Final Environmental Impact Report

Proposed Mamathwane Compilation Yard, Northern Cape

Transnet SOC Limited

DEA Ref: 14/12/16/3/3/2/405

March 2013

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<td>kV</td>
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<td>m²</td>
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<td>NOₓ</td>
<td>Nitrous Oxide</td>
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<td>R</td>
<td>South African Rand</td>
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<tr>
<td>SO²</td>
<td>Sulphur Dioxide</td>
</tr>
<tr>
<td>VOCs</td>
<td>Volatile Organic Compounds</td>
</tr>
</tbody>
</table>
**TERMINOLOGY**

**Administrative Framework:** The compendiums of requirements with which the project is required to, and/or has chosen to, comply with. This will typically include the following:

- Legal requirements (laws, regulations, decrees, etc.);
- International treaties or conventions, including those ratified by the country in which the project will occur and potentially those non ratified;
- Internal corporate standards (e.g., company specific environmental performance standards, company specific impact assessment standards);
- Programme requirements (e.g. IFC Performance Standards, EHS Guidelines); and
- Jurisdictional policies.

**Affected Community:** Any community that is subject to actual, or potential, project related positive or negative impacts on its social, physical, economic, cultural or natural environment. Such communities often include those located in the projects near geographical proximity, particularly those contiguous to the proposed project facilities. However, more distant communities may also be affected by project impacts, for example those communities where construction workers are housed.

Community, in general terms, refers to a group of people or families, who live in a particular locality, sometimes share a common interest (e.g., water users, fishers, herders, grazers, etc), often have common cultural and historical heritage and exhibit varying degrees of cohesiveness.

**Alternative:** A possible course of action, in place of another, that would meet the same purpose and need (of the proposal). Alternatives can refer to any of the following, but are not limited to, alternative sites for development, alternative projects for a particular site, alternative site layouts, alternative designs, alternative processes and alternative materials.

**Area of Influence:** Under International Finance Corporation (IFC) Performance Standard 1, “Area of Influence” is defined to encompass:

- The area likely to be affected by;
- The Project and the client’s activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project;
- Impacts from unplanned but predictable developments caused by the project that may occur later or at a different location;
- Indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities’ livelihoods are dependent;
• Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable.
• Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

Following on from this definition, the Area of Influence includes the following:

• The primary project site(s) and related facilities that the project Proponent develops or controls (e.g., power transmission corridors, pipelines, canals, tunnels, access roads, borrow and disposal areas, construction camps) and the additional areas in which aspects of the environment could conceivably experience significant impacts;
• Associated facilities that are not developed and funded as part of the project, but are essential for the project and without which the project cannot proceed, and the associated additional areas in which aspects of the environment could conceivably experience significant impacts;
• Areas potentially affected by cumulative impacts resulting from other developments known at the time of the impact assessment (IA), further planned phases of the project or any other existing circumstances; and
• Areas potentially affected by impacts from predictable (but unplanned) developments as a result of the project (i.e., induced activities), occurring at a later stage or at a different location.

Note that the Area of Influence for a particular resource/receptor may vary depending on the nature of the change caused by the project activities and the type of effect being considered. The Area of Influence thus takes into account:

• The physical extent of the proposed project activities; and
• The nature of the affected resource, the source of impact and the manner in which the resultant impact is likely to be propagated beyond the physical extent of the project activities.

**Ballast:** Track ballast forms the trackbed upon which railway sleepers are laid. It is packed between, below, and around the ties. It is used to bear the load from the railroad ties, to facilitate drainage of water, and also to keep down vegetation that might interfere with the track structure. This also serves to hold the track in place as the trains roll by. It is typically made of crushed stone, although ballast has sometimes consisted of other, less suitable materials. The term ‘ballast’ comes from a nautical term for the stones used to stabilize a ship.

**Bulk Material:** This material is used for earthworks within the rail prism before the construction of the structural sub-ballast layers (see *sub-ballast*...
below). The bulk material is comprised of material found in-situ and some fill material from elsewhere, if required.

**Competent Authority:** The environmental authority at the national, provincial, or local level entrusted in terms of legislation, with the responsibility for granting approval to a proposal or allocating resources and for directing or coordinating the assessment of a proposal that affects a number of authorities.

**Culvert:** A metal or concrete pipe/structure placed below a road or railway to allow drainage systems to function as naturally as possible.

**Cutting:** The section of a hill, or mountain, which is cut away to keep a road or railway line straight and/or flat.

**Embankment:** A section of land, over which a road or rail line will travel, which is built up to form a large mound or embankment to keep a road or railway line straight and/or flat. Embankments are often constructed using material obtained from a cutting.

**Environment:** The surroundings within which humans exist and that are made up of:

- The land, water and atmosphere of the earth;
- Micro-organisms, plant and animal life;
- Any part or combination of (i) and (ii) and the interrelationships among and between them; and
- The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being. This includes the economic, social, cultural, historical and political circumstances, conditions and objects that affect the existence and development of an individual, organism or group.

**Environmental Assessment:** The generic term for all forms of environmental assessment for projects, plans, programmes or policies. This includes methods/tools such as environmental impact assessment, strategic environmental assessment, sustainability assessment and risk assessment.

**Impact:** The positive or negative effects on human well-being and/or on the environment.

**Interested and Affected Parties:** Individuals, communities or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by the proposal or activity and/or who are concerned with a proposal or activity and its consequences.

**Level Crossing:** A level crossing is a crossing of a railway line by a road or path without the need to construct a bridge or tunnel.
**Loop:** A passing loop, or crossing loop, is a point on a single line railway where trains, that are travelling, in opposing directions can pass each other.

**Mitigate:** The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.

**Project Footprint:** An area that may reasonably be expected to be physically touched or altered by project activities across all phases (construction, operation and decommissioning). The project footprint includes land used on a temporary basis, such as construction lay down areas or construction haul roads, as well as disturbed areas in transport corridors, both public and private.

**Project Site:** The (future) primary operational area for the project activities. Private transport corridors (i.e. those dedicated for use solely by project operational activities) are included as part of the project site.

**Scoping:** The process of identifying the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an environmental assessment. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined.

**Significance:** Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability). It is an anthropocentric concept (when one regards humankind as the most important element of existence), which makes use of value judgements and science-based criteria (i.e. biophysical, social and economic).

**Stakeholder Engagement:** The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities.

**Study Area:** The area that needs to be studied in order to adequately understand and describe the baseline likely to be affected by the project (e.g. for the ecological baseline assessment, 500m from the development is included in the study area).

**Sub-base Material:** This material is used to construct the top layers of the rail prism onto which the ballast, sleepers and rail is then placed.

**Turnouts:** A turnout is a structure along the railway line where a single track divides into two tracks and is used to divert trains from one track to another.
INTRODUCTION

1.1 PROJECT APPLICANT

Transnet State Owned Company (SOC) Limited (Transnet) is a wholly state owned company in South Africa, which strives to enable competitiveness, growth and development of the South African economy by delivering reliable freight transport and handling services that satisfy customer demand.

Transnet’s mandate is to assist in lowering the cost of doing business in South Africa, enabling economic growth and ensuring security of supply through providing appropriate port, rail and pipeline infrastructure in a cost-effective and efficient manner (Transnet Sustainability Report, 2012).

Transnet operates as an integrated freight transport company and contains five divisions. These operating divisions focus on the operational aspects of Transnet’s business and are supplemented by specialist units such as Transnet Property; Transnet Foundation and Transnet Capital Projects. The five separate divisions mentioned above include:

- Transnet Freight Rail (TFR);
- Transnet Engineering (TE);
- Transnet National Ports Authority (TNPA);
- Transnet Port Terminals (TPT); and
- Transnet Pipelines (TPL).

The above divisions focus on the operational aspects of Transnet’s business and are supplemented by three specialist units including: Transnet Property; Transnet Foundation and Transnet Capital Projects.

1.2 PROJECT RATIONALE AND OVERVIEW

Transnet intends to construct a new compilation yard at Mamathwane, Northern Cape (see Figure 1.1). This forms part of a broader project to expand the capacity of the existing manganese ore railway line from Hotazel in the Northern Cape to the Port of Ngqura in the Eastern Cape. This railway line currently transports a maximum of 5.5 Million tons per annum (Mtpa) of manganese ore from the mines in the Northern Cape. In 2008, Transnet, in association with the manganese ore mining industry, identified a need for a greater export capacity along the existing railway line to the Port of Ngqura. This led to Transnet’s decision to increase the export capacity from 5.5 Mtpa to 12 Mtpa. An environmental assessment was undertaken for this upgrade and environmental authorisation was obtained in 2009.

Subsequently, Transnet, in conjunction with the manganese mining industry, identified that a further upgrade of the railway line would be required, in
order to increase the capacity of the line from 12 Mtpa to 16Mtpa. Requirements for this additional capacity are related to the increased demand for manganese ore needed to supply the growing steel manufacturing industry (manganese ore forms part of the product mix during steel manufacturing).

As part of this expansion project, a new compilation yard (referred to as the Mamathwane Compilation Yard / Compilation Yard) is required in the northern section of the existing railway line (see Figure 1.2). This Compilation Yard will be used for the consolidation and deconsolidation of wagon trains. The facility will cover an area of 120ha and will be constructed adjacent to the existing railway line and will comprise five yard lines with crossovers (1) at third points. The Compilation Yard will receive wagon trains from various manganese mines in the region and consolidate them into 200 wagon trains that will then travel to the Port of Ngqura. Similarly empty wagon trains will be received at the Compilation Yard and deconsolidated to be returned to the manganese mines. Shunting diesel locomotives will be used to haul the empty 100 wagon trains to the mines.

The project site is located south of the Mamathwane Mine, approximately 15km south of Hotazel, and is comprised of the following parcels of land (see Figure 1.3 below):

- Portion 3 of Remainder of the farm Moab No. 700;
- Portion of Remainder of Portion 1 of the farm Shirley No 367;
- Portion of Remainder of Portion 2 of the farm Walton No 390; and
- Portion 2 of Remainder of the farm of Walton No 390.

A proposed layout of the Compilation Yard is shown in Figure 1.2.

1.2.1 Compilation Yard Infrastructure

The main Compilation Yard will be fully signalled with the rolling stock maintenance area of the yard being provided with automated yard signalling.

The Compilation Yard will comprise of five rail lines (2) and a balloon rail loop. The balloon loop will allow trains to change direction without having to shunt. Shunting is the process of sorting or shifting the wagons that move on a railway (known as rolling stock) into a complete train set. The yard also makes provision for the inspection and break testing of trains. More detail about the project and associated infrastructure and activities is provided in Section 2.

---

(1) A crossover is a pair of switches that connects two parallel rail tracks, allowing a train on one track to cross over to the other.

