purpose of the monitoring programme is to ensure that mitigation measures identified and described in the EMPr are implemented. Construction activities of the railway line will be monitored and recorded by the ECO and audited against the EMPr on a monthly basis. A report must be submitted at the end of each month prior to the progress meetings where they will form part of the agenda. The ultimate target is to achieve 100% compliance with the EMPr.


### 2.6.2 Penalties

The Contractor will comply with the environmental management requirements of this EMPr on an ongoing basis, any failure on their part to do so will entitle the Project Manager, in consultation with the ECO to certify the imposition of a non-conformance with associated defects penalty. The value of the penalty will be agreed between the PM and ECO based on the nature, extent and duration of the offence and subsequent environmental damage. Such penalties shall be payable in addition to any remediation costs for correction of environmental damage as a result of non-compliance to this EMPr, that will also be for the Contractor's account. Time penalties may also be awarded by the contract's manager where the contractors do not comply. These details are to be included into the contracts.

Note that the following is applicable:

- In terms of the Conventional Penalties Act (1962) a creditor is not entitled to recover both the penalty and damages,
- Accordingly, where a Contractor causes damage, Transnet can either enforce a penalty or make the Contractor make good the damage, but not both.





The Contractor is deemed NOT to have complied with this specification if:

- Within the boundaries of the site, site extensions and access roads there is evidence of contravention of the requirements of the EMPr,
- Environmental damage ensues due to negligence,
- The requested recordkeeping as stated in the EMPr is not available,
- The Contractor fails to comply with corrective or other instructions issued within a specific time,
- The contractor fails to comply with a site instruction given by the Project Manager based on the ECO report.
- The Contractor fails to respond adequately to complaints from the public,
- Legal action is instituted against the proponent in terms of Environmental laws.

Payment of any fines in terms of the contract will not absolve the offender from being liable from prosecution in terms of any law.



## 3 COMMITTEES TO BE ESTABLISHED

The environmental impact assessment (EIA) process saw the need for various committees to be established and upheld throughout the construction phase of the project. In order to ensure the public concerns and views are adequately addressed and the requirements of this EMPr adhered to, requirements for the following committees have been set. Note that the implementation of such committees, the meetings and required communication and actions are the responsibility of Transnet.

### 3.1.1 Environmental Monitoring Committee (EMC)

Transnet is to ensure the establishment of an Environmental Monitoring Committee (EMC) for the project. The Davel Yard section can be combined with the Davel to Nerston upgrade and new construction section, with one meeting to be held on a quarterly basis in Mpumalanga. The venue is to be agreed upon between the committee members. Committee members are to consist of interested and affected parties, directly affected neighbouring landowners, Transnet employees and Environmental Managers. . The EMC meetings are to be considered formal meetings, including environmental progress presentations from the Transnet environmental manager and ECO. All stakeholders involved must be given a fair and equal opportunity to comment or raise queries and concerns regarding the environmental management status of the project.

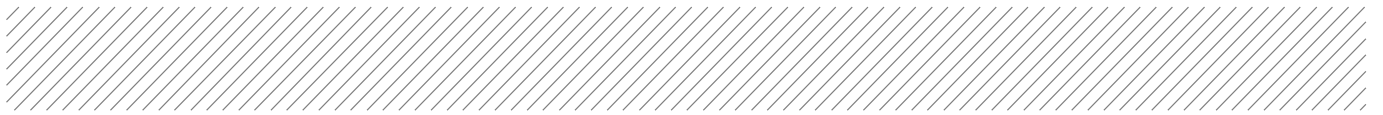
### 3.1.2 Community Safety Committee (CSC)

A potential impact associated with the inflow of construction workers into the region is the development of informal settlements and the associated social pathologies. Most informal settlements are highly underdeveloped in terms of infrastructure. Most houses have no electricity supply, buy bottled water and have no refuse disposal systems. These informal settlers are also mostly unemployed as they are job seekers who migrate to the area.

In most instances the local communities would claim that the informal settlements are contributing directly to a number of problems. In particular, the community believes that these settlements lead to a higher crime rate in the area.

Measures to mitigate or control the expansion of informal settlements will have to be implemented with considerable sensitivity so as not to infringe on people's constitutionally guaranteed right to freedom of movement. To this end, it is recommended that Transnet facilitate the establishment of a "Community Safety Committee" with the aim of monitoring and controlling illegal squatting. The suggested membership of such a committee would include:

- The Community Relations Department of Transnet;
- Msukaligwa and Mkhondo Local Municipality;
- Farmers Association;
- Local landowners;
- Representatives of local community; and
- Local police and the Community Policing Forum.



The functions of this committee would include:

- Frequent monitoring of the area to detect the establishment of new informal settlements. (It is foreseen that this function could be carried out by Community Relations Department of Transnet in cooperation with the local Community Policing Forum, as well as other stakeholders in the area);
- The establishment of a “hotline” at a local police station or at the local municipality for reporting of illegal squatting. The number of this hotline should be widely disseminated among local communities and landowners to ensure that the erection of new informal settlements is reported as soon as possible, thereby allowing for timeous response ; and
- The formulation, in consultation with all relevant stakeholders, of an appropriate plan for responding to illegal squatting.



## 4 DESCRIPTION OF ACTIVITIES

The activities that are going to be undertaken involve, but are not limited to:


### 4.1 Pre-construction and construction phase

#### 3.1.1. Pre-construction

- Establishment of the contractor's camp and laydown areas;
- Survey controls;
- Preliminary geotechnical investigations;
- Protection of archaeological sites
- Vegetation/ faunal search and rescue (as applicable);
- Resettlement of affected communities/ landowners;
- Staff procurement, induction and training;
- Establish fuel storage and dispensing sites;
- Establish stores for explosives;
- Establish water supplies (abstraction, local connections, etc.);
- Fencing;
- Establish basic access roads (to camp(s) and site)

#### 3.1.2. Construction

- Clearing the proposed site of vegetation;
- Removal and stockpiling of topsoil;
- Fencing of the construction sites;
- Personnel conduct;
- Storage of hazardous material;
- Batching sites (if used);
- Handling and disposal of construction waste; and
- Construction of earthworks:
  - Embankments;
  - Cuttings;
  - Borrow pits;
  - Spoil heaps;
- Construction of structures and drainage:
  - Major structures: bridges and viaducts;
  - Road/ rail structure;
  - Rail/ Rail structures;
  - Access structures/ culverts;

- 
- Drainage structures;
  - Track (perway) construction;
  - Construction of tunnels;
  - Roads and fencing;
  - Railway engineering – signalling and telecommunications.

## **4.2 Rehabilitation**

- Removal/decommissioning of Contractor's camp;
- Removal of all construction, hazardous and domestic waste;
- Rehabilitation of the disturbed areas as a result of construction works.



## 5 SUMMARY OF IMPACTS AND ASSOCIATED MITIGATION MEASURES

The following table covers the construction activities and associated environmental impacts that will occur during the construction of the railway line and associated connections.

The table considers the expected impacts on-site during the different phases of the project, as well as the mitigation measures and environmental management procedures required to manage the expected impacts. The following sections are dealt with in the table:

- Section 5 : Pre-construction and construction site environmental management
- Section 6 : Materials
- Section 7 : Waste
- Section 8 : Surrounding land
- Section 9 : Flora & fauna
- Section 10 : Air Quality
- Section 11 : Water
- Section 12 : Noise
- Section 13 : Archaeological and Heritage sites
- Section 14 : Social
- Section 15 : Planning and engineering
- Section 16 : Rehabilitation

# 6 PRE-CONSTRUCTION AND CONSTRUCTION ENVIRONMENTAL MANAGEMENT

Table 1: Impacts and mitigation table

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
6.1 Engineering Design	All the aspects listed in the EMP	Design incompatible with environment	<p><b>Objective:</b> To ensure the design of the railway line takes into account the environment.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Assimilate requirements of the EMP in the design and construction management.</li> <li>All bridges crossing national roads shall be designed and approved to the satisfaction of SANRAL.</li> <li>During the walk down of the approved corridors prior to construction commencement, Transnet shall ensure that a suitably qualified person physically pegs out/mark all sensitive areas identified within the corridors. This information must be consolidated into a map with exclusion zones. These exclusion zones must be avoided and the associated infrastructure and construction activities must be kept outside these areas (unless otherwise permitted/licensed).</li> <li>Existing railway line which will be replaced by new railway line must be uplifted and adequately disposed of or responsibly reused.</li> </ul>	Design meets objectives and does not degrade the environment	Engineering Design Consultant	Contract and allowance in P&G's	During Tender Design & Design Review Stage	Engineering design consultant	Design Phase
6.2 Establishment of the construction	Construction camp	Damage or loss of existing vegetation and changes to the area's water	<p><b>Objective:</b> To prevent negative influence to the surrounding surface and groundwater.</p>	Construction camp established in compliance with objectives.	Contractor, CECO.	Contract and allowance in P&G's	Pre-construction, Establishment of Site	ECO	Once off