(2) The yard consists of two arrival lines and two departure lines where 200 wagon trains are compiled and from where the trains can depart. A central line is included for locomotives to run-around on.
Figure 1.1: Locality Map of the Transnet Mamathwane Compilation Yard

Legend
- Mamathwane Mine
- Sishen Mine
- Towns
- Existing Railway
- Contours (20m)
- River
- National Freeway Route
- Arterial Route
- Main Road
- Secondary Road

Study Area

Proposed Compilation Yard

Mamathwane Mine
Sishen Mine
Kathu
N14

To Hotazel
To Kuruman
To Olifantshoek

R380

Towards

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Map Showing Compilation Yard.mxd

Projection: Transverse Mercator, CM23. Datum: WGS 84

Source: NGI - 2722BD_15_2009_143_RGB_RECT.tif

Scale: 1:25,000

Title: Project Site Layout of the Transnet Mamathwane Compilation Yard - North and South Sections

Client: Transnet SOC Ltd

It is unlawful for any firm or individual to reproduce copyrighted maps, graphics or drawings in whole or in part, without permission of the copyright owner, ERM Southern Africa (Pty) Ltd.
1.3 **PURPOSE OF THIS REPORT**

Transnet has appointed Hatch Africa (Pty) Ltd (Hatch) to project manage the planning, engineering and associated studies for the railway upgrade. Hatch has subsequently appointed Environmental Resources Management Southern Africa (Pty) Ltd (ERM), as independent environmental consultants to undertake the Environmental Impact Assessment (EIA) process for the construction of the Mamathwane Compilation Yard.

ERM submitted an EIA Application for Authorisation to the Department of Environmental Affairs (DEA) on 24 August 2012. Approval to proceed with the EIA process was obtained from the DEA and the project was assigned a reference number: 14/12/16/3/3/2/405. Subsequently, an integrated application was submitted and accepted by DEA with the reference number 14/12/16/3/3/3/90.

A Draft and Final Scoping Report was compiled as part of the EIA process in accordance with the regulatory requirements stipulated in the EIA Regulations (Government Notice R543) promulgated in terms of Section 24(5) of the National Environmental Management Act (NEMA), as amended; the National Environmental Management: Waste Act (NEMWA); and the National Environmental Management: Air Quality Act (Act No. 39 of 2004). The objectives of these reports were, amongst others, to provide information to stakeholders, including the public and authorities, about the project and the EIA process. The Final Scoping Report also included a Plan of Study for the EIA which set out the proposed approach to the environmental impact assessment of the Compilation Yard and was accepted on 18 November 2013.

The next phase of the EIA process involved the compilation of a draft Environmental Impact Assessment Report with the following objectives:

- Communicate the results of the EIA process for the proposed development site as well as the alternatives considered;
- Ensure that the impacts identified during the EIA process are adequately addressed;
  - Show the Transnet’s response to the environmental concerns raised, and efforts taken by the Transnet towards mitigating/ enhancing the impacts/ benefits;
- Provide a record of comments and responses received from Interested and Affected Parties (I&APs) during the process; and
- Facilitate an informed, transparent and accountable decision-making process by the relevant authorities.

The information contained in this EIA Report, along with comments and inputs received from stakeholders and commenting authorities will assist the competent authority, the National Department of Environmental Affairs (DEA), in deciding whether or not to grant environmental authorisation for the proposed development, and to inform the conditions associated with such authorisation.
1.4 **STRUCTURE OF THIS REPORT**

The structure of this EIA Report is as follows:

**Table 1.1 Outline of EIA Report structure**

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1 Introduction</td>
<td>Outlines the purpose of the report, introduces the EIA process and proposed project and provides an outline of the report structure.</td>
</tr>
<tr>
<td>Chapter 2 Project Description</td>
<td>Includes a detailed description of the proposed activities and the alternatives.</td>
</tr>
<tr>
<td>Chapter 3 EIA Process</td>
<td>Describes the specific process followed to date for this EIA process, including the public engagement, specialist studies and way forward.</td>
</tr>
<tr>
<td>Chapter 4 EIA Approach and Methodology</td>
<td>Outlines the approach to the study and the EIA methodology used to assess the significance of impacts.</td>
</tr>
<tr>
<td>Chapter 5 Administrative Framework</td>
<td>Describes the legislative and policy requirements for the proposed project. This includes a breakdown of the applicable pieces of legislation and associated policies/guidelines.</td>
</tr>
<tr>
<td>Chapter 6 Biophysical and Socio-economic baseline environment</td>
<td>Summarises the current baseline environment, presented for the socio-economic and bio-physical environment.</td>
</tr>
<tr>
<td>Chapter 7 Impact Assessment and Mitigation</td>
<td>Describes and assesses the potential impacts of the proposed project with respect to the different project components and provides mitigation measures to reduce negative impacts and enhance project benefits.</td>
</tr>
<tr>
<td>Chapter 8 Project Environmental Specification (PES)</td>
<td>Describes the mitigation and management of those aspects of the project that are not included in Transnet’s generic Environmental Management Plan (EMP) documents.</td>
</tr>
<tr>
<td>Section 9 Conclusions and Recommendations</td>
<td>Outlines the conclusions of the EIA process recommendations going forward.</td>
</tr>
<tr>
<td>Section 10 References</td>
<td>Contains a list of references used in compiling the report.</td>
</tr>
</tbody>
</table>

1.5 **DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER**

1.5.1 **ERM Southern Africa**

ERM is a global environmental consulting organisation employing over 3,500 specialists in over 145 offices in more than 41 countries. Founded in 1971, ERM has built an organisation based on the supply of a full range of environmental and social policy, scientific, technical, and regulatory expertise. ERM’s primary focus is to provide quality work and service to our clients in these areas.

From a regional perspective ERM has been involved in numerous projects in Africa over the past 30 years and in 2003 established a permanent presence in Southern Africa to meet the growing needs of our clients. The Southern African ERM offices are based in Cape Town, Johannesburg, Pretoria and
Durban. ERM Southern Africa has a staff complement of over 120 dedicated environmental professionals offering expert skills in EIA, EMPs, EMS, risk assessment, EHS management and auditing, corporate social responsibility and socio-economic impact assessment, climate change services, specialist groundwater services as well as contaminated site management.

ERM Southern Africa has undertaken a number of EIAs for Transnet facilities across South Africa. In 2012 ERM was again appointed by Hatch to undertake the EIA for the Mamathwane Compilation Yard. ERM, and specialists that have been appointed by ERM during the course of this EIA, have no financial ties to, nor are they a subsidiary, legally or financially of Hatch or Transnet. Remuneration for the services by the Applicant (Transnet) in relation to this EIA is not linked to approval by any decision-making authority and ERM has no secondary or downstream interest in the development.

1.5.2 Project Team

The project team includes ERM consultants, support staff and external specialists. Details of ERM’s core project team are provided below. Details of the external specialists that form part of the team are provided in Table 3.1.

Table 1.2 Expertise of ERM core team

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Education</th>
<th>Experience and Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stuart Heather Clark</td>
<td>Partner in Charge: BSc Civil Engineering – Univ. of Cape Town (1992) MPhil. Environ Science – Univ. of Cape Town (1996). EAPSA Certified</td>
<td>Stuart Heather-Clark is a Partner in the Impact Assessment and Planning Team within ERM Southern Africa based in Cape Town, South Africa. Mr Heather-Clark’s has over 17 years of experience in industrial, oil &amp; gas and infrastructure related ESIA and Strategic Environmental Assessments (SEA) throughout Africa. His experience has afforded him a sound understanding of the sustainability issues facing development in Africa. He has been involved in a number of internationally funded projects in Cameroon, Ethiopia, Zambia, Tanzania, Angola, Botswana, Namibia, Uganda and Mozambique. All of these projects involved interaction with lenders, developers, local stakeholders, including NGO’s, government officials and local communities. Mr Heather-Clark has an in-depth understanding of the Equator Principles and IFC performance Standards.</td>
<td></td>
</tr>
<tr>
<td>Tania Swanepoel</td>
<td>Project Manager: BSc Hons (Engineering &amp; Environmental Geology), University of Pretoria, 2000.</td>
<td>Tania Swanepoel is a Principal Consultant in the Impact Assessment and Planning team based in Cape Town, South Africa. Tania has over thirteen years of broad</td>
<td></td>
</tr>
</tbody>
</table>
Geohydrology, University of the Western Cape, 1997.

BSc (Geology, Mathematics), University of the Western Cape, 1996.

Registered Natural Scientist (Pr Sci Nat).

based environmental experience. Her experience includes environmental impact assessments, management plans, public participation, environmental site investigations, pollution risk assessments, remedial system monitoring, geotechnical investigations, groundwater monitoring and rural water supply & sanitation studies.

1.6 OPPORTUNITY TO COMMENT ON THE DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Interested and Affected Parties (I&APs) and authorities were provided with an opportunity to comment on any aspect of the project. The Draft EIA Report was made available for review at the Kathu Public Library and on the project website www.erm.com/transnet-expansion. A notification letter was sent to I&APs to inform them of the release of the Draft EIA Report, where it could be reviewed and that comments could be provided to ERM at the address, tel. /fax numbers or e-mail address shown below.

Stakeholder comments are captured in a Comments and Responses Report contained in Annex C.
PROJECT DESCRIPTION

2.1 PROJECT LOCATION AND EXISTING LAND USE

The project site is located approximately 3.5 km south of the existing Mamathwane Station, adjacent to the Mamathwane Mine which forms part of the Kalahari manganese fields. The project site is located within the John Taolo Gaetsewe District Municipality (JTG DM), in the Northern Cape Province of South Africa. The project site falls between two Local Municipal jurisdictions, namely the Gamagara Local Municipality (Gamagara LM) and the Joe Morolong Local Municipality (Joe Morolong LM); within two municipal wards, namely Ward 4 (in Gamagara LM) and Ward 5 (in Joe Morolong LM).

The portions of the proposed site not currently owned by Transnet are designated for agricultural use. Current practices comprise sheep/cattle farming and in the surrounding area the land uses include sheep/cattle farming as well as extensive mining. Refer to Figures 1.1, 1.2 and 1.3 for maps depicting the project locality, project layout and directly impacted properties. As demonstrated in Figure 1.2 above, the proposed Compilation Yard will be located in the vicinity of the existing Mamathwane Mine. Directly adjacent properties, together with their associated landuse is presented in Figure 1.3 above.

2.2 PROJECT COMPONENTS

The following buildings/facilities are included in the design of this Project:

- Security building;
- Wagon servicing slab;
- Diesel refuelling facility;
- Oil/water separator;
- Locomotive light maintenance shed;
- Relay rooms (operations room with track controls and signals);
- Railway triangle;
- Two shunter cabins; and
- Main operations building.

In addition, the following associated components will also be developed:

- New level crossings (and decommissioning of existing level crossing);
- New relay room;
- New station building;
- Storm water drainage as well as sewerage systems;
- Parking facilities;
- Extension of an existing culvert;
- A four metre wide maintenance road;
- A new run-off railway line;
- A new boundary fence;
- Temporary laydown areas;
- Sanding facility;
- Locomotive staging line
- A new road bridge that passes over the railway line;
- Deviation of the existing mine access road; and
- Common User Facility.

Existing infrastructure located on the project site includes the following:

- Mamathwane Eskom substation;
- Eskom 132 kV overhead power line; and
- Mamathwane station building.

The yard will be electrified to three kilovolts (kV) Direct Current (DC) with tangential turnouts\(^{1}\). A stockpile area will be constructed where manganese from smaller mining operations can be stored temporarily prior to loading onto trains. This portion of the yard will be known as the Common User Facility.

2.2.1 Common User Facility

The Common User Facility (CUF), which is to be located within the balloon loop will likely be the most significant component of this project (size wise).

The CUF will comprise the following:

- Internal access roads;
- Stockpile area;
- Haulage vehicles;
- Bulk fuel storage;
- Mechanical equipment for loading, offloading, stacking and reclaiming; and
- Stockpile areas.

Manganese ore will be road hauled (via road side-tippers or bulk trucks) to the Common User Facility from various smaller outlying mines without rail loading infrastructure and loaded into designated bins in the stockpile area. Front end loaders will predominantly be used for the movement of ore within the facility, including the building of stockpiles although ore may also be reclaimed by other means such as gravity feed conveyors. Based on available market information, it is envisaged that not more than 10% of 4 Mtpa (400,000 tons) will be stockpiled and cover an area of approximately 3600 m\(^2\).

\(^{1}\)A turnout is a structure along the railway line where a single track divides into two tracks and is used to divert trains from one track to another.
2.2.2 **Access and Internal Roads**

The existing rail reserve boundary fence will be demolished and a new one will be constructed around the Compilation Yard in order to limit general access. In addition to the existing service roads, a four metre wide maintenance road will be constructed along the length of the compilation yard, a new road over the rail bridge will be constructed and the existing mine access road will be deviated.

2.2.3 **Water Requirements**

The water required at the project site during the construction phase is estimated to total 153,300 m$^3$ while water requirements during operation are likely to be in the order of 64 kilo litres per day. Water will be sourced locally from proposed boreholes) or from the adjacent mine. Authorisation for water abstraction from the proposed boreholes has been applied for separately to the Department of Water Affairs (DWA) by Transnet.

2.2.4 **Borrow Pits**

No borrow pits will be required for the construction of the Compilation Yard. Material will likely be sourced from the surrounding mines.

2.3 **CONSTRUCTION CAMPS AND LAYDOWN AREAS**

A laydown area will be established at the project site and will contain a site office, chemical toilets and lock-up facilities for valuables. No fuel or oil will be stored within the laydown area of the project site.

2.4 **ENERGY USE**

Electricity during the construction phase will be provided by mobile generators in areas that have not been electrified. Electricity will be used for lighting and industrial use such as welding and powering electrical equipment.

2.5 **WASTE MANAGEMENT**

An oil/water separator with a capacity of approximately 49 m$^3$ will be installed adjacent to the locomotive maintenance shed. A waste storage area of 400 m$^2$ will also be established adjacent to the maintenance shed. This area will be used to store waste at the site in appropriately labelled containers before removal by an appropriately licenced contractor.

A waste management license (WML) application under the National Environmental Management: Waste Act for storage and transfer facilities.
forms part of the current application. The DEA will issue an integrated decision on the environmental authorisation and WML.

2.6 **SOCIO-ECONOMIC ASPECTS**

2.6.1 *Job Creation*

A number of both temporary and permanent jobs will be created through both the construction and operation phase of this project. Skilled, semi-skilled and unskilled labour will be required. Skilled labour will be sourced nationally and semi-skilled and unskilled labour will be sourced locally as far as practicable. It is estimated that the upgrade of the railway line including the establishment of the Compilation Yard will generate approximately 12 170 employment opportunities during the construction phase and 570 during the operational phase.

*Construction Phase (Temporary Labour)*

The construction of the Compilation Yard will require both skilled and unskilled personnel. Skilled labourers will be required to operate machinery and equipment on the project site. Skilled artisans and supervisors will also be required. Unskilled personnel will be used for manual labour.

*Operation Phase (Permanent Labour)*

The following types of personnel may be recruited for the operational phase of the project: administrators, private secretaries, yard masters, yard officials, yard foreman, sundry workers, section managers, chief shedmen, shed assistants, shedmen, train assistants, train control officers, service drivers, train drivers and general personnel.

2.7 **ALTERNATIVES**

In terms of the EIA Regulations and NEMA feasible and reasonable alternatives are required to be considered in the EIA process. Alternatives, in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include alternatives to:

(a) the property on which, or location where, it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity (No Go).
2.7.1 *Site Alternatives*

The following strategic alternatives were originally considered by Transnet as part of their logistics studies for various export corridors:

- The Port of Saldanha and the Port of Ngqura were investigated as alternative ports to export manganese ore. The existing railway line to the Port of Saldanha is used extensively for iron ore transport. Strategically it is considered preferable for manganese ore to be transported to the Port of Ngqura via the existing railway line.

- The alternative to relocate the entire railway line from Sishen to De Aar (and bypassing Kimberley) was also investigated and found to be unfeasible due to cost and environmental implications and risks.

- A new second railway line was considered for the entire length of the line however, this option was not considered feasible at present due to cost, as well as significant geographic constraints such as deep or narrow valleys and numerous river crossings.

There were two site alternatives considered for the project, the Mamathwane site and a site at Lohatla. There are two main reasons as to why the Lohatla site is considered unsuitable:

- The Lohatla site is further from the manganese mines than the Mamathwane site and will require less efficient shunting and hauling operations due to the consolidation and de-consolidation of 200 wagon trains into 100 wagon trains for supply to the mines.
  
  The topography of the landscape at the Lohatla site does not suit the requirements of the yard layout as a flat area is preferred.

2.7.2 *Design Alternatives*

Layout alternatives for the Mamathwane site were considered. In this regard, the design (i.e. length and number of lines in the Compilation Yard) was predominantly informed by the Compilation Yard’s ability to facilitate the consolidation and de-consolidation of 200 wagon trains.

2.7.3 *Activity Alternatives*

Activity alternatives relate to providing alternative ways of achieving the same objectives. In this project, the objective is to increase the number of wagon trains available to transport manganese ore along the existing railway line. This can only be achieved via rail if the infrastructure is able to deal with the consolidation and deconsolidation of wagons for 16 Mtpa (i.e. a compilation yard with sufficient capacity). An activity alternative would, therefore, relate to transportation by road, rather than rail.

Assessing the potential for road transport would require involvement of other role players and government and would require considerable input and investigation, owing to the large geographic scale of the study area and the
volumes that need to be transported. There are a number of advantages and disadvantages to road transport which include the following:

- **Advantages** - include opportunities for small entrepreneurs / road transport contractors to benefit from the associated employment and economic opportunities.
- **Disadvantages** - include the impact on the public in terms of road infrastructure maintenance, vehicle congestion, vehicle emissions and road safety; accessibility and extent of major road networks; and the cost of transport by road.

### 2.7.4 Process Alternatives

Process alternatives are dictated by various aspects including but not limited to the operating conditions, throughput needs and design requirements and/or restrictions. The most optimal solution is found by limiting the extent of infrastructure and rolling stock investments required. This is achieved by optimising the processes i.e. streamlining activities and using an optimal train length.

Shorter trains would result in increased train frequency and fleet size, with the latter carrying a significant capital cost. An increase in train frequency would require additional train slots in the overall schedule which would become more congested. This would therefore necessitate the construction of additional loops or loop extensions and the Compilation Yard would need to be of sufficient size to cope with the required consolidation and deconsolidation. This construction would carry a cost implication and potential environmental and social risks.

### 2.7.5 Material Alternatives

Due to the specialised nature of the material required for a project of this nature there are limited opportunities for considering material alternatives. Material requirements are dictated by train axle loads and design requirements so as to safely operate a compilation yard.

### 2.7.6 The No-go Alternative

The No-go alternative is the option of not implementing the project. Assuming that the Compilation Yard would not be constructed, the site would remain in its current state (i.e. previously disturbed in sections). There would be no direct negative environmental and socio-economic impacts associated with the construction and operation of the Compilation Yard.

Similarly, there would be no potential positive impacts associated with the construction and operation of the Compilation Yard if the project is not executed. An increase in the export capacity on the existing railway line between the Port of Ngqura and Hotazel will not be possible. This would indirectly have serious implications for South Africa’s mining sector and
would affect South Africa’s export capabilities. The intent of the proposed project serves to strategically improve the existing railway capacity to facilitate economic growth at a national and international level.

Not proceeding with this project would likely result in direct negative consequences for the provincial and national economy. Economic growth related to the export potential of the rail infrastructure will be hindered. Local effects would be related to a lack of stimulation in terms of employment and reduced opportunities for small and medium enterprises that would benefit from the project. Furthermore, local procurement opportunities would be impacted, thus negatively impacting on local suppliers.
Environmental Impact Assessment (EIA) is a systematic process that identifies and evaluates the potential impacts (positive and negative) that a proposed project may have on the biophysical and socio-economic environment, and identifies mitigation measures that need to be implemented in order to avoid, minimise or reduce the negative impacts and also identifies measures to enhance positive impacts. The overall EIA process required is shown schematically in Figure 3.1. It is not fully a linear process, but one where several stages are carried out in parallel and where the assumptions and conclusions are revisited and modified as the project progresses.
3.1 **SCOPING PHASE**

The first phase of the EIA process is the Scoping Phase. During this phase there is a strong emphasis on stakeholder engagement and understanding the baseline conditions of the project site and potential impacts that need to be investigated in further detail during subsequent phases of the EIA.

3.1.1 **Project Initiation**

As part of the project initiation ERM carried out an initial site reconnaissance visit from 1 to 5 October 2012. The purpose of the site visit was to familiarise
the project team with the project proposal and study area and to begin the environmental and social screening and scoping process.

3.1.2 Authority Consultation

ERM submitted an EIA Application for Authorisation to the DEA on 24 August 2012. DEA’s Acknowledgement of Receipt and approval to proceed with the Scoping Phase was received on 07 September 2012. DEA assigned the reference 14/12/16/3/3/2/405 to the project.

A Waste Management License Application has also been submitted to DEA (Reference number 12/9/11/L1181/8) and the application process for environmental authorisation and waste management licencing will be handled as an integrated process by DEA).

Subsequently, an integrated application form was submitted to the DEA and the reference number 14/12/16/3/3/3/90 was assigned to the project.

3.1.3 Approval of Scoping Report

The Final Scoping Report was submitted to the DEA on 14 May 2013 along with additional information submitted on 06 August 2013, 14 October 2013 and 01 November 2013. Acceptance of the Final Scoping Report by DEA was obtained on 18 November 2013.

3.2 SPECIALIST STUDIES PHASE

Specialists gathered data relevant to identifying and assessing environmental impacts that might occur as a result of the proposed project. Potential impacts were assessed according to a predefined assessment methodology included in the Scoping Report. Specialists also suggested ways in which negative impacts could be mitigated and benefits could be enhanced. The independent specialists responsible for the specialist studies are listed in Table 3.1.
Table 3.1 **Independent Specialist Studies and Appointed Specialists**

<table>
<thead>
<tr>
<th>Specialist Study</th>
<th>Name and Organisation</th>
<th>Qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archaeological, Heritage and Palaeontology</td>
<td>Elize Becker (Private Consultant)</td>
<td>BSc Hons, Archaeology and Anthropology, University of Pretoria</td>
</tr>
<tr>
<td></td>
<td>David Morris (peer review) (McGregor Museum)</td>
<td>Head of Archaeology at the McGregor Museum in Kimberley and PhD candidate at the University of the Western Cape</td>
</tr>
<tr>
<td></td>
<td>John Almond (Private Consultant)</td>
<td>PhD Earth Sciences (Palaeontology), University of Cambridge</td>
</tr>
<tr>
<td>Air Quality</td>
<td>Mark Zunckel (uMoya-NILU Consulting Pty Ltd)</td>
<td>PhD Meteorology, University of Witwatersrand</td>
</tr>
<tr>
<td>Noise and Vibration</td>
<td>Demos Dracoulides (DDA Environmental Engineers)</td>
<td>MSc Engineering, (Energy Studies), University of Cape Town</td>
</tr>
<tr>
<td>Botany and Terrestrial Ecology</td>
<td>Simon Todd (Simon Todd Consulting)</td>
<td>MSc, Cum Laude Conservation Biology University of Cape Town</td>
</tr>
<tr>
<td>Socio-Economic</td>
<td>Janet Mkhabela (ERM)</td>
<td>MA, Policy &amp; Development Studies, University of KwaZulu-Natal</td>
</tr>
<tr>
<td>Hydrological Assessment</td>
<td>Mr Retief Grobler (Imperata Consulting)</td>
<td>BSc (Hons) Botany, MSc Botany and wetland / riverine assessment</td>
</tr>
</tbody>
</table>

All specialist reports and declarations of independence are included in Annex F. The social specialist is employed by ERM and therefore acts as an independent environmental/ social practitioner within the EIA project team.