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
camp sites		quality	<p><b>Target:</b></p> <ul style="list-style-type: none"> <li>• Site establishment shall take place in an orderly manner and all amenities shall be installed at camp sites before the main workforce move onto site</li> <li>• A method statement is required from the Contractor at appointment stage that includes the layout of the camp, management of ablution facilities and wastewater management</li> <li>• The planning and design for the construction camp must ensure that there is a minimum impact on the environment.</li> <li>• A site plan of the construction camp must be provided indicating waste areas, storage areas and placement of ablution facilities.</li> <li>• The Contractor camp shall have the necessary ablution facilities with chemical toilets where such facilities are not available at commencement of construction.</li> <li>• The Contractor shall supply a wastewater management system that will comply with legal requirements and be acceptable to Transnet.</li> <li>• Where Transnet facilities are available the Contractor shall make use of such facilities where it is viable and possible.</li> <li>• 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.</li> <li>• 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</li> <li>• A certificate of safe disposal shall be obtained by the Contractor and kept on file.</li> <li>• 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.</li> <li>• The construction camp must be placed on already disturbed land as far as possible.</li> </ul>						



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>The construction camp should be fenced off so as to limit the unnecessary removal of vegetation.</li> <li>Fences and security access must be maintained, throughout the project.</li> <li>All fences removed to facilitate access will be replaced by the contractor once machinery and personnel have been removed from the site to the satisfaction of all the relevant landowners.</li> <li>Emergency and contact numbers of the contractors must be available and prominently displayed on a signage board that is clearly visible.</li> </ul>						
6.3 Establishment of the construction camp site	Construction camp	Loss of soil fertility.	<p><b>Objective</b></p> <p>The environmental objective when establishing the contractor's camp is to minimise the footprint of disturbance thereby preventing the degradation and loss of topsoil.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Allowance for a contractor's camp site per principle contractor must be made. Care must be taken to ensure camps are located away from residential/community areas. However, where existing buildings and houses can be used as contractors camps this must be done.</li> <li>Where no existing buildings/houses are available, the construction camp site shall be strictly within the project working area (i.e. 75 m or area approved by ECO).</li> <li>Once the site has been cleared of vegetation, the topsoil should be stripped.</li> <li>Topsoil must be stored in a demarcated area which is protected from wind and rain.</li> <li>The topsoil stockpiles must not exceed 2 m in height.</li> <li>The area must be rehabilitated once the construction camp has been decommissioned.</li> </ul>	Established construction camp in compliance with objectives and no evidence of environmental degradation	Contractor, CECO.	Contract and allowance in P&G's	Pre-construction, Establishment of Site	ECO	Once off
6.4 Closure of the	Construction camp.	Potential impacts associated with the closure of the	<p><b>Objective(s):</b></p> <p>To limit potential impacts on the environment for the period for which the</p>	Closure of the construction camp in line with the	Engineer, Contractor and	Contract and allowance	Closure of camp	Engineer ECO	Whenever the construction camp is

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
construction camp		construction camp	<p>construction camp is closed.</p> <p><b>Target :</b></p> <p>Should the construction camp be closed for a period of more than one week, a report on compliance will be lodged with the Contractor, Engineer and Project manager confirming the following:-</p> <ul style="list-style-type: none"> <li>• No persons allowed on site other than project employees;</li> <li>• Minimal materials are stored;</li> <li>• All waste disposal bins will be emptied periodically.</li> <li>• Materials are stored in leak-proof, sealable containers or packaging;</li> <li>• The store area is secure and locked;</li> <li>• Fire extinguishers are serviced and accessible;</li> <li>• The area is secure from accidental damage through vehicle collision, etc.;</li> <li>• Emergency and contact numbers of the contractor are available and prominently displayed;</li> <li>• All stores will be secured;</li> <li>• Chemical toilets are empty, kept hygienically clean and secured;</li> <li>• 24 hour security will be on site during this period.</li> <li>• All trenches are barricaded with danger tape.</li> </ul>	requirements of the EMPr.	CECO	in P&G's			closed for longer than a week.
6.5 Storage of topsoil	Stripping and stockpiling of topsoil.	<p>Mixing of topsoil and subsoil.</p> <p>Erosion of topsoil.</p> <p>Contamination of top soil.</p> <p>Dust.</p>	<p><b>Objective(s):</b></p> <p>Topsoil is conserved, maintained and reused.</p> <p><b>Target :</b></p> <ul style="list-style-type: none"> <li>• The topsoil in the specific region is regarded as the top 300 mm (maximum) of the soil profile irrespective of the fertility appearance or physical depth, unless otherwise confirmed by the ECO.</li> <li>• Topsoil is to be stripped up to this depth when it is in as dry a condition as possible in order to prevent compaction.</li> </ul>	<p>Storage of topsoil in line with requirements.</p> <p>No loss of topsoil fertility.</p>	Contractor, CECO.	Contract and allowance in P&G's		ECO	

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>• The topsoil, including the existing grass cover is to be shallowly ripped (only the depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process.</li> <li>• Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.</li> <li>• The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding. The use of berms must be considered to prevent the topsoil from washing away during rainy periods.</li> <li>• All grass and other vegetation should be left on the topsoil stockpiles so that they colonize the area after construction.</li> <li>• Photographic record must be kept of the topsoil stockpiles.</li> <li>• Topsoil stockpiles must be placed on disturbed soil. Should no such area be available, the ECO is to advise on the laydown area for the stockpiles in each section.</li> <li>• Dust and erosion of topsoil from runoff must be minimised through appropriate watering and the avoidance of transporting and placing of topsoil in areas exposed to high wind or excessively rainy conditions.</li> <li>• The contractor shall devise a soil conservation and stockpiling plan, to be approved by the ECO and Engineer, which shall detail:- <ul style="list-style-type: none"> <li>○ Stockpile sizes, laydown areas and form;</li> <li>○ Means of erosion (wind and water) prevention for stockpiles;</li> <li>○ The rehabilitation measures to be taken for the area occupied by the temporary stockpile;</li> <li>○ A generic schedule of soil replacement for areas where work has been completed. Soil replacement should preferably run in parallel (where feasible) with the construction process;</li> <li>○ Soil erosion prevention measures for general site use.</li> </ul> </li> </ul>						

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>Alien vegetation growing on stockpiles must be eradicated.</li> <li>Herbicides shall not be used to remove alien vegetation unless approved by the ECO.</li> </ul>						
6.6 Construction of site buildings	Site buildings materials	Soil pollution and permanent alteration to the natural environment.	<p><b>Objective(s):</b> To ensure the material for site buildings are recyclable and to minimise the impacts of the construction of the buildings on the environment.</p> <p><b>Target :</b></p> <ul style="list-style-type: none"> <li>No new permanent structures will be permitted at the contractor's camp.</li> <li>Temporary structures shall be founded on a platform, either subsoil or screed slab.</li> <li>Buildings should preferably be pre-fabricated or constructed of re-usable/recyclable materials.</li> <li>All temporary structures must be soundly built and not pose a danger to workers.</li> <li>Containers are to be used for the storage of materials which have the potential to release pollutants into the environment.</li> <li>All structure footprints to be rehabilitated and re-vegetated after construction is complete.</li> </ul>	On site buildings constructed according to the requirements of the EMPr.	Contractor and CECO.	Contract and allowance in P&G's	Pre-construction, Establishment of site.	ECO	Once off
6.7 Fencing of the construction sites that will be affected by the proposed project	Demarcation of the site	Unnecessary removal of vegetation.  Loss of topsoil.  Safety	<p><b>Objective(s);</b> Whilst establishing the site, the footprint of disturbance must be minimised and the extent of soil erosion, loss of vegetation and the potential for the pollution of soils must be prevented.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>All excavations posing a risk to both human and animal safety must be demarcated as indicated in the EMPr using danger tape with steel droppers or other methods approved by the ECO;</li> <li>The width of the construction footprint must be agreed upon by the ECO and</li> </ul>	The site is demarcated according to the requirements of this section of the EMPr.	Contractor and CECO.	Contract and allowance in P&G's	Construction sites must be fenced off along the alignment before site clearance.	Engineer, ECO.	As construction proceeds along the alignment.

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			the Engineer and as far as possible must be kept to a minimum. The maximum width of the construction footprint servitude will not exceed 75 m. Should additional space be needed for the temporary storage of material, the ECO must advise on an adequate area away from any sensitive areas.						
6.8 Cooking of food	Cooking facilities	Type and placement of cooking facilities used, and how they will be used.	<p><b>Objective(s):</b> To ensure that the cooking facilities used on site do not pose risks to the environment.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>The contractor must supply gas and /or electricity cooking facilities for the labourers at the construction camp.</li> <li>If gas cooking facilities are not available fires (for the purposes of cooking) will be allowed in a demarcated area that has been cleared of any combustible materials. This area must be carefully controlled. A fire extinguisher must be kept in close proximity to the cooking area.</li> <li>Firewood, or other suitable fuels, must be supplied by the Contractor.</li> <li>No vegetative matter may be removed from the area for firewood.</li> <li>After use, all cooking fires must be extinguished.</li> </ul>	Evidence of presence of gas and /or electricity cooking facilities and/or demarcated area for cooking with fire.	Contractor.	Contract and allowance in P&G's	Pre-construction, Establishment of site.	ECO	Once off.