### 3.3 INTEGRATION AND IMPACT ASSESSMENT PHASE

The final phase of the EIA process is the Integration and Assessment Phase. The assessment of impacts proceeds through an iterative process considering three key elements:

a) **Prediction of the significance** of impacts that is the consequences of the proposals on the natural and social environment.

b) **Development of mitigation measures** to avoid, reduce or manage the impacts.

c) **Assessment of residual significant impacts** after the application of mitigation measures.
3.4 **PUBLIC PARTICIPATION**

Public participation forms part of the EIA process throughout its life cycle. *Table 3.2* provides details on the public participation tasks that have been undertaken to date.

**Table 3.2  Public Participation during the EIA Process**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Details</th>
<th>Reference in EIA Report</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Announcement Phase/Stakeholder Consultation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field visit to the Compilation Yard and public meetings in the town of Kathu.</td>
<td>Field visit during 1 – 5 October 2012 within the Northern Cape to gather baseline information, consult with key stakeholders, gather additional stakeholder information and put up site notices.</td>
<td>N/A</td>
</tr>
<tr>
<td>Distribution of project announcement letter and Background Information Document (BID).</td>
<td>BID and announcement documentation emailed and posted in English and Afrikaans to stakeholders on Wednesday 2 October and Thursday 3 October 2012.</td>
<td>Annexure C BID, letters, registration and comment sheet, adverts, site notices.</td>
</tr>
<tr>
<td>Placing of adverts.</td>
<td>Newspaper adverts, in English and Afrikaans, were placed in: • Somerset Budget on 04 October 2012; • Volksblad on 04 October 2012; • The Kathu Gazette on 06 October 2012; and • West and East Burger on 15 October 2012.</td>
<td>Annexure C BID, letters, registration and comment sheet, adverts, site notices.</td>
</tr>
<tr>
<td>Putting up of site notices.</td>
<td>English, Afrikaans, Xhosa and Tswana site notices were put up at the project site, local library and frequently visited shops within the study area.</td>
<td>Annexure C BID, letters, registration and comment sheet, adverts, site notices.</td>
</tr>
<tr>
<td>Identification of stakeholders.</td>
<td>Stakeholder database includes information from existing ERM databases, information provided by Transnet and stakeholder information gathered during the field visit.</td>
<td>Annexure B Stakeholder database.</td>
</tr>
<tr>
<td>Consultation with relevant stakeholders.</td>
<td>Consultations with key stakeholders and directly affected landowners were conducted between 24 September and 5 October 2012 in the Northern and Eastern Cape Provinces. All comments, issues of concern and suggestions were captured in the Comment and Response Report.</td>
<td>A Comment and Response Report was included in the Final Scoping Report.</td>
</tr>
<tr>
<td>Obtained comments from stakeholders.</td>
<td>Comments, issues of concern and suggestions received from stakeholders were captured in the Comment and Response Report.</td>
<td>A Comment and Response Report was included in the Final Scoping Report.</td>
</tr>
</tbody>
</table>

**Scoping Phase**

| Announcement of Draft Scoping Report. | Draft Scoping Report announcement were sent to I&APs on the stakeholder database during November 2012 together with a notification of the Kathu | Annexure C Public Participation material. |
The public review period extended from 19 November 2012 to 09 January 2013 (thus excluding the period of 15 December to 02 January). A newspaper advert was placed in the Kathu Gazette to invite stakeholders to public meetings and to announce the availability of the Draft Scoping Report for review.

**Making Draft Scoping Report available to I&APs.**

<table>
<thead>
<tr>
<th>Draft Scoping Report and accompanying documents were placed at the Kathu Public Library. The Draft Scoping Report was also available on the project website: <a href="http://www.erm.com/transnet-expansion">www.erm.com/transnet-expansion</a>.</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="#">Annexure C</a> Public Participation material.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stakeholder meetings.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The public meeting was held in the Kathu Community Hall on 05 December 2012. The public meeting was announced together with the announcement of the availability of the Draft Scoping Report.</td>
</tr>
<tr>
<td><a href="#">A Comment and Response Report and Meeting Minutes were included in the Final Scoping Report.</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Obtain comments from stakeholders.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comments, issues of concern and suggestions received from stakeholders during the Draft Scoping Report public review period were captured into the Comment and Response Report.</td>
</tr>
<tr>
<td><a href="#">A Comment and Response Report was included in the Final Scoping Report.</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Making Final Scoping Report available to I&amp;Ps</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Final Scoping Report was simultaneously submitted to the competent authority and made available to I&amp;APs on 13 March 2012.</td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact Assessment Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draft EIR and accompanying documents were placed at the Kathu Public Library. The Draft EIR is also available on the project website: <a href="http://www.erm.com/transnet-expansion">www.erm.com/transnet-expansion</a>.</td>
</tr>
<tr>
<td><a href="#">Annexure C</a> Public Participation material.</td>
</tr>
</tbody>
</table>

Comments received on the Draft EIR will be assimilated and the EIA project team will provide responses to comments. A Comments and Responses Report has been appended to the Final EIR, which will be submitted to DEA for decision-making.

Registered I&APs and members of the public will be notified when an Environmental Authorisation has been issued by DEA. A 20-day notice of intention to appeal period followed by a 30-day appeal period will follow the issuing of the Environmental Authorisation.

### 3.5 PROPOSED TIMEFRAME FOR THE REMAINDER OF THE EIA PROCESS

The estimated schedule for the remainder of the EIA process is presented in Table 3.3.
Table 3.3  Estimated EIA Process Schedule

<table>
<thead>
<tr>
<th>Task</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder Comment on Draft EIA Report and EMP</td>
<td>Sept/October 2013</td>
</tr>
<tr>
<td>Finalise EIA Report &amp; EMP and submit to DEA</td>
<td>October 2013</td>
</tr>
<tr>
<td>Acceptance of EIA Report and EMP received from DEA</td>
<td>November 2013</td>
</tr>
<tr>
<td>Decision on Environmental Authorisation</td>
<td>April 2014</td>
</tr>
</tbody>
</table>
**4**

**IMPACT ASSESSMENT APPROACH AND METHODOLOGY**

**4.1 INTRODUCTION**

An impact is essentially any change to a resource or receptor brought about by the presence of the project component or by the execution of a project related activity. The adequate assessment and evaluation of the impacts and benefits that will be associated with the project necessitates the development of a methodology that will reduce the subjectivity involved in making such evaluations. A clearly defined methodology is used in order to accurately determine the significance of the predicted impact on, or benefit to, the surrounding natural and/or socio-economic environment. For this reason, the project must be considered in the context of the area and the affected communities.

The purpose of impact assessment is to identify and evaluate the likely significance of the impacts on identified receptors and resources according to defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise, reduce or compensate for any potential adverse environmental effects, and to report the significance of the residual impacts that remain following mitigation. There are a number of ways that impacts may be described and quantified.

Nonetheless, an impact assessment will always contain a degree of subjectivity, as it is based on the value judgment of various specialists and EIA practitioners. The evaluation of significance is thus contingent upon values, professional judgment, and dependent upon the environmental and community context. Ultimately, impact significance involves a process of determining the acceptability of a predicted impact to society.

**4.2 ASSESSING IMPACTS**

Impacts are defined according to the impact characteristic which is described according to the type, extent, duration, scale and frequency of the impact, as summarised in *Table 4.1*. 
### Table 4.1  Defining Impact Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Definition</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>Indicates the relationship of the impact to the project (cause and effect).</td>
<td>Direct (Impacts that result from a direct interaction between the project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected).)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indirect (Impacts that follow on from the direct interactions between the project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population resulting from loss of part of a habitat as a result of the project occupying a plot of land)).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Induced (Impacts that result from other activities (which are not part of the project) that happen as a consequence of the project (e.g., influx of camp followers resulting from the importation of a large project workforce).)</td>
</tr>
<tr>
<td><strong>Extent</strong></td>
<td>The “reach” of the impact (e.g., confined to small area or projected for several kilometres, etc.).</td>
<td>Local (Defined on a resource/receptor-specific basis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regional (Defined on a resource/receptor-specific basis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>International (Defined on a resource/receptor-specific basis)</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>The time period over which a resource / receptor is affected.</td>
<td>Temporary (Defined on a resource/receptor-specific basis).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Short-term (Defined on a resource/receptor-specific basis).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long-term (Defined on a resource/receptor-specific basis).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Permanent (Defined on a resource/receptor-specific basis).</td>
</tr>
<tr>
<td><strong>Scale</strong></td>
<td>Size of the impact (e.g. size of damaged area or fraction of a resource lost or affected, etc.).</td>
<td>(No fixed designations; intended to be a numerical value).</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>Measure of the constancy or periodicity of the impact.</td>
<td>(No fixed designations; intended to be a numerical value).</td>
</tr>
</tbody>
</table>

The terminology and designations are provided to ensure consistency when these characteristics are described in an impact assessment deliverable.

An additional characteristic that pertains only to unplanned events (e.g., traffic accident, accidental release of fuel, community riot, etc.) is likelihood. The likelihood of an unplanned event occurring is designated using a qualitative (or semi-quantitative, where appropriate data are available) scale.
Table 4.2  Definitions of Likelihood

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlikely</td>
<td>The event is unlikely but may occur at some time during normal operating conditions.</td>
</tr>
<tr>
<td>Possible</td>
<td>The event is likely to occur at some time during normal operating conditions.</td>
</tr>
<tr>
<td>Likely</td>
<td>The event will occur during normal operating conditions (i.e. it is essentially inevitable).</td>
</tr>
</tbody>
</table>

Likelihood is estimated on the basis of experience and/or evidence that such an outcome has previously occurred. It is important to note that likelihood is a measure of the degree to which the unplanned event is expected to occur, not the degree to which an impact or effect is expected to occur as a result of the unplanned event. The latter concept is referred to as uncertainty, and this is typically dealt with in a contextual discussion in the impact assessment deliverable, rather than in the impact significance assignment process.

4.2.1 Assessing Significance

Once the impact characteristics are understood, they are used to assign each impact a magnitude. Magnitude is a function of the following impact characteristics:

- Extent
- Duration
- Scale
- Frequency
- Likelihood (for unplanned events only)

Magnitude essentially describes the degree of change that the impact is likely to impart upon the resource/receptor. The magnitude designations are as follows:

- Positive
- Negligible
- Small
- Medium
- Large

The methodology incorporates likelihood into the magnitude designation (i.e. in parallel with consideration of the other impact characteristics), so that the “likelihood-factored” magnitude can then be considered with the resource/receptor sensitivity/vulnerability/importance in order to assign impact significance.

The magnitude of impacts takes into account all the various dimensions of a particular impact in order to make a determination as to where the impact falls on the spectrum from negligible to large. Some impacts will result in
changes to the environment that may be immeasurable, undetectable or within the range of normal natural variation. Such changes can be regarded as essentially having no impact, and should be characterised as having a negligible magnitude.

In addition to characterising the magnitude of impact, the other principal step necessary to assign significance for a given impact is to define the sensitivity/vulnerability/importance of the impacted resource/receptor. There are a range of factors to be taken into account when defining the sensitivity/vulnerability/importance of the resource/receptor, which may be physical, biological, cultural or human. Where the resource is physical (for example, a water body) its quality, sensitivity to change and importance (on a local, national and international scale) are considered.

Where the resource/receptor is biological or cultural (for example, the marine environment or a coral reef), its importance (for example, its local, regional, national or international importance) and its sensitivity to the specific type of impact are considered. Where the receptor is human, the vulnerability of the individual, community or wider societal group is considered. Other factors may also be considered when characterising sensitivity/vulnerability/importance, such as legal protection, government policy, stakeholder views and economic value.

As in the case of magnitude, the sensitivity/vulnerability/importance designations themselves are universally consistent, but the definitions for these designations will vary on a resource/receptor basis. The universal sensitivity/vulnerability/importance designations are:

- Low
- Medium
- High

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor have been characterised, the significance can be assigned for each impact. The following provides a context for defining significance.
Table 4.3  Context for Defining Significance

- An impact of negligible significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be ‘imperceptible’ or is indistinguishable from natural background variations.

- An impact of minor significance is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low sensitivity/vulnerability/importance. In either case, the magnitude should be well within applicable standards.

- An impact of moderate significance has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently.

- An impact of major significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of IA is to get to a position where the project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts remaining even after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the project.

Based on the context for defining significance, the impact significance rating will be determined, using the matrix below.

Table 4.4  Impact Significance Rating Matrix

<table>
<thead>
<tr>
<th>Sensitivity/Vulnerability/Importance of Resource/Receptor</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible</td>
<td>Negligible</td>
<td>Negligible</td>
<td>Negligible</td>
</tr>
<tr>
<td>Small</td>
<td>Negligible</td>
<td>Minor</td>
<td>Moderate</td>
</tr>
<tr>
<td>Medium</td>
<td>Minor</td>
<td>Moderate</td>
<td>Major</td>
</tr>
<tr>
<td>Large</td>
<td>Moderate</td>
<td>Major</td>
<td>Major</td>
</tr>
</tbody>
</table>

4.3  IDENTIFICATION OF MITIGATION MEASURES

Once the significance of a given impact has been characterised using the above matrix, the next step is to evaluate what mitigation measures are warranted. In keeping with the Mitigation Hierarchy, the priority in mitigation is to first
apply mitigation measures to the source of the impact (i.e., to avoid or reduce the magnitude of the impact from the associated project activity), and then to address the resultant effect to the resource/receptor via abatement or compensatory measures or offsets (i.e. to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

Once mitigation measures are declared, the next step in the EIA process is to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above, considering the assumed implementation of the additional declared mitigation measures.

The approach taken to defining mitigation measures is based on a typical hierarchy of decisions and measures, as described below.

**Table 4.5 Mitigation Hierarchy**

<table>
<thead>
<tr>
<th>Mitigation Hierarchy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Avoid at Source; Reduce at Source:</strong> avoiding or reducing at source through the design of the project (e.g., avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity).</td>
</tr>
<tr>
<td><strong>Abate on Site:</strong> add something to the design to abate the impact (e.g., pollution control equipment, traffic controls, perimeter screening and landscaping).</td>
</tr>
<tr>
<td><strong>Abate at Receptor:</strong> if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce noise impact at a nearby residence or fencing to prevent animals straying onto the site).</td>
</tr>
<tr>
<td><strong>Repair or Remedy:</strong> some impacts involve unavoidable damage to a resource (e.g. agricultural land and forestry due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures.</td>
</tr>
<tr>
<td><strong>Compensate in Kind; Compensate Through Other Means:</strong> where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of fisheries access, recreation and amenity space).</td>
</tr>
</tbody>
</table>

### 4.4 SPECIALIST STUDY METHODOLOGY

A number of specialist studies were identified (predominantly during the scoping phase) as being necessary to effectively assess the potential impacts associated with the proposed development in the EIA phase. These include:

- Vegetation and terrestrial ecology;
- Socio-economic;
- Archaeological and cultural heritage;
- Palaeontology;
- Hydrology;
• Air quality; and
• Noise and vibration.

The following section provides a brief summary of the methodology used for each of these specialist studies. Please refer to Annex F for the full specialist reports and further details on the specific methodology.

4.4.1 Ecology and Biodiversity

An ecology and biodiversity study was undertaken (report dated March 2013) to characterise the receiving biophysical environment and provide an assessment of the likely impact of the development on the fauna and flora of the proposed project site.

A literature review and data sourcing exercise was undertaken to identify relevant information on animal and plant species within the study area. This was followed by a site visit that was conducted on 4 October 2012. During the site visit the following activities were undertaken:

• The different biodiversity features, habitat, vegetation and landscape units present at the site were identified and mapped.
• Walk-through-surveys were conducted across the site. All plant and animal species that were observed were recorded.
• The entire development footprint was surveyed. All listed and protected plant species observed within the development area were recorded and located using a GPS.

A draft ecological sensitivity map of the site was produced by integrating the information collected on-site with the available ecological and biodiversity information available in the literature and various spatial databases that were reviewed. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

• **Low** – Units with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity (e.g. transformed habitats).
• **Medium** – Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact (such as erosion) low.
• **High** – Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area.
• **Very High** – Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided at all costs.
Finally, a number of potential ecological impacts resulting from the proposed development were identified for the construction and operational phases of the project. In addition to this, specific mitigation measures were provided to minimise and/or avoid any adverse impacts identified. The specific sensitivity of the impacted area is discussed and assessed in Chapter 7 below.

Please refer to Annex F for the specialist report.

4.4.2 Archaeological and Cultural Heritage

A Phase 1 Heritage Impact Assessment (HIA) was undertaken in October 2012 to determine whether or not any heritage resources of significance are positioned in close proximity to the project site. Through identifying such heritage resources, the study aimed to minimise and/or avoid any adverse impacts to such resources.

The study assessed the potential impacts on both tangible (e.g. monuments, stone artefacts, rock paintings) and intangible (e.g. the projects impact on the cultural characteristics of local traditional communities) heritage resources.

Data was collected through a desktop review of a previous archaeological study that was completed along the length of the railway line in 2008 (Archaic, 2008). The data was corroborated through a reconnaissance survey of the proposed site, undertaken on an intermittent basis from March 2012 to April 2012. In addition, the study was informed through consultation with local community members, authorities, museums, academic institutions and historical associations that was undertaken on a regular basis. Subsequent to a gap analysis additional information, in terms of the occurrence of significant heritage resources, was included and summarised.

The relevant tangible and intangible heritage resources identified during the initial phase of the study were classified in terms of their importance. Finally, a list of recommendations, alternatives and mitigation measures were provided in order to inform the sustainable management of such heritage resources and the final decision-making process on the feasibility of the proposed project.

Please refer to Annex F for the report.

4.4.3 Palaeontology

A desktop palaeontological specialist study was undertaken in September 2012 to provide an assessment of the observed or inferred palaeontological heritage resources within the proposed project site.

The study initially used geological maps and satellite images to identify fossil bearing rock units occurring within the broader study area. Known fossil heritage in each rock unit was inventoried using:
- A review of scientific literature (Almond 2010a, 2010b, 2011a, 2011b, 2012a, 2012b, among others);
- Previous assessments of the broader study region (Almond & Pether, 2008); and
- The author's field experience and palaeontological database.

Based on this data, as well as field examination of representative exposures of all major sedimentary rock units present, the impact significance of the proposed development was assessed with recommendations for any further studies or mitigation.

Please refer to Annex F for the report.

4.4.4 Noise and Vibration

A noise and vibration specialist study was conducted to determine the baseline noise levels and to undertake the noise and vibration impact assessment of the proposed project. Noise measurements for the entire project, of which the Compilation Yard formed a part, were carried out over a 3 day period from 15 to 18 October 2012.

Ambient noise measurements were taken with a Type 1 Precision Impulse Integrating Sound Level Meter, in accordance with international standards for sound level meter specifications (IEC and ISO). Noise measurements were performed intermittently over a twenty-four hour period and were categorised in terms of daytime (07:00-22:00) and night-time (22:00-07:00). Abnormal disturbances, such as loud noise generation in close proximity, or sudden noise bursts that affect the measurement, were discarded.

Measurements were performed in compliance with the weather condition requirements specified by the SANS and ISO codes. As a result measurements were not performed when the steady wind speed exceeded 5ms⁻¹ or wind gusts exceeded 10 ms⁻¹.

The code of practice for noise and vibration control on construction and open sites (BS 5228-1: 2009 standard, Part 1: Noise) was utilised for the calculation of noise levels during the construction phase and the determination of the sound level data from on-site equipment and site activities. Typical sound power levels utilised in the standard were taken from measurements at various sites, percentage on-times and power ratings for a wide range of construction activities. The expected worst-case mix of excavators, bulldozers, front-end loaders, graders, compressors and trucks utilised for the noise modelling was assumed by similar operations. It was also assumed, as a worst-case scenario, that all the equipment would be operated simultaneously at the construction site.

Noise modelling was performed using the Computer Aided Noise Abatement (CADNA) noise model. Sound propagation calculations were undertaken and
sound pressure levels around the proposed project site were predicted. A noise contour grid was determined. Noise levels were estimated at discrete receptors in the vicinity of the proposed project site.

Noise modelling and impact assessment was undertaken for two different scenarios relating to the proposed ramp-up in export capacity of the railway line:

- Scenario A - Based on transport of 12 Mtpa ore;
- Scenario B – Based on transport of 16 Mtpa ore.

Based on the noise modelling the resulting noise levels around proposed project site were estimated for both day- and night-time conditions. Finally, the impacts of construction and operation were assessed and mitigation measures and recommendation were provided, where necessary.

With respect to identifying vibration levels during the construction phase, there are no standards that provide a methodology to predict levels of vibration from construction activities, other than those contained within British Standard for noise and vibration control on construction sites and open sites (BS5228: Part 2).

Measurements for existing cargo trains were undertaken along the existing railway to determine the peak particle velocity (PPV). The PPV is used to measure vibration through a solid surface. A PPV value of 5.87 mm/s was used as a worst-case scenario. Vibration level calculations were undertaken according to the BS5228 standard at various distances from the railway. The results were used to estimate vibration levels at various distances from the track centreline.

Finally, the impacts of construction and operation were assessed and mitigation measures and recommendation were provided, where necessary.

Please refer to Annex F for the report.

### 4.4.5 Air Quality

An air quality specialist study was undertaken to assess the impact the proposed Compilation Yard may have on air quality. The description of the climate in the study area is based on available meteorological information for the Northern Cape. The description of the state of air quality in the vicinity of the Compilation Yard and Common User Facility is based on an assessment of the sources of atmospheric emissions, the nature of the pollutants that are released and information in the Initial State of Air Report (DEA, 2005).