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
6.9 Operation of the sanitation system(s)	Sanitation systems	Unpleasant odours on site.  Inadequate number of latrines on site.  Position of latrines and shower systems.  Poor management of waste water.	<p><b>Objective(s):</b> To ensure good sanitation system and management throughout the construction period.</p> <p><b>Targets:</b></p> <ul style="list-style-type: none"> <li>• Adequate chemical toilets must be provided for all staff. Alternatively, existing ablution facilities on site can be utilised if available.</li> <li>• Chemical toilets must be emptied / serviced on a regular basis to prevent them overflowing. Proof of this must be provided to the ECO.</li> <li>• A minimum of one toilet must be provided per 11 persons at each working area within 100 m from worker activity.</li> <li>• Where shower facilities are provided for use by staff the following must be imposed:- <ul style="list-style-type: none"> <li>○ Positioning of the showers, specifically the discharge point , must be placed in a way to ensure that erosion and build-up of detergents does not occur;</li> <li>○ All discharge from the shower and other washing facilities must pass through a suitable filter to reduce the load of detergents to the environment;</li> <li>○ Use of the shower facilities must be limited to staff or authorised persons only.</li> </ul> </li> </ul>	<p>Adequate toilets and showers will be positioned at the right places as per the EMPr and ECO.</p> <p>Absence of odours, erosion and build-up of detergents.</p>	Contractor	Contract and allowance in P&G's	Pre-construction, Establishment of site.	ECO	Once off

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
6.10 Vehicle parking area. Storage of equipment	Vehicle parking and parking area(s). Storage of equipment.	Pollution of soils. Disturbance of soils due to parking of vehicles outside of designated areas.	<p><b>Objective(s):</b> To ensure vehicles are parked according to the specifications in the EMPr and that equipment is handled appropriately.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>No storage of vehicles or equipment will be allowed outside of the designated area.</li> <li>Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment when not in use for periods longer than 3 days and/or for those vehicles and plant showing evidence of leaking hydrocarbons.</li> </ul>	Drip trays must be provided and placed under vehicles and equipment which are not being utilised on site.	Contractor and CECO.	Contract and allowance in P&G's	Throughout the construction period.	ECO	As per specified target.
6.11 Servicing and washing of vehicles and machinery	Workshop and Equipment Storage Areas	Water contamination. Soil contamination. Noise pollution.	<p><b>Objective(s):</b> To ensure that the environment is not polluted by ensuring that service areas and wash bays for vehicles and machinery are made available and utilised.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Where possible and practical, all maintenance of vehicles and equipment shall take place in a workshop area.</li> <li>During servicing of vehicles or equipment, a suitable drip tray shall be used to prevent spills onto the soil, especially where emergency repairs are conducted outside the workshop area.</li> <li>Leaking equipment shall be repaired immediately or be removed from site to facilitate repair.</li> <li>All potentially hazardous and non-degradable waste, including used ballast or the waste water effluent from washing the contaminated ballast, shall be collected and removed to a registered waste site.</li> <li>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.</li> <li>A method statement is required from the Contractor for dealing with possible</li> </ul>	Evidence of prescribed servicing and washing services.	Contractor, CECO.	Contract and allowance in P&G's	During construction.	ECO	As per specified target.

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>emergencies that can occur, such as fire and accidental leaks and spillage.</p> <ul style="list-style-type: none"> <li>• The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site.</li> <li>• Should emergency repairs be necessary, drip trays or tarpaulins must be utilised to ensure the collection of the oil. The area for emergency repairs should be identified by the ECO.</li> <li>• Only emergency repairs shall be allowed on site and a drip tray shall be used to prevent oil spills.</li> <li>• The contractor must ensure that delivery drivers and plant operators are informed of all relevant procedures and restrictions required ensuring compliance with this document.</li> <li>• All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages.</li> <li>• The following shall apply: <ul style="list-style-type: none"> <li>○ All contaminated soil / yard stone shall be removed and be placed in containers for further disposal;</li> <li>○ Hazardous waste may only be stored on site for a maximum period of 90 days before it must be disposed of at a registered hazardous waste site.</li> <li>○ Contaminated material can be taken to one central point where bio-remediation can be done;</li> <li>○ Smaller spills can be treated on site;</li> <li>○ A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site; and</li> <li>○ All spills of hazardous substances must be reported to the ECO and relevant authorities.</li> </ul> </li> </ul>						
6.12 Personnel conduct	Personnel	Infringement of the EMPr requirements by personnel	<p><b>Objective(s):</b> To ensure that personnel are adhering to the EMPr requirements.</p> <p><b>Target:</b></p>	<p>Personnel wearing proper safety uniform.</p> <p>Absence of trespassers on site.</p>	Contractor and labourers.	Contract and allowance in P&G's	Approved PPE must be issued to all employees pre-construction but must be	ECO	Throughout construction period.



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>• The Contractor will adhere to all requirements of the Occupational Health and Safety Act (Act 56 of 2004), including the drafting of a suitable Health and Safety Plan which will be implemented during the construction phase.</li> <li>• All personnel to undergo Environmental Awareness Training. Such training must include the requirements of the EMPr as well as the location of sensitive areas of which the workers must be aware. A signed register of attendance must be kept for proof.</li> <li>• Transnet induction must be attended by all parties involved in the construction.</li> <li>• Tool box talks to include aspects of the EMPr.</li> <li>• Labourers associated with the contractor must be easily recognizable (i.e. company issued overalls with company name/logo etc.), and other persons will not be allowed within the construction camp at any time without prior permission from the project manager.</li> <li>• The Contractor shall take all necessary precautions against trespassing on private properties.</li> <li>• Warning signs must be placed on and around the site as per the Occupational, Health and Safety requirements.</li> <li>• Adequate first aid services must be provided by the contractor at the contractor's camp.</li> <li>• The contractor will be responsible for his own security arrangements and shall comply will all site security instructions.</li> <li>• Basic firefighting equipment must be available on site.</li> <li>• PPE to be provided and well maintained at contractor's camp.</li> <li>• All environmental incidents should be reported to ECO, investigated, documented and kept on file.</li> </ul>				used for the duration of the construction period.		

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
6.13 Construction activities	Safety of the Public / surrounding landowners	Injuries to Public / landowners  Health of Public / landowners	<p><b>Objective(s):</b> To ensure that the Public at large is not injured or affected negatively in any way.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>The Contractor shall recognise that the Site is situated close to inhabited and agricultural areas and shall therefore take all reasonable measures to ensure the safety of people in the surrounding communities.</li> <li>Where the public could be exposed to danger by any of the Works or Site activities, the Contractor shall as appropriate provide suitable flagmen, barriers and/ or warning signs in English, Afrikaans and SiSwati, all to the approval of the Project Manager.</li> <li>All unattended open excavations shall be adequately demarcated (fencing shall consist of a minimum of three strands of wire and made clearly visible). Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed structures and protective scaffolding.</li> </ul>	<p>No injuries or health consequences to neighbouring people.</p> <p>No complaints from neighbouring people.</p>	Contractor and CECO.	Contract and allowance in P&G's	Throughout the construction period.	ECO	Whenever there are stationary vehicles or equipment present on site.

# 7 MATERIALS

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
7.1 Transportation of material	Material transport	Traffic congestion. Dust during transportation. Excessive noise.	<p><b>Objective(s)</b> To ensure that whilst material is transported, it cannot be of negative influence to the surrounding environment.</p> <p><b>Target:</b> The following targets must be adhered to:</p> <ul style="list-style-type: none"> <li>Existing access roads must be utilised as far as possible, with only the minimum new access roads being constructed where absolutely necessary.</li> <li>Access to privately owned land will be arranged with the various landowners along the alignment by the contractor.</li> <li>Adequate and appropriate traffic warning signage must be erected where applicable, along transport routes and access roads.</li> <li>The Contractor shall take preventative measures e.g. screening, muffling, timing, pre-notification of affected parties to minimise complaints regarding noise and vibration nuisance from sources.</li> <li>Vehicle speed on site shall be restricted to 30 km/h for construction vehicles and 40 km/h for motor vehicles.</li> <li>Fine materials (such as sand) must be covered during transportation when travelling on public roads. Covering of loads will not be necessary where the vehicles transporting such fine materials abide by the construction speed limit of 30 km/h.</li> <li>Appropriate response plans must be prepared by Contractors to ensure the fastest possible reaction to spills or accidents. This response plan must be included in the awareness training and a flow chart indicating the procedures to be followed must be erected onto signage boards for easy reference.</li> </ul>	<p>Mufflers and silencers fitted to construction vehicles and equipment.</p> <p>Covering of material during transportation.</p> <p>Emergency reaction plan (for spills/accidents) must always be readily available on site.</p>	Contractor and CECO	Contract and allowance in P&G's	Prior to construction start.	ECO	Throughout construction period or as required by the ECO.

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>Deliveries must be scheduled for off-peak hour traffic times.</li> <li>All trucks and vehicles removing spoil from the site via a public road must have load areas and must be covered by a tarpaulin (plastic/synthetic sheets (covers) to prevent rocks and spoil falling onto the road surfaces. Should the covering of vehicles not be possible, vehicles are only to be loaded to a capacity of 80% of the maximum capacity of the vehicle. If it is not possible for the Contractor to comply with this requirement, a detailed method statement must be provided to the ECO for approval.</li> <li>All drivers and operators are to have licences for driving and moving of plant on site.</li> <li>All road vehicles to be road worthy.</li> </ul>						
7.2 Storage and use of Hazardous Material	Hazardous Material storage and usage areas	Contamination of soil by hazardous material.  Inadequate remediation measures for spills.	<p><b>Objective(s):</b> To ensure adequate protection of soil and soil remediation measures in case of spills.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Hazardous materials – such as paint, cement, fuels, bitumen, fuel, oil, herbicides, battery acid or detergents – must be stored in sealed, lockable containers when not in use</li> <li>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</li> <li>No decantation into unmarked containers or containers with irrelevant labeling.</li> <li>The construction of the workshops, cleaning bays and fuel dispensing areas of the construction camps should be in such a way that no accidental spillages leave the site and surface and stormwater run-off be diverted through an oil/water separator before leaving the site.</li> <li>To avoid fire risks, no decanted fuel to be left unattended in the sun to avoid</li> </ul>	Storage of hazardous materials in sealed and lockable containers.  No evidence of spills on site.  Absorbent and clean-up material readily available on site.	Contractor and CECO.	Contract and allowance in P&G's	Construction period	ECO	For the duration of the construction period dependent on the presence of hazardous material on site.

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>fire.</p> <ul style="list-style-type: none"> <li>When handling hazardous materials, manufacturer's specifications must be complied with. The 16 point Material Safety Data Sheet must be available on site.</li> <li>All reasonable care must be taken to prevent spills of any hazardous material when in use.</li> <li>Emergency spill response and clean-up procedures must be in place with capable people listed as responsible parties. These parties must have the necessary training to adequately handle major accidents and/or accidental spillages, including where such spillages might occur within a watercourse.</li> <li>All spills (minor and major) must be cleaned and remediated to the satisfaction of the ECO and CECO within 24 hours of occurrence.</li> <li>Should contamination of the soil/groundwater be suspected, a detailed site and consequent risk assessment must be conducted in order to establish the risk that the contaminated soils and groundwater pose to the receiving environment using the Risk Based Corrective Action approach. Appropriate remedial measures must be designed and implemented at the site.</li> <li>The contractor must ensure that there is a supply of absorbent material (e.g. Drizit) and cleanup materials readily available to absorb, breakdown and, where possible, encapsulate minor hazardous material spillages.</li> <li>All products are to be stored with compatibility in mind.</li> <li>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.</li> <li>The contractor shall supply a method statement to the engineer for approval for the storage of hazardous materials prior to site preparation works.</li> </ul>						
7.3 Storage of Fuel	Storage areas	Contamination of soil by fuel.  Inadequate	<p><b>Objective(s):</b></p> <p>To ensure that there is optimum environmental protection (especially soil) from fuel spills.</p>	Established fuel storage areas in compliance with the objectives of the	Contractor and CECO.	Contract and allowance in P&G's	Pre-construction, Establishment of site.	ECO	Once off

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
		remediation measures for spills.	<p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Fuel must be stored in above ground storage tanks or sealed containers, contained within a bunded area with sump drainage.</li> <li>All bunds must be designed to contain at least 110% of the tank or drum storage capacity (this shall apply to above ground storage, and include fuels, welding equipment and oxy-acetylene cutting equipment).</li> <li>No drainage from fuel storage areas shall be permitted.</li> <li>Any other hazardous substances stored in bulk will require bunding.</li> </ul>	EMPr.					
7.4 Use of cement	Cement	Contamination of soil and surrounding environment by cement.  Decrease in ambient air quality.	<p><b>Objective(s):</b> To ensure that the environment is protected from cement that will be used on site.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Cement must be delivered in sound and properly secured bags or in approved bulk containers.</li> <li>Cement products in bags must be stored in storage containers to be provided at the construction camp and should only be opened when needed.</li> <li>The storage facility and surrounding area must be swept and cleaned regularly as required to ensure that cement products do not pollute the surrounding environment.</li> <li>Empty cement bags are to be collected in larger hessian or material bags which, once full, can be disposed of at a registered landfill site.</li> <li>Cement bags are not to be burnt on site.</li> <li>No concrete batching on bare soil.</li> <li>Batch plants shall be located within the designated working area on an impermeable surface to prevent cement spillages from contaminating bare soil.</li> <li>Care must be taken to prevent concrete spills.</li> </ul>	Cement delivery, storage and use will be in line with the EMPr requirements.	Contractor and CECCO.	Contract and allowance in P&G's	Construction period.	ECO	As long as cement is in use on site.

# 8 WASTE

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
8.1 Storage, removal and disposal of construction waste	Construction waste	Land pollution.  Compaction of soil by rubble.  Decreased aesthetic integrity of the site.	<p><b>Objective(s):</b></p> <p>To ensure that waste is correctly stored and disposed of, decreasing the visual and environmental impacts during the construction and post construction period. To keep the servitude neat and clean. Disposal of rubble and refuse in an appropriate manner. Minimise litigation. Minimise landowner complaints.</p> <p><b>Targets:</b></p> <ul style="list-style-type: none"> <li>The Waste Management Plan must be adhered to at all times.</li> <li>No material shall be left on site that could be of harm to humans and animals.</li> <li>Surplus concrete may not be dumped indiscriminately on site, but shall be removed from site when nearing completion of the different stages of work.</li> <li>Concrete trucks shall not be washed on site unless adequate washing and concrete collection facilities are introduced to site.</li> <li>Bins and containers must be made available by the contractor for the storage of construction waste.</li> <li>All construction waste shall be stored in waste skips located strategically on site. A licensed waste contractor shall collect these skips for removal to a licensed landfill site. No construction waste may be stored on site for longer than 90 days;</li> <li>The Contractor will be responsible to remove and transport all construction waste material off site to a registered waste disposal facility (proof of this as well as a copy of the site's Registration Permit, must be provided by the Contractor to the ECO)</li> <li>No burning of waste permitted on site.</li> </ul>	Construction waste stored, collected and disposed of as per the requirements of this EMPr.	Contractor and CECO	Contract and allowance in P&G's	Waste bins/ skips must be available prior to construction.  Removal of waste throughout the construction period.	ECO	The ECO will determine the frequency of waste removed from site.

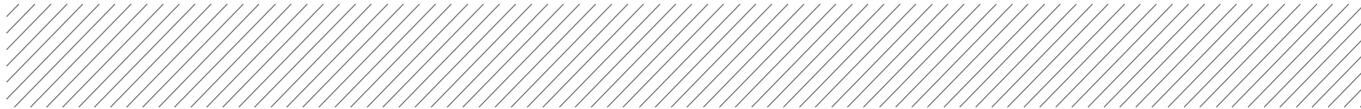
Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
8.2 Storage, removal and disposal of domestic waste	Domestic waste	Land pollution. Unpleasant odours. Decreased aesthetic integrity of the site.	<p><b>Objective(s)</b></p> <p>To ensure that waste is correctly stored and disposed of, decreasing the visual and possible environmental impact during the construction and post construction period.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>All requirements contained in the Waste Management Plan must be adhered to and shall be audited by the ECO as part of the EMPr audits.</li> <li>The Contractor must supply sealable waste bins at the construction camp for the storage of domestic waste.</li> <li>Clearly marked waste bins are to be provided for the separation of waste.</li> <li>Recyclable waste, including glass, paper and plastic must be separated at the construction camp, stored and recycled, where economically feasible.</li> <li>Personnel must be informed about the necessity of using the waste drums.</li> <li>The Contractor must do site clean-ups of litter other than construction waste on a daily basis, and dispose of it in the designated refuse bins provided at the Contractor's Camp. It is recommended that one designated cleaner per section of construction is appointed to collect and sort the litter on site.</li> <li>The contractor must ensure that general site-wide litter clean-up will occur at least once a week.</li> <li>The Contractor must dispose of all domestic refuse generated by his staff and Sub-Contractors on a weekly basis at a registered waste disposal facility. The Contractor must provide proof of this to the ECO in the form of a safe disposal certificate unless the domestic waste is collected by the local municipality.</li> <li>Sealable waste drums should be provided at least every 100 m along the active working servitude of the railway line.</li> <li>Grey water must be stored in sealable marked containers and disposed of with other waste water from the construction works.</li> </ul>	Evidence of domestic waste stored, removed and disposed of according to the requirements indicated in this EMPr.	Contractor and CECO	Contract and allowance in P&G's	The waste bins/ skips must be available prior to construction.  Removal of waste throughout the construction period.	ECO	The ECO will determine the frequency of waste removal from site.



Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
8.3 Storage, removal and disposal of hazardous waste.	Hazardous waste.	Soil pollution.  Groundwater contamination	<p><b>Objective(s):</b> To ensure that soil and the rest of the surrounding environment on site is protected from hazardous waste.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>The Contractor of is required to the National Environmental Management: Waste Act (no 59 of 2008) and the globally harmonised system for the classification of waste to determine whether any substance (new or waste) stored on site is subject to controls contained within the act;</li> <li>All hazardous waste must be stored in sealed and suitably marked containers for removal to a registered hazardous waste disposal facility.</li> <li>Hazardous waste may only be stored on site for a period of 90 days, where after it must be disposed of at a registered hazardous waste disposal site.</li> <li>Used ballast from railway lines proposed to be upgraded shall be treated as hazardous waste. Should the contaminated ballast be washed for re-use, the dirty water effluent from the washing process will constitute the hazardous waste.</li> <li>Any oil spillage on site will be excavated to a depth determined between the CECO and ECO and disposed of for removal to a registered hazardous waste disposal site. Excavated areas are to be refilled with suitable replacement material. Alternative <i>in-situ</i> remediation techniques could be used, if approved by the ECO.</li> </ul>	All mitigation measures with regards to Hazardous waste mentioned in the EMPr are implemented.	Contractor and CECO	Contract and allowance in P&G's	Hazardous Wastes must be collected in sealable, safe containers.  Removal of hazardous waste throughout the construction process.	ECO	During whole construction period.

# 9 SURROUNDING LAND

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
9.1 Interaction between Transnet and surrounding landowners	Access roads and firebreaks	Damage to access roads. Damage to environment. Fire Loss of topsoil. Erosion.	<p><b>Objective(s):</b> To minimise damage to existing access roads. To minimise damage to the environment due to construction of new access roads. To minimise loss of topsoil and erosion.</p> <p><b>Targets:</b></p> <ul style="list-style-type: none"> <li>Existing maintenance and access roads along the servitude shall be used for construction activities as far as possible.</li> <li>Planning and construction of any additional access routes must be done in conjunction between the Contractor, ECO, PM and applicable Landowners.</li> <li>All agreements reached should be documented and no verbal agreements should be made.</li> <li>The Contractor shall properly mark all access roads. Markers shall show the direction of travel. Roads not to be used shall be marked with a "NO ENTRY" sign and adequately barricaded to prevent construction vehicles from utilizing such roads.</li> <li>Water diversion berms shall be installed from the start of the contract. These berms shall be maintained at all times and be repaired at the end of the contract.</li> <li>Where berms are introduced on steep slopes the outflow shall be suitably stone pitched to prevent erosion from starting at the berms.</li> <li>Roads may not be constructed on steep slopes prone to result in excessive erosion unless such roads follow contours.</li> <li>The introduction of concrete pipes and drifts, to facilitate access, shall be at the discretion of ECO on site. Any dangerous crossings shall be marked as</li> </ul>	<p>No claims from Landowners due to further damage on existing access roads.</p> <p>No erosion visible on access roads three months after completion of construction.</p> <p>No loss of topsoil due to run-off water on access roads.</p>	Contractor and CECO.	Contract and allowance in P&G's	During the establishment of the construction site.	ECO	Once off



Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>such and where necessary, speed limits shall be enforced.</p> <ul style="list-style-type: none"> <li>• Where necessary, a suitable mixture of grass seed shall be used to re-seed damaged areas.</li> <li>• Deteriorated areas shall be fenced-in to enhance rehabilitation.</li> <li>• Firebreaks shall be implemented and maintained along the rail servitude. Firebreaks may be made and maintained in collaboration with the adjacent landowners to ensure optimum prevention of the spread of fires.</li> <li>• Transnet should consider joining the local Fire Association.</li> <li>• Should private infrastructure (e.g. boreholes) be damaged (intentionally or unintentionally) or removed by Transnet during the construction activities, Transnet shall compensate the owner as agreed between the two parties.</li> <li>• Disruption of business activities (with special attention made to the Nu-Scotland Sawmill) must be given adequate consideration by the contractor. Transnet is to ensure the contractor is aware of such business activities to ensure minimum disruption. The contractor should consult with the business owners regarding the construction work schedule on these properties.</li> </ul>						

# 10 FLORA AND FAUNA

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
10.1 Construction activities (Physical issues and their control)	Terrain	Scarring of soil surface, disturbance/loss of topsoil	<p><b>Objective(s):</b> Minimise scarring of the soil surface and land features. Minimise disturbance and loss of topsoil. Rehabilitate all disturbed areas along the servitude.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>• Topsoil to be stripped to 300 mm where required by ECO</li> <li>• Topsoil only to be stripped where absolutely necessary</li> <li>• Rehabilitation of disturbed area is required</li> </ul>	<p>No visible erosion scars once construction is completed.</p> <p>Minimum loss of topsoil at any one site.</p> <p>No barren areas visible three months after construction is completed.</p> <p>All damaged areas successfully rehabilitated.</p>	Contractor and CECCO.	Contract and allowance in P&G's	During the establishment of the construction sites along the alignment.	ECO	Topsoil will be removed and stockpiled as construction proceeds along the alignment.
	Vegetation	Damage to vegetation. Erosion due to removal of vegetation.	<p><b>Objective(s):</b> Minimise damage to vegetation. Minimise possibility of erosion due to removal of vegetation. Minimise removal of plant material on river and stream embankments. Eradication of alien invader species.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>• The objective of vegetation clearing is to trim, cut or clear the minimum number of trees and vegetation necessary for the safe mechanical construction of the railway line</li> <li>• No scalping shall be allowed on any part of the servitude road unless</li> </ul>	<p>No trees and vegetation removed unnecessarily.</p> <p>No vegetation interfering with structures and statutory distances upon completion of the contract.</p>	Contractor and CECCO.	Contract and allowance in P&G's	During the establishment of the construction sites along the alignment.	ECO	Vegetation will be cleared as construction proceeds along the alignment.

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency	
			<p>absolutely necessary.</p> <ul style="list-style-type: none"> <li>Permits from the Department of Forestry will be attained where necessary for the removal of flora.</li> <li>The removal of all economically valuable trees or vegetation shall be negotiated with the Landowner before such vegetation is removed.</li> <li>No vegetation shall be pushed into heaps or left lying all over the veld.</li> <li>Vegetation clearing on railway line servitudes must be kept to a minimum.</li> <li>Stumps shall be treated with herbicide in conjunction with the approval of the ECO. Smaller vegetation can be flattened with a machine, but the blade should be kept above ground level to prevent scalping.</li> <li>Any vegetation cleared on the servitude shall be removed or flattened and not be pushed to form an embankment.</li> <li>No vegetation clearing in the form of de-stumping, scalping or uprooting shall be allowed on river- and stream banks.</li> <li>Protected or endangered species of plants and animals shall not be removed unless they are interfering with a structure. Where such species have to be removed due to interference with a structure, the necessary permission and permits shall be obtained from Provincial Nature Conservation.</li> <li>All protected species not to be removed must be clearly marked and such areas fenced off if required.</li> <li>The use of herbicides shall only be allowed after a proper investigation into the necessity, the type to be used, the long-term effects and the effectiveness of the agent and must be approved by the ECO.</li> <li>Transnet's approval for the use of herbicides is mandatory. 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.</li> </ul>	<p>No visible erosion scars three months after completion of the contract due to vegetation removal.</p> <p>No visible damage to the vegetation along the servitude one year after completion of the contract due to herbicide use.</p> <p>No litigation due to unauthorised removal of vegetation.</p> <p>All alien invaders eradicated from the servitude</p>						
	Gate	Damage to	<b>Objective(s):</b>		Contractor and	Contract	During the	ECO	During	