The assessment of impacts resulting from the emissions is done in three stages. The first is the development of a qualitative emission inventory for the main sources. Secondly to estimate ambient concentrations (PM10, PM2.5, SO2, NOx, benzene) and dust deposition using the US-EPA approved (US-
EPA, 2012) and DEA recommended (DEA, 2012) SCREEN 3 dispersion model, and lastly to assess the impacts by comparing the predicted concentrations with ambient air quality standards or guidelines.

The dust emissions methodology that has been used in this study is based on activity data, emission factors and control factors. Activity data in terms of estimated throughputs (tonnages) railed and design specifications for the proposed operations were obtained from the Final Scoping Report (ERM, 2013) and personal communication with the project team. The configuration of the operations in terms of the Compilation Yard and Common User Facility is based on the plant layout as provided in the Final Scoping Report (ERM, 2013).

The SCREEN3 model is designed to estimate the worst-case impact based on the meteorological matrix for use as a conservative screening technique. The SCREEN3 model does not use hourly meteorological data. Instead, the user can select one of the following options:

- Full Meteorology – model uses a predefined matrix of meteorological conditions that references all stability classes (A through F) and associated wind speeds, where the maximum wind speed is stability-dependent;
- Single Stability Class – user selects a single stability category, and the model automatically examines all wind speeds appropriate for that category; or
- Single Stability Class and Wind Speed – user selects a single stability category and wind speed combination.

The Full Meteorology option is used for routine application of the SCREEN3 model.

Recommendations on appropriate mitigation to reduce the impacts are based on best practice and the nature of the emitting activity. Input to the management of activities to ensure that impacts are minimised analyses the proposed activities to identify alternative approaches or methods to achieve the end result, but reducing the impact.

Please refer to Annex F for the report.

4.4.6 Socio-economic Assessment

The socio-economic baseline is compiled based on a combination of secondary and primary information. Publicly available secondary information used during the study included:

- StatsSA, Population Census 2011;
- District and Local Municipalities’ Integrated Development Plan, 2011-2012;
- StatsSA, Quarterly Labour Force Survey, Quarterly 1, Jan- March 2012;
- StatsSA, Monthly earnings of South Africans, 2010; and
- Stats SA, Gross Domestic Product, Third Quarter, 2011.
The primary data used was derived from semi-structured, qualitative interviews with the project affected landowners and Community Development Workers’ (CDW) as well as feedback received through the public participation process.

The potential impacts associated with establishment and operation of the Compilation Yard was assessed within the context of the baseline conditions. Finally, mitigation measures and recommendations for enhancement were provided. As mentioned previously, the socio-economic specialist is part of the ERM EIA team and the assessment has been pulled directly into the report and is not included as a stand-alone report.
The proposed project is subject to legislative and policy requirements at national, provincial and local level. This chapter specifically focuses on legal requirements related to the environmental authorisation of activities and provides a broad description of key environmental legislation governing the EIA process as well as the construction, operation and decommissioning phases of the project.

An overview of additional regulatory aspects and broader policy and planning context within which the project will take place is included in Annex A. This information is not meant to be complete, but rather aims to provide some clarity on the planning context, since this will form part of a separate study.

5.1 NATIONAL LEGISLATIVE REQUIREMENTS

5.1.1 National Environmental Management Act

The National Environmental Management Act (NEMA) (Act No. 107 of 1998) is a framework Act which embraces three major areas of environmental concern, namely:

- Resource conservation and exploitation;
- Pollution control and waste management; and
- Land use planning and development.

NEMA is underpinned by the globally accepted principle of sustainable development. Section 2 (4)(b) of NEMA gives effect to the South African Constitution, which states that all South African citizens have a right to an environment that is not harmful to their health or well-being. Key principles of NEMA related to the Compilation Yard include but are not limited to the following:

- Development must be socially, environmentally and economically sustainable;
- Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination;
- Environmental management must be integrated;
- Avoidance, minimisation and remediation of ecosystem disturbance and biodiversity loss;
- Waste must be avoided or reduced, reused and recycled;
• Decisions concerning the environment must take into account the needs, interests and values of all Interested and Affected Parties (I&APs);
• Community well-being and empowerment must be promoted through environmental education and awareness, and the sharing of knowledge and experience;
• Specific attention must be given to sensitive, vulnerable and highly dynamic ecosystems;
• Lifecycle responsibility must be ensured; and
• Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with law.

Chapter 5 of NEMA requires that the potential impact on the environment, socio-economic conditions, and cultural heritage of certain activities must be considered, investigated and assessed prior to implementation, and reported to the relevant competent authority. The EIA Regulations (R543), which was promulgated in terms of the NEMA, identifies activities which “could have a substantial detrimental effect on the environment” and require environmental authorisation from the environmental authority prior to commencement of the activity. The competent authority for this application is the National Department of Environmental Affairs (DEA). The provincial environmental authority, the Northern Cape Department of Environment and Nature Conservation (DENC), is a key commenting authority.

The proposed Compilation Yard and associated infrastructure triggers a list of activities promulgated in the EIA Regulations, as listed in Table 5.1.

**Table 5.1 Listed Activities in Terms of NEMA EIA Regulations**

<table>
<thead>
<tr>
<th>Government Notice R544 of 2010 (requiring a basic environmental assessment)</th>
<th>Applicability to the Project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity 2</strong> - The construction of facilities or infrastructure for the storage of ore or coal that requires an atmospheric emissions license in terms of the National Environmental Management: Air Quality Act (Act No. 39 of 2004).</td>
<td>The Common User Facility at the compilation yard will require the storage of manganese ore.</td>
</tr>
<tr>
<td><strong>Activity 11</strong> - The construction of canals; channels; bridges; bulk storm water outlet structures; buildings exceeding 50 square metres in size; or infrastructure or structures covering 50 square metres or more, amongst other, where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</td>
<td>Expansion of the existing culvert, over the Vlermuislaagte River.</td>
</tr>
<tr>
<td><strong>Activity 13</strong> - The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres;</td>
<td>Diesel storage, with a combined capacity in excess of 80 cubic meters but not exceeding 500 cubic metres. Diesel will be required for locomotives pulling the wagons back to the mine.</td>
</tr>
</tbody>
</table>
### Government Notice R544 of 2010 (requiring a basic environmental assessment)

#### Activity 18

*The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving; is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or occurs behind the development setback line.*

**Applicability to the Project**

Construction related activities in the vicinity of the river (Vlermuislaagte River) south of the compilation yard may trigger this listed activity.

#### Activity 22

*The construction of a road, outside urban areas with a reserve wider than 13,5 meters or, where no reserve exists where the road is wider than 8 metres, or for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.*

**Applicability to the Project**

It is anticipated that the construction of the compilation yard will include road construction.

#### Activity 23

*The transformation of undeveloped, vacant or derelict land to residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares, or residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares; except where such transformation takes place for linear activities; or for purposes of agriculture or afforestation, in which case Activity 16 of Notice No. 545 applies.*

**Applicability to the Project**

The compilation yard is proposed to be located outside of an urban area over an area of more than one hectare.

### Government Notice R545 of 2010 (requiring a full Scoping and EIA process)

#### Activity 11

*The construction of railway lines, stations or shunting yards, excluding railway lines, shunting yards and railway stations in industrial complexes or zones; underground railway lines in a mining area; and additional railway lines within the reserve of an existing railway line.*

**Applicability to the Project**

The proposed activity comprises the construction of a new compilation yard with associated infrastructure including railway lines and shunting.

### National Environmental Management: Waste Act

The temporary storage of general and hazardous wastes requires a Waste Management Licence (WML) from the DEA in accordance with Section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). The relevant activities applicable to the project are listed in Category A of the Schedule of Waste Management Activities published in terms of section 19(1) of the National Environmental Management: Waste Act, 2008 (GN 718).

Activities listed in Category A require a Basic Assessment (BA), as stipulated in the EIA Regulations made under Section 24(5) of the NEMA (No. 107 of 1998), as part of the WML Application. However, since a full Scoping/EIA process is being undertaken for the Compilation Yard, the WML application process will be incorporated as part of the same process. The aim is to ensure that all aspects of the project are considered in an integrated manner to facilitate informed decision-making.

The WML activities which may be triggered by the project are included in Table 5.2 below.
### Table 5.2 Relevant Listed Activities in term of NEMWA Regulations

<table>
<thead>
<tr>
<th>Description of Listed Activity</th>
<th>Applicability to project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category A: Activity 1</strong> - The storage, including the temporary storage, of general waste at a facility that has the capacity to store in excess of 100 cubic meters of general waste at any one time, excluding the storage of waste in lagoons.</td>
<td>A storage area for general waste will be established on site; general waste could include rubble, plastics, etc. It is anticipated that the storage area would have the capacity to store more than 100 cubic meters.</td>
</tr>
<tr>
<td><strong>Category A: Activity 2</strong> - The storage excluding the temporary storage of hazardous waste at a facility that has the capacity to store in excess of 80m³ of hazardous waste at any one time.</td>
<td>A storage area for hazardous waste will be established on site; hazardous waste could include used oil, oily rags etc. It is anticipated that the storage area would have the capacity to store more than 80 cubic meters.</td>
</tr>
<tr>
<td><strong>Category A: Activity 11</strong> - The treatment of effluent, wastewater or sewerage with an annual throughput capacity of more than 2000 cubic meters but less than 15 000 cubic meters.</td>
<td>An oil/water separator is to be installed at the site to treat contaminated water emanating from the fuel storage area. It is anticipated that the annual throughput would be more than 2000 cubic meters.</td>
</tr>
<tr>
<td><strong>Category A: Activity 18</strong> - The construction of facilities for activities listed in Category A of this Schedule (not in isolation to associated activity).</td>
<td>The establishment of the Compilation Yard will include construction of the facilities for the activities mentioned above.</td>
</tr>
</tbody>
</table>

*Please note: This activity has been removed from the list of activities requiring a waste management licence and given that the daily throughput is anticipated to be considerably less than 2000 cubic meters, this activity will be considered withdrawn from the application.

#### 5.1.3 Additional Legislation Applicable to the Project

In addition to the NEMA environmental authorisation requirements mentioned above, the project will need to comply with other legislative requirements at a national, provincial and local level. The most important of these are listed below:

- National Heritage Resources Act (No. 25 of 1999);
- National Environmental Management: Air Quality Act, 2008 (No. 39 of 2008);
- National Water Act (No. 36 of 1998);
- The National Environmental Management: Biodiversity Act, 2008 (No. 10 of 2004);
- Mineral and Petroleum Resources Development Act (28 of 2002);
- The National Forests Act (No. 84 of 1998);
- Water Services Act (No. 108 of 1997);
- Hazardous Substances Act (No. 56 of 1973);
- Occupational Health and Safety Act (Act No. 85 of 1993);
- Subdivision of Agricultural Land Act (Act No. 70 of 1970);
- Noise Control Regulations, Environment Conservation Act (Act No. 73 of 1989) and SANS Code 10328, Methods for Environmental Noise Impact Assessments in Terms of NEMA;
- Conservation of Agricultural Resources Act (Act No. 43 of 1983);
- Northern Cape Nature Conservation Act (No. 9 of 2009); and
- Certain activities related to the project may, in addition to the above mentioned national and provincial legislation, be subject to control by municipal by-laws for aspects such as planning, dust, noise and roads.
A brief description of the requirements in the above listed Acts and Regulations were included in the Scoping Report.

5.2 **REGIONAL PLANNING AND ADMINISTRATIVE CONTEXT**

This section briefly describes the administrative structure of the study area as well as broader policy and planning context.