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
	installation and control	existing fences, security	<p>Properly install gates to allow access to the servitude. To minimise damage to fences, limit access to Transnet and Contractor personnel with gate keys. To minimise the extent of removal of vegetation.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Gate installation shall be according to Transnet standards.</li> <li>All gates installed in electrified fencing shall be electrified as well</li> <li>All gates shall be fitted with locks and be kept locked at all times during the construction phase. Gates shall only be left open on request of the Landowner if he accepts partial responsibility for such gates in writing, once the Contractor have left site and the gates are fitted with Transnet locks. Such gates shall be clearly marked by painting the posts green</li> <li>All claims arising from gates left open shall be investigated and settled in full by the Contractor</li> <li>If any fencing interferes with the construction process, such fencing shall be deviated until construction is completed.</li> </ul>	<p>No transgressions of the Fencing Act.</p> <p>No damage to fences and subsequent complaints from Landowners.</p> <p>All gates equipped with locks and kept locked at all times to limit access to key holders.</p> <p>All fences properly tied off to the gate posts.</p> <p>All gates properly and neatly installed according to specifications.</p> <p>No complaints about open gates.</p>	CECO.	and allowance in P&G's	establishment of the construction sites along the alignment.		construction
10.2 Vegetation clearing	Conservation and protection of flora	<p>Unnecessary removal of flora.</p> <p>Removal of vegetative matter for firewood.</p>	<p><b>Objective(s):</b></p> <p>To minimise the extent of removal of vegetation.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Prior to construction commencing, a thorough search and rescue operation for both plants and fauna (particularly reptiles) must be initiated once the required permits are in place.</li> <li>Applications must be submitted to the DAFF and the Mpumalanga</li> </ul>	No unnecessary loss of vegetation.	Contractor and CECO.	Contract and allowance in P&G's	During the establishment of the construction sites along the alignment.	ECO	During construction

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>Department of Economic Development Environment and Tourism (MDEDET), where applicable.</p> <ul style="list-style-type: none"> <li>Plants outside of the construction area are not to be disturbed, destroyed or removed.</li> <li>A nursery must be maintained to protect plants removed during the search and rescue operation. These plants are then to be used during the rehabilitation phase.</li> <li>Should construction activities have to occur outside the maximum disturbance boundary of 75 m, this will only be allowed with the prior approval of the ECO so as to ensure that sensitive areas are avoided.</li> <li>The Contractor will be held liable for the replacement of any plant or feature under the protection of these specifications that is removed or damaged by the Contractor's negligence or mismanagement.</li> <li>No open fires are permitted.</li> <li>No material storage or lay down is permitted under trees.</li> <li>All woody material not donated to local villages is to be chipped and used back on site for rehabilitation.</li> </ul>						
10.3	Alien vegetation	Introduction of alien plants/seeds on site.	<p><b>Objective(s):</b></p> <p>To prevent alien plants/ seeds from being introduced on site.</p> <p>To remove alien plants where possible, from site.</p> <p><b>Targets:</b></p> <ul style="list-style-type: none"> <li>All sites disturbed by construction activities must be monitored for exotic or invasive plant species and weeds.</li> <li>Chemical removal shall be used in accordance with manufacturer's specification for weeds.</li> <li>The type of chemical to be utilised must be approved by the ECO in consultation with a registered Pest Control Operator</li> <li>Any eradicated exotic/invasive plant or weed vegetation must be removed</li> </ul>	Decrease of alien plants on site.	Contractor, Labourers, CECO.	Contract and allowance in P&G's	For the duration of the construction period.	ECO	During construction

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>from site and disposed of at an approved waste disposal facility.</p> <ul style="list-style-type: none"> <li>A maintenance schedule is to be provided after reinstatement.</li> <li>Transnet will be responsible for the implementation of the maintenance schedule. Such a schedule must include applicable requirements taken from this EMPr.</li> </ul>						
10.4	Protection of Fauna	<p>Intentional or unintentional killing of fauna on site.</p> <p>Loss of fauna due to habitat disturbance.</p>	<p><b>Objective(s):</b></p> <p>To ensure that fauna found on site are protected and not interfered with.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>The contractor must ensure that the site is kept clean and free of litter that could potentially attract animal pests, and that refuse bins are scavenger proof.</li> <li>The contractor must report problem animals or vermin to the ECO. A high probability exists that domestic animals from the neighbouring communities will scavenge the site.</li> <li>Ensure that domesticated and livestock animals belonging to the local community are kept away from the construction works.</li> <li>The contractor may under no circumstances make use of pesticide or poison to control unwanted animals.</li> <li>Workers should be educated so as not to kill any fauna found on site.</li> <li>The footprint of disturbance should be kept to a minimum.</li> <li>Hunting or trapping is strictly prohibited. Anyone found guilty of such an act will be removed from the project.</li> <li>Access roads should be planned so that only minimum linear distances are developed.</li> <li>Excavations must be checked on a daily basis for any signs of fauna which may have fallen in.</li> </ul>	<p>No evidence of domestic animals on site.</p> <p>The site is kept clean and does not attract fauna.</p>	Contractor, CECO.	Contract and allowance in P&G's	Throughout the construction and post construction period.	ECO	Ongoing



# 11 AIR QUALITY

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
11.1 Trenching and transport or soils.	Dust, smoke and emission control	Air pollution	<p><b>Objective(s):</b> To reduce the generation of dust and emissions on the construction site.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Dust suppression is to be conducted during construction.</li> <li>The use of enclosures, screens and sheeting should be considered to contain dust at defined locations, e.g. batching plants, etc.</li> <li>The Contractor is to take appropriate measures to minimise the generation of dust as a result of excavation works. Such measures include frequent spraying during low rainfall periods or by using chemical dust binding agents approved by the ECO.</li> <li>Paved or surfaced roads should be used where possible. Where none are available, haul roads should be cleaned of loose material to prevent dust.</li> <li>Speed limits must be enforced in all areas to reduce the generation of dust.</li> <li>Cover dump trucks before traveling on public roads or relevant as per ECO-approved method statement.</li> <li>Keep soil loads below the freeboard of the truck to minimise fugitive dust.</li> <li>Minimise drop heights when loaders dump soil into trucks.</li> <li>Re-vegetate disturbed areas as soon as possible after disturbance.</li> <li>When feasible, shut down idling construction machinery.</li> <li>Tighten gate seals on dump trucks.</li> <li>No burning on site and close to settlements.</li> </ul>	Dust is kept at its lowest level on site.	Contractor and CECO.	Contract and allowance in P&G's	Throughout construction period.	ECO	During periods of low rainfall or as required by the ECO.

# 12 WATER

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
12.1 Construction activities in or around watercourses.	Wet areas	Unnecessary removal of aquatic flora.	<p><b>Objective(s):</b> Avoid and/ or mitigate activities in or around watercourses (including wetlands, rivers, etc.) to prevent negative impacts.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>All designs should include means to protect or maintain the current hydrological regime.</li> <li>A Stormwater Management Plan must be developed and implemented during the construction phase.</li> <li>Stormwater management systems should include energy dissipation structures to minimize the potential impact or erosion and sedimentation</li> <li>Surface water management features such as the crossing of drainage lines should be placed in a manner to ensure flows remain unaltered in terms of direction, velocity and volume, thus the natural base flows, i.e. hydrological regime within these systems is maintained.</li> <li>Excess ballast during construction and operation is not allowed to enter any watercourse areas, culverts etc. to prevent alterations of these systems by forming impoundments.</li> <li>Clearing of vegetation should be kept to a minimum</li> <li>No vehicular traffic shall be allowed outside the construction servitude/ path in wet areas and along the boundaries of pans. No equipment shall be used outside the construction path which may cause irreparable damage to wet areas</li> </ul>	No damage to wet areas.	Contractor and CECO.	Contract and allowance in P&G's	During the establishment of the construction sites along the alignment.	ECO	During whole construction period.

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>• The wet areas outside the immediate railway servitude must be marked as “no-go zones” to prevent unauthorised access to these sensitive areas by construction activities.</li> <li>• The conditions contained in the water use license must be adhered to.</li> <li>• No water may be abstracted from local water sources (including farm dams) unless such abstraction is approved by the Department of Water Affairs or the relevant authorised user.</li> <li>• Where culverts are installed across drainage lines and watercourses, the proposed designs should ensure that natural ground levels are maintained, i.e. the culvert base does not pose an obstacle to the movement of aquatic organisms</li> </ul>						

# 13 NOISE

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
13.1 Construction activities	Construction vehicles, plant and machinery.	Noise and vibration.	<p><b>Objective(s):</b> Reduction in the amount of noise on site.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Working hours are to be viewed as 06:00 to 18:00 on weekdays and 07:00 to 15:00 on Saturdays.</li> <li>Should construction have to continue after hours, all residents affected must be notified.</li> <li>All machinery and equipment must be maintained in good working order, and fitted with approved and specified muffler systems.</li> </ul>	<p>Construction vehicles and machinery fitted with mufflers silencers.</p> <p>Working hours are adhered to.</p>	Contractor and CECCO.	Contract and allowance in P&G's	<p>The vehicles and machinery must be fitted with mufflers prior to the commencement of construction.</p> <p>Work hours, unless otherwise permitted, must be adhered to through the construction period.</p>	ECO	Ongoing