5.2.1 **Administrative Structure**

The Provincial government is responsible for providing a strategic vision and framework for the province, as well as ensuring cooperation between municipalities and ensuring each municipality performs their respective functions. The district municipality is responsible for integrated development planning for the district municipality as a whole. This is facilitated through the development and implementation of Integrated Development Plans (IDPs), Strategic Development Frameworks (SDFs) and Local Economic Development (LED) Plans. The local municipalities have a shared responsibility (with the district municipality) to monitor and manage service delivery to communities within its jurisdiction, implement plans and policies of the district municipality and to carry out the development objectives outlined within the LED plans.

*Figure 5.1* shows the administrative structure of the respective levels of government.

*Figure 5.1* **Administrative Structure**
Both local municipalities within the project site are represented in the communities by ward councillors. These councillors represent local government in the various towns and work closely with local government departments. The role of the councillors is to monitor and maintain existing service delivery such as water, sanitation and refuse removal and to initiate new projects within the communities.

Councillors work closely with the Community Development Workers (CDW). These are local people employed by the Department of Housing and Local Government. The role of these CDWs is to represent their communities at the local and district government level and to identify potential development opportunities and needs.
Figure 5.5: Municipal Map of the Transnet Mamathwane Compilation Yard

CLIENT:
Transnet SOC Ltd

Legend
- Mamathwane Mine
- Sishen Mine
- Towns
- Proposed Compilation Yard
- Existing Railway
- National Freeway Route
- Arterial Route
- Main Road
- Secondary Road

Local Municipalities
- Gamagara
- Moshaweng
- Tsantsabane
- Ga-Segonyana

District Municipalities
- John Taolo Gaetsewe (Formerly Kgalagadi Municipality)

Projection: Geographic, Datum: WGS 84
Source: ENPAT (2001)

ERM Southern Africa
19 Lunnon Road
Hillcrest, Pretoria
Tel: +27 12 362 0008
Fax: +27 12 362 8368

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5.2.2 Northern Cape Provincial Framework

Growth and Development Strategy

The Northern Cape Provincial Growth and Development Strategy (NCPGDS) (2011) plays a vital role in achieving efficacy in delivery of the overall strategic development objectives of Northern Cape. From the plethora of societal challenges that are prevalent in South Africa, the NCPGDS identifies the following aspects that require attention:

- Reducing the backlog of basic needs such as water, sanitation and housing;
- Improving and increasing access to health, education and social services;
- Decreasing the prevalence rate of TB, HIV and AIDS;
- Creating opportunities for employment;
- Reducing contact crime; and
- Targeting vulnerable groups.

The strategy identifies long-term sustainable economic growth and development as an effective means to target the key societal concerns. Mining is identified as an important economic sector to promote such growth, as well as agriculture and tourism.

Spatial Development Framework

Spatial Development Frameworks attempt to guide overall development in a direction that local and provincial authorities see as being desirable. They also aim to specify the spatial implications of Integrated Development Plans (IDPs) that are designed to optimise economic opportunities.

Amongst other things, the Northern Cape Provincial Spatial Development Framework (2012) recognises the importance of the mining sector, as a driver behind the region’s economic growth. Nevertheless, it also identifies that economic development often has a detrimental impact on the environment which, in turn, often manifests in a negative impact on human-wellbeing and on tourism in the region. As such, the NCPSDF sets out the following objectives and policies to address such concerns:

- Offsetting direct detrimental impacts of resource use.
- Providing measures to cater for indirect impacts or impacts that may in the long-term emerge as a result of resource use.
- Unlocking the latent benefits and synergies vested in the resource use in order to create a positive socio-economic legacy once the initial resource use has reached its productive life cycle.

Similarly, but at a slightly lower level, the John Taolo Gaetsewe District Municipality SDF (2012) addresses key trends in the area.
The environment consists of interacting physical, biological, social, economic and cultural factors. It is essential that the baseline conditions of an environment are characterised in order to be in a position to accurately predict the potential effects a development may have on that environment. As such, this section describes the existing environmental baseline conditions of the project site and its surroundings.

6.1 BIOPHYSICAL BASELINE

This section provides an overview of the biophysical components of the receiving environment.

6.1.1 Climate

Rainfall

The study area normally receives approximately 450mm of rain per year (SAWS, 1998). Most rainfall occurs during the summer months (October to March). The area receives the lowest average rainfall (0mm) in June and the highest average rainfall (50mm) in February.

Temperatures

The average midday temperatures range from 19.1°C in June to 33.2°C in January. The lowest temperatures are experienced in July, with an average minimum temperature of one degree Celsius during the night (1).

Wind

The prevailing winds within the project area are generally light to moderate and from the north to northeast.

Extreme Weather Conditions

Extreme weather conditions which occur within the project area include thunderstorms during the rainy summer months, which may be accompanied by lightning, heavy rain, strong winds and sometimes hail. The area also occasionally experiences frost during winter months.

6.1.2 Landscape and Topography

The area is characterised by a very flat topography on the floodplain of a valley, dominated by farmlands. The Ga-Mogara River runs in a south to

north direction approximately 13.5km west of the project site. The Vlermuisleegte River, a tributary of Ga-Mogara River, extends along the southern section of the site. There are north south running mountains approximately 40km west and approximately 30km east of the project site.

6.1.3 Hydrology

Within the broader landscape, the Ga-Mogara River which is more than 10km west of the project site is a significant ecological feature. A single watercourse crossing traverses the southern portion of the project site in the form of a wash associated with the Vlermuisleegte watercourse, which is indicated on the 1:50 000 topographic map (2722BD), as well as the 1:50 000 DWA river dataset (Middleton & Bailey 2008)(refer to Figure 6.1). The watercourse lacks clearly defined channel banks, but is characterised by tall Grey Camel Thorn Acacia haematoxylon trees that are associated with deep sands and dry watercourses (Van Wyk, 1997). This river system runs in a south east to north west direction and feeds into the larger Ga-Mogara River that runs in a south to north direction located to the west of the project site.
Figure 6.1 Vlermuisleegte Watercourse within Mamathwane Study Area
6.1.4  Geohydrology

The area has an aquifer classification of minor, i.e. a moderately yielding aquifer system of variable water quality (Hydrogeological map series of the Republic of South Africa, 2003). The dissolved solid concentrations (mg/L) of the groundwater are between 301-500mg, and the borehole distribution for the area is between 6-10 per square kilometer.

6.1.5  Biodiversity

National Vegetation Types

According to the national vegetation map (Mucina & Rutherford 2006) the project site is entirely within the Kathu Bushveld vegetation type (see Figure 6.2). This vegetation unit occupies an area of 7,443 km² and extends from around Kathu and Dibeng in the south through Hotazel and to the Botswana border between Van Zylsrus and McCarthysrus.

The study area is associated with Aeolian red sand and surface calcrite, deep sandy soils of the Hutton and Clovelly soil forms. The Kathu Bushveld vegetation type is still largely intact, with less than two percent transformed by mining activity, and classified as Least Threatened 1. However, it is poorly conserved and does not currently fall within any formal conservation areas.

Although no endemic species are restricted to this vegetation type a number of Kalahari endemics are known to occur in this vegetation type, such as False Umbrella Thorn Acacia luederitzii var luederitzii, Silverbrush Grass Anthephora argentea and Kalahari Buffalo Grass Panicum kalaharense. Other vegetation types which occur in the broad vicinity include Gordonia Duneveld and Kuruman Thornveld. These other vegetation types are also classified as Least Threatened. There are no listed vegetation types known from the project site.

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1 Least threatened in terms of the classification system found in Mucina & Rutherford, 2006. The system provides a classification of vegetation types into four levels (from Critically Endangered to Least Threatened) based on percentage of untransformed areas with this vegetation type and biodiversity targets.
Figure 6.2  Broad-scale Vegetation Types

**On-site Vegetation Types**

Within the project site, the vegetation consists of a tree layer, comprised mainly of Grey Camel Thorn *Acacia haematoxylon*, Black Thorn *Acacia mellifera*, Camel Thorn *Acacia erioloba*, Silver Cluster-Leaf *Terminalia sericea* and Velvet Brandybush *Grewia flava*, with a grassy under storey consisting mainly of perennial grass species including Lehmann Lovegrass *Eragrostis lehmanniana* and Bushman Grass *Stipagrostis uniplumis*. There are some occasional shrubs present, such as January Bush *Gnidia polycephala*. Other large woody species that occurred at the site as scattered individuals or localised clumps include Karee *Searsia lancea*, Candle Thorn *Acacia hebeciada* and Kriedoring *Lycium hirsutum*.

The overall flora diversity at the project site is considered low and there is little variation in the vegetation present. Apart from the Grey Camel Thorn *Acacia haematoxylon* and the Camel Thorn *Acacia erioloba*, there were no other threatened or protected species observed at the project site.

Examples of the project site vegetation is shown in *Figure 6.3*, indicating the dominance of Camel Thorn *Acacia erioloba* and Grey Camel Thorn *Acacia haematoxylon* at the site, the relatively dense grass layer and the flat topographical nature of the project site.

*Figure 6.3 Examples of Project Site Vegetation*

Flora Species of Conservation Concern

According to the South African National Biodiversity Institute (SANBI) Integrated Biodiversity Information System (SIBIS) database, 202 plant species have been recorded from the four quarter degree squares 2722 BD and DB and 2723 AC and CA maps. Although the study area does not contain very high plant diversity, this is nevertheless a relatively low total, suggesting that the study area has not been very well sampled in the past. Only one species, Camel Thorn *Acacia erioloba* is of conservation concern and is listed as Declining¹ by the South African Red Data List of Plants (2012). Several nationally protected tree species may occur on the project site including Grey Camel Thorn *Acacia haematoxylon* and Camel Thorn *Acacia erioloba* which are dominant species on the project site and Sheperd’s Tree *Boscia albitrunca* which is widespread in the study area but was not observed on the project site.

Critical Biodiversity Areas

No fine-scale conservation planning has been conducted for this area. The site also does not fall within a National Protected Areas Expansion Strategy focus area, indicating that it has not been recognized as a potentially important area for future conservation efforts.

The habitats present at the project site are widely available across an extensive area surrounding the site and the potential for broad-scale fragmentation or loss of connectivity is low. In terms of the broad-scale processes operating at the site, the flat, open nature of the site suggests that few such ecological gradients and processes are likely to be operating across the site.

Within the broader landscape, the Ga-Mogara River, which is more than 10km to the west of the site, is a significant ecological feature that may be important for dispersal and broad-scale ecological processes. However, the development would not have an impact on that ecosystem.

Mammals

The site falls within the distribution range of 48 terrestrial mammal species, and 8 eight bat species, indicating that the mammalian diversity at the site is potentially high. Those species associated with rocky habitats are however not likely to occur at the project site, which is restricted to deep Kalahari sands.

Five terrestrial mammal species of conservation concern may occur in the area, the Brown Hyaena *Hyaena brunnea* (Near Threatened), Black-footed Cat *Felis nigripes* (Vulnerable), Leopard *Panthera pardus* (Near Threatened), Honey Badger *Mellivora capensis* (SARDB Endangered) and Ground Pangolin *Smutsia temminckii* (Vulnerable).