# 14 SOCIAL

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
14.1 Creation of employment opportunities and social benefits.	Employment opportunities and social benefits	Maximisation of opportunities and benefits in the local area	<p><b>Objective(s):</b> To ensure that temporary employment opportunities and social benefits are maximised.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>• Make use of local labour as far as possible.</li> <li>• Liaise with local community structures (e.g. employment forums) to identify local labour pool.</li> <li>• Include conditions in construction contract to involve and train emerging BEE companies.</li> </ul>	<p>Maximised local job opportunities afforded to local community.</p> <p>Construction contracts contain training and involvement of emerging BEE companies.</p>	Contractor, Transnet.	Contract and allowance in P&G's	For the duration of the construction period.	ECO	Ongoing
14.2 Influx of job seekers	Influx of job seekers in the area surrounding the site.	Population increase in the immediate social environment. Additional demand for services and infrastructure.	<p><b>Objective(s):</b> To ensure that the potential population influx is adequately mitigated to limit adverse effects on the social environment.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>• Make use of local labour as far as possible.</li> <li>• Liaise with farmers, local community structures and the local municipality to identify mutually acceptable means of controlling the influx of job seekers.</li> <li>• Recruitment is to be conducted via the Employment Forum and not within the project area itself.</li> </ul>	<p>Local labour made use of for construction phase.</p> <p>Adequate structures utilised for controlling influx and recruiting workers.</p>	Contractor, Transnet.	Contract and allowance in P&G's	For the duration of the construction period.	ECO	During construction
14.3 Outflow of labour	Outflow of labour from the area.	Current employers left to re-train other labourers.	<p><b>Objective(s):</b> To ensure that the potential outflow of labour is adequately mitigated to limit adverse effects on local employers and the social environment.</p>	Targets achieved.	Contractor, Transnet.	Contract and allowance in P&G's	For the duration of the construction period.	ECO	During construction

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
		Setback for farm management. Creation of migrant community. Spread of STDs.	<b>Target:</b> <ul style="list-style-type: none"> <li>Develop skills transfer plans that would enable a worker to move from one project to another within the same area / region.</li> <li>Implement methods to create HIV and STI awareness amongst construction workers.</li> </ul>						
14.4 Creation of informal settlements and accommodation for construction staff.	Creation of informal settlements in the area. Management of housing areas for workers.	Increase in social pathologies. Increase in service infrastructure.	<b>Objective(s):</b> To ensure that the potential creation of informal settlements is adequately mitigated to limit adverse effects on the social environment.  <b>Target:</b> <ul style="list-style-type: none"> <li>Facilitate the establishment of a community safety committee to monitor and control illegal squatting as per section 3 of this EMP.</li> <li>Transnet employees who receive living-out allowances should be required to provide proof that this allowance is used for formal accommodation.</li> <li>Include a requirement in the Conditions of Service of construction contractors that construction workers must be vacated from the area once construction is complete.</li> <li>The proportion of job opportunities allocated to local residence must be maximised, thus reducing the need for outsiders.</li> <li>Provision of sufficient entertainment facilities (e.g. a lounge with TV, pool table etc.).</li> <li>The construction village must be removed after construction activities have finished, or alternatively donated to the local municipality for formal housing. The village may also be converted to permanent housing for labourers during the operational phase.</li> </ul>	Targets achieved.	Contractor, Transnet.	Contract and allowance in P&G's	For the duration of the construction period.	ECO	During construction
14.5 Population influx and	Social pathologies and increase in crime in the	Increase in crime. Increase in conflict between	<b>Objective(s):</b> To ensure that the potential influx of population is adequately mitigated to limit the possible social pathologies associated therewith.	Targets achieved.	Contractor, Transnet.	Contract and allowance	For the duration of the construction	ECO	During construction

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
crime	area.	newcomers and local residents.  Increase in alcoholism, drug abuse, prostitution and spread of STDs.	<p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Additional security must be provided during the construction period by the contractors. This should be integrated with existing farm / community security systems.</li> <li>Construction workers should be clearly identifiable. Overalls should have the logo of the construction company on it and construction workers should wear identification cards.</li> <li>Construction site to be fenced and access to be controlled.</li> <li>Loitering of outsiders at either the construction site or at the construction camps should not be allowed. Local SAPS should be requested to assist in this regard.</li> <li>Implement HIV / AIDS and alcohol abuse campaigns in the communities.</li> <li>Align awareness campaigns with those of other organisations in the area (i.e. the local municipality).</li> </ul>			in P&G's	period.		
14.6 Physical intrusion	Physical intrusion of the new project on the existing environment.	"Sense of place" negatively affected.	<p><b>Objective(s):</b></p> <p>To ensure that the potential influx of job seekers in the area is adequately mitigated to limit the possible increase in crime levels.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Working hours are to be strictly adhered to (see section 13.1).</li> <li>Do not engage in construction activities during church gatherings or at night as far as possible. Should this be unavoidable due to construction time constraints, the applicable parties and affected persons must be notified of such planned construction in good time.</li> <li>Ensure that business and works conducted on adjacent and surrounding properties are not negatively affected by construction activities.</li> </ul>	Targets achieved.	Contractor, Transnet.	Contract and allowance in P&G's	For the duration of the construction period.	ECO	During construction

# 15 ARCHAEOLOGICAL AND HERITAGE SITES

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
15.1 Protection of archaeological sites	Heritage & Archaeology	Destruction of graves and other sites of archaeological and heritage value.	<p><b>Objective(s):</b> To ensure that sites of archaeological interest are preserved.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>The following heritage structures and issues as described in the Heritage Impact Assessment (HIA) report must be considered no go areas. Should construction impact on these structures be unavoidable, the necessary permits must be applied for as described in the HIA report: <ul style="list-style-type: none"> <li>The station building at Lothair;</li> <li>Part of the old station at Estancia;</li> <li>The station at Burgerspan (water tanks and water intake point); and</li> <li>The three span metal truss bridge across the Vaal River</li> </ul> </li> <li>All sandstone culverts identified in the HIA must be adequately documented and destruction permits applied for through the South African Heritage Resources Agency (SAHRA).</li> <li>Various graves, cemeteries and burial grounds were identified in section 5.4.4 of the HIA report. Should these graves not be directly affected by the actual construction of the railway line, but fall within the servitude, they should be ring fenced and classified as a no-go area.</li> <li>Furthermore, all graves within a 100 m buffer zone from the centre of the railway line, but outside the servitude must be located via the coordinates contained in the HIA and temporarily fenced off with danger tape during the</li> </ul>	<p>No places of archaeological value are being disturbed or affected due to the construction of the railway line.</p> <p>No destruction of or damage to known archaeological sites.</p> <p>Management of existing sites and new discoveries in accordance with the recommendations of the Archaeologist</p>	Contractor, CECO.	Contract and allowance in P&G's	For the duration of the construction period.	ECO	Ongoing





Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>construction period in the specific area.</p> <ul style="list-style-type: none"> <li>Graves which cannot be avoided are to be relocated following the due process as outlined in Appendix 3 of the HIA report.</li> <li>Artefacts may not be removed under any circumstances except with a valid permit from SAHRA and where necessary for construction purposes.</li> <li>Any destruction of a site will only be allowed once a permit is obtained and the site has been mapped and documented.</li> <li>Permits shall be obtained from SAHRA should the proposed development cause any sites to be destroyed or altered.</li> <li>Should any archaeological sites be uncovered during construction, their existence shall be reported to the Transnet PM immediately.</li> <li>An archaeologist will then take the necessary action so that construction can continue.</li> <li>Construction must be immediately stopped, should any elements of cultural or heritage significance be found.</li> <li>A qualified and registered archaeologist must be consulted at such a finding to appropriately excavate any artefacts in agreement with SAHRA.</li> </ul>						
	Monuments & Historical sites	Damage or loss of monuments or historical sites. Vandalism, theft of such sites	<p><b>Objective(s):</b> To protect sites and land considered to be of cultural value. To protect sites against vandalism, destruction and theft.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>All monuments, heritage sites and historical sites shall be treated with the utmost respect.</li> <li>All graves shall be clearly marked and treated as no go areas as covered above.</li> <li>Destruction of such sites is strictly not allowed. Should it be necessary to remove any sites, the necessary procedures shall be followed and permits</li> </ul>	<p>No destruction of or damage to known sites.</p> <p>Management of existing sites and new discoveries in accordance with legislation.</p> <p>No litigation due to destruction of sites.</p>	Contractor, CECO.	Contract and allowance in P&G's		ECO	During construction



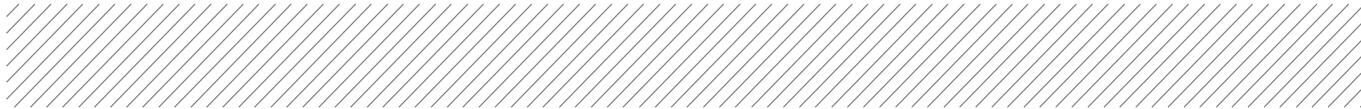
Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			obtained.						
	Farmhouses & Buildings	Damage or loss of farmhouses or buildings of heritage value	<p><b>Objective(s):</b> To have control over actions and activities in close proximity to inhabited areas</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>• If and where the lines cross any inhabited area, the necessary precautions shall be taken by the Contractor to safeguard the lives and property of the inhabitants.</li> <li>• The Contractor shall under no circumstances interfere with the property of Landowners.</li> <li>• If water is required, the Contractor shall negotiate with the relevant Landowner and a written agreement shall be drawn up.</li> </ul>	<p>No complaints from Landowners.</p> <p>No damage to private property of heritage value.</p>	Contractor, CECO.	Contract and allowance in P&G's		ECO	During construction

# 16 PLANNING AND ENGINEERING

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
16.1 Construction activities	Existing infrastructure	Disruption of services, damage to installations, damage or loss of plant	<p><b>Objective(s):</b></p> <ul style="list-style-type: none"> <li>To have control over and prevent temporary or permanent damage to plant and infrastructure;</li> <li>To prevent interference with the normal operation of plant and infrastructure; and</li> <li>Securing the safe use of infrastructure, plant and infrastructure have control over actions and activities in close proximity to inhabited areas.</li> </ul> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Where construction vehicles need to cross underneath electrical power lines or cables, sufficient access will be ensured to prevent vehicles from coming into contact with electricity.</li> <li>Where pipe lines are found along the route, the depth of the pipes under the surface shall be determined to ensure that proper protection is afforded to such structures.</li> <li>Any damage to pipe lines shall be repaired immediately.</li> <li>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.</li> <li>Speed limits shall be enforced in such areas and all drivers shall be sensitised to this effect.</li> <li>Upon completion of the project all roads directly damaged by construction activities shall be repaired to their original state.</li> <li>Interruptions of existing services must be carefully planned. If possible,</li> </ul>	<p>No unplanned disruptions of services.</p> <p>No damage to any plant or installations.</p> <p>No complaints from authorities or Landowners regarding disruption of services.</p> <p>No litigation due to losses of plant, installations and crops.</p>	Contractor, CECO.	Contract and allowance in P&G's		ECO	During construction

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>disruptions must be kept to a minimum and should be well advertised and communicated to the Landowners should they be affected by such service interruptions.</p> <ul style="list-style-type: none"> <li>Care must be taken not to damage irrigation equipment, lines, channels and crops.</li> <li>The position of all pipelines and irrigation lines must be obtained from the Landowners and be shown on the physical access plan.</li> </ul>						
16.2 Batching concrete	Batching plants (if applicable)	<p>Damage to vegetation.</p> <p>Damage to topsoil.</p> <p>Surface water contamination.</p> <p>Disturbance to area.</p>	<p><b>Objective(s):</b></p> <p>To ensure all agreements with Landowners are adhered to. To prevent complaints arising from batching plant/ activities from Landowners. Successful rehabilitation of disturbed areas</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>The siting of batching plants shall be done in conjunction with the PM and ECO.</li> <li>Transnet specifications regarding batching plants must be adhered to.</li> <li>The batching plant area shall be operated in such a way as to prevent contaminated water to run-off the site and polluting the nearby streams or water bodies.</li> <li>Transnet PM shall ensure that all agreements reached with the Landowner are fulfilled, and that such areas be rehabilitated once construction is completed</li> </ul>	<p>No complaints from Landowners.</p> <p>All disturbed areas successfully rehabilitated three months after completion of the Contract.</p>	Contractor, CECO.	Contract and allowance in P&G's			During construction
16.3 Construction activities on private land	Interaction with Landowners	<p>Damage to expensive structures and crops.</p> <p>Disruption of</p>	<p><b>Objective(s):</b></p> <p>To create sound and sustainable relationships with Landowners</p> <p><b>Target:</b></p>	No delays in the project due to Landowner interference.	Contractor, CECO.	Contract and allowance in P&G's		ECO	During construction

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
		services.	<ul style="list-style-type: none"> <li>The success of the project depends a lot on the good relations with the Landowners. It is required that the Contractor will supply one person to be the liaison officer (CLO) for the entire contract, and that this person shall be available to investigate all problems arising on the work sites concerning the Landowners.</li> <li>All negotiations for any reason shall be between Transnet, the Landowner and the Contractor.</li> <li>No verbal agreements shall be made. All agreements shall be recorded properly and all parties shall co-sign the documentation.</li> <li>The Contractor shall keep a photographic record of access roads. This will then be available should any claims be instituted by any Landowners.</li> <li>All claims instituted by the Landowners shall be investigated and treated promptly.</li> <li>Unnecessary delays should be avoided at all costs.</li> <li>The Landowners shall always be kept informed about any changes to the construction program should they be affected.</li> <li>If the ECO is not on site the Contractor's liaison officer should keep the Landowners informed.</li> <li>The contact numbers of the Contractor's liaison officer and the Transnet's ECO shall be made available to the Landowners. This will ensure open channels of communication and prompt response to queries and claims.</li> <li>All contact with the Landowners shall be courteous at all times.</li> <li>The rights of the Landowners shall be respected at all times and all staff shall be sensitised to this.</li> </ul>						
16.4 Actions by site staff	Littering on site	Untidy and polluted site and surrounding land	<b>Objective(s):</b> To maintain a neat and tidy workplace	No visible sign of littering.  No complaints from	Contractor, CECO.	Contract and allowance in P&G's		ECO	During construction



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<b>Target:</b> <ul style="list-style-type: none"><li>Littering by the employees of the Contractor shall not be allowed.</li><li>The ECO shall monitor the neatness of the work sites as well as the campsite.</li></ul>	Landowners					

# 17 REHABILITATION

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
18.1 Rehabilitation of construction site	Rehabilitation	Fauna and flora.	<p><b>Objective(s):</b> To minimise damage to topsoil and environment at construction areas. Successful rehabilitation of all damaged areas. Prevention of erosion</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>All areas earmarked for construction shall have the topsoil removed separately and stored for later use during rehabilitation of such areas.</li> <li>All backfill should be reinstated in the layers in which they were encountered.</li> <li>Re-seeding shall be done on disturbed areas as directed by the ECO.</li> <li>Other methods of rehabilitation may also be used at the discretion of the ECO, e.g. stone pitching, logging, etc.</li> </ul> <p>A mixture of grass seed can be used provided the mixture is carefully selected to ensure the following:</p> <ul style="list-style-type: none"> <li>Annual and perennial grasses are chosen;</li> <li>Pioneer species are included;</li> <li>Species chosen will grow in the area without many problems;</li> <li>Root systems must have a binding effect on the soil; and</li> <li>The final product should not cause an ecological imbalance in the area</li> </ul> <ul style="list-style-type: none"> <li>Maintenance of the re-seeded areas shall be conducted until an acceptable cover has been established, meaning 75% ground cover with no gaps exceeding 500 mm. Maintenance includes watering, mowing and weeding</li> </ul>	<p>No loss of topsoil due to construction activities.</p> <p>All disturbed areas successfully rehabilitated within three months of completion of the Contract.</p> <p>No visible erosion scars three months after completion of the contract.</p>	Contractor, CECO.	Contract and allowance in P&G's	<p>Gradually throughout construction as sections of works are completed.</p> <p>Post construction phase.</p>	ECO	During construction

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>as well as preventing the development of erosion channels.</p> <ul style="list-style-type: none"> <li>• To get the best results in a specific area, consult with a specialist or the local extension officer of the Dept of Agriculture.</li> <li>• Re-seeding, as well as fencing in of badly damaged areas, will always be at the discretion of the ECO, unless specifically requested by a Landowner.</li> <li>• The removal of all construction facilities and materials from the construction camp will be required, and rehabilitation carried out. This includes the removal of concrete and compacted earth platforms, fuel storage tanks and chemical toilets.</li> <li>• All access roads not required for operational purposes shall be rehabilitated.</li> <li>• Railway lines earmarked for uplifting due to new railway line turns being constructed must be completely rehabilitated according to these specifications. All waste from such uplifting must be removed as required by the EMPr.</li> <li>• Any contaminated material or soil must be removed to a registered hazardous waste disposal facility and the prescribed re-vegetation process must then be followed thereafter.</li> <li>• Rehabilitation must be carried out as soon as possible after the construction is completed. All rehabilitation is to be done with approval of Transnet environmental management department.</li> <li>• The rail reserve shall be fenced once rehabilitation has been completed.</li> <li>• All access and maintenance roads to be utilised during the operational phase shall be cleared of any alien and/or invasive plant species. Transnet must ensure the proper upkeep of such roads is included in their operational management plans and systems. The applicable requirements from this EMPr is to be included in such a plan.</li> </ul>						







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