¹ The species is declining but the population has not yet reached a threshold of concern
Given that the area is currently used for livestock grazing, the abundance of larger predators such as Leopard and Brown Hyena in the area is likely to be very low as a result of persecution from farmers. There is a high probability that the other listed species occur in the area as the habitat is broadly suitable for all three. The Black-footed Cat, Honey Badger and Ground Pangolin are however widely distributed across the arid and semi-arid parts of South Africa and the development of the site would not constitute significant habitat loss for these species, a single individual of which has a home range far exceeding the extent of the study area.

In addition, the proposed project site is in close proximity to a large amount of human activity and disturbance (especially in the form of mining) and it therefore unlikely that there are large populations of these shy species in the area.

Avifauna

The avifauna in area around the site has not been well sampled in the past and both South African Bird Atlas Projects (SABAP), SABAP1 and SABAP2 do not have many records from the area. According to SABAP2 only 140 species have been recorded from the area. This list does not include any listed species and is very depauperate (lacking in numbers) of raptors, suggesting that less common species are not well represented. Taking the list for the Kathu area as being more representative, there are at least 10 listed species known from the broader area which may occur at the site. This includes the Black Stork, Martial Eagle, Secretarybird, White-backed Vulture, Bateleur, Black Harrier, Lesser Kestrel, Lanner Falcon, Kori Bustard and Ludwig’s Bustard. Several of these species have very low reporting rates suggesting that they are probably not resident in the area; nevertheless this list suggests that the area is likely to be fairly important from an avifaunal perspective.

Reptiles

The project site lies in or near the distribution range of 33 reptile species, indicating that the reptile diversity at the site is likely to be of relatively low diversity. Based on distribution maps and habitat requirements, the composition of the reptile fauna is likely to comprise two tortoises, 11 snakes, 13 lizards and skinks, one chameleon and five geckos. The actual number of species present at the site is likely to be significantly lower as species associated with rocky habitats are not likely to be present. Reptile fauna is likely to be characterised by species associated with sandy substrates or those with wide habitat tolerance. Species commonly encountered in the area include the Cape Cobra *Naja nivea*, Kalahari Sand Snake *Psammophis trinasalis*, Ground Agama *Agama aculeata* and Spotted Sand Lizard *Pedioplanis lineocellata*. No listed reptiles are known from the area and there are also no narrow endemics which occur in the area, indicating that the reptiles at the site are likely to be largely widespread species of low conservation concern.
Amphibians

The site lies within the distribution range of 11 amphibian species, of which only three or four are likely to occur at the site. There is no natural surface water at the site and no areas where water is likely to collect for any prolonged length of time. As a result, only those species able to persist away from perennial water are likely to occur at the project site. The Giant Bullfrog *Pyxicephalus adspersus* is the only species of conservation concern which occurs in the area, but as there is no breeding habitat for this species in or near the site, the site is not likely to be significant for the Giant Bullfrog. The species which are likely to occur at the site, such as sand and rain frogs, are widespread species associated with sandy substrates which characterise the broad area and the project site is not likely to be of above-average significance for these species either.

Project Site Sensitivity Assessment

The only feature of higher ecological significance that could be identified within the study area is the Vlermuisleegte drainage system towards the southern extent of the project site. This is an ephemeral drainage system that carries water only during exceptional circumstances. It is characterised by the presence of large Camel Thorn *Acacia erioloba* trees. The rest of the project site is an open plain on deep sand and cannot be differentiated in terms of ecological sensitivity.

Within this area the major sensitive feature of the site is the abundance of the protected tree species Camel Thorn *Acacia erioloba* and Grey Camel Thorn *Acacia haematoxylon*, which are ubiquitous across the site and it would not be possible to develop the site without some impact on these species.

The project site is very flat which will reduce the erosive capacity of any runoff generated from the project site. In addition, the deep sandy soils have a high infiltration capacity with the result that any runoff generated will be quickly absorbed by the adjacent areas receiving the runoff. As a result the risk and likelihood of water erosion at the project site is low.

The existing railway line, the Mamathwane Manganese Mine as well as the R380 (which bisects the railway line), all generate significant noise, human activity and disturbance. As a result, the ecological value of the site is already low and the site does not appear to have any ecological characteristics to distinguish it from the surrounding landscape or suggest that it would be of above average importance for biodiversity or ecological processes.

6.1.6 Protected Areas

The project site is not located within any protected areas, as defined in terms of the National Environmental Management: Protected Areas Act (No. 57 of 2003, as amended by Act No 15 of 2009). The nearest protected area to the project site is the Tswalu Kalahari Nature Reserve, located approximately
55km west north-west of the project site. Given the distance from the project site, it is unlikely to be affected by the project.

6.1.7 **Noise and Vibration**

The project site is located directly adjacent to the Mamatwane Manganese Mine and sinter plant. As such, the noise environment around the site is of an industrial nature, with high constant noise levels owing to the existing manganese plant, which operates on a continuous basis. In contrast, the noise environment further away from the project site, the manganese mine and the sinter plant is that of a typical rural area.

In terms of nearby noise receptors, two farm houses, which belong to Transnet, are situated next to the railway line on the western side of the project site. In addition to this, two farm houses are located approximately 4 km to the south of the project site. The baseline noise monitoring point (MP11) and the sensitive receptors described above are shown in Figure 6.4 below.
Figure 6.4  Mamatwane Yard Noise Monitoring Point and Receptors
The recorded average measured daytime and night-time noise levels were 53.0 dB(A) and 50.3 dB(A) respectively, and fell well within the SANS guidelines for industrial districts of 70 dB(A) and 60 dB(A). The noise environment was dominated by vehicular traffic on the R380, the mining operations, as well as the train operations to and from the manganese plant and mine.

6.1.8 **Air Quality**

The project site is a remote site mostly used for farming (sheep and cattle) and extensive mining. There are no measurements of ambient air quality at the site. However, ambient monitoring of manganese has been done at Van Zyl’s Rus and Kuruman since 1999 (DEA. 2009b). Measured concentrations at these two residential sites are below the WHO annual ambient air quality guideline of 0.15 µg/m³. The fraction of manganese ore in the airborne dust is consistently less than 2% at both sites. With no major sources of air pollution in the project area other than the mines, and on the evidence of the monitoring results, air quality is expected to be relatively good at the Compilation Yard.

6.2 **SOCIOECONOMIC BASELINE**

The following section provides a description of the socio-economic environment within which the proposed project is located. The description provided in this section is based on publically available and high level secondary information, as well as primary data gathered from interviews with affected landowners and CDWs in the area.

6.2.1 **Directly Affected Farm Portions**

The project is expected to directly affect four privately-owned commercial farms. The combined size of the farms is approximately 3,556ha. Table 6.1 provides a list of the affected farms, the individual sizes of the farms as well as the size of land to be acquired for the Project.

<table>
<thead>
<tr>
<th>Name of Farm</th>
<th>Size of Farm</th>
<th>Land Required for the Project</th>
<th>Land Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portion 3 of Remainder of the farm Moab No. 700</td>
<td>100ha</td>
<td>0.6779ha</td>
<td>Privately owned</td>
</tr>
<tr>
<td>Portion of Remainder of Portion 1 of the farm Shirley No 367</td>
<td>1,700ha</td>
<td>103.40ha</td>
<td>Privately owned</td>
</tr>
<tr>
<td>Portion of Remainder of Portion 2 of the farm Walton No 390</td>
<td>856ha</td>
<td>18.65ha</td>
<td>Privately owned</td>
</tr>
<tr>
<td>Portion 2 of Remainder of the farm of Walton No 390</td>
<td>900ha</td>
<td>1.7ha</td>
<td>Privately owned</td>
</tr>
</tbody>
</table>

Source: Pers. Comms with affected landowners, April/May2012

Portion of Remainder of Portion 1 of the farm Shirley No. 367, is divided by the railway line into two sections (west and east). Transnet will need to purchase a
portion of the land, to accommodate for the project. According to the landowners there are no known and/or pending land claims on any of the four properties.

6.2.2 Provincial and District Overview

The Northern Cape Province is the largest province in South Africa, measuring 361,830 km². It is, however, the least populated Province in the country, with a population density of 3.1 persons/ km². The primary Metropolitan areas within the Northern Cape are Kimberly and Upington. Smaller District towns include Douglas, De Aar, Prieska, Victoria West, Hopetown and Colesburg. Its economy is dominated by mining, agricultural (sheep and cattle) and tourism activities.

Major challenges faced by the Province include high unemployment (26.7 percent) and low income levels (median monthly earnings of R2 100) (1). In addition to this, low education levels are regarded as another concern for the region. With respect to this, the 2011 census data shows that 11 percent of the Northern Cape population has no education, 24 percent has primary education and approximately 35 percent has secondary education. Only 8 percent were reported to have higher education in 2011.

The Northern Cape economy is dominated by mining, agriculture (predominantly sheep and cattle) and tourism activities (2).

In turn, John Taolo Gaetsewe District Municipality is approximately 27,283 km² in land size. The District is divided into three Local Municipalities namely, Joe Morolong, Ga-Segonyana and Gamagara. Similarly to the Province, the District’s economy is dominated by mining, agriculture and tourism activities. The District has one of the highest populations in the Province and a high population growth of nearly two percent. This is attributed to the booming mining sector. Even though the mining sector is booming, only 29 percent of the population is classified as employed and a significantly high number of people (53 percent) are classified as economically inactive (EIAP); include people children, elderly, disabled, and those who choose not to seek employment. The reasons for a high percentage of EIAP are unclear.

Table 6.2 (3) and Figure 6.5 provide a statistical summary of the socio-economic indicators for the Province and John Taolo Gaetsewe District Municipality.

---

(1) StatsSA: Monthly earnings of South Africans, 2010
(2) http://www.tradeinvestsa.co.za/news/982513.htm
Table 6.2  Socio-economic Indicators: Northern Cape Province and John Taolo Gaetsewe District Municipality

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Northern Cape Province</th>
<th>John Taolo Gaetsewe District Municipality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DEMOGRAPHIC INDICATORS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population Size</td>
<td>1,145,861</td>
<td>224,799</td>
</tr>
<tr>
<td>Population Growth Rate</td>
<td>1.44%</td>
<td>1.60%</td>
</tr>
<tr>
<td>Rural/Urban Split</td>
<td>70% rural and 30% urban</td>
<td>Mostly rural, dominated by mining and commercial agricultural activities (cattle).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Racial Composition in %</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>African/Black</td>
<td>50</td>
<td>85</td>
</tr>
<tr>
<td>Coloured</td>
<td>40</td>
<td>9</td>
</tr>
<tr>
<td>White</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Indian/Asian</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Other includes foreign nationals</td>
<td>2</td>
<td>0.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOCIO-ECONOMIC INDICATORS in %</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Levels of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Schooling</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>Primary Schooling</td>
<td>24</td>
<td>35</td>
</tr>
<tr>
<td>Secondary Schooling</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>Grade 12</td>
<td>22</td>
<td>12</td>
</tr>
<tr>
<td>Tertiary</td>
<td>8</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment &amp; Unemployment Rates in %</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>40 (1)</td>
<td>29</td>
</tr>
<tr>
<td>Unemployment</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>Economically Inactive People (EIAP)</td>
<td>40</td>
<td>53</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Annual Economic Growth Rate in %</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Economic Growth Rate</td>
<td>2.4</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Source: StatsSA: Population Census 2011

The major challenges facing the JTG DM include:

- low levels of education with 23 percent of the population with no formal education;
- high level of unemployment, with 75 percent of the population with no recordable income;
- large income discrepancies within the district municipality; and
- skills available in the DM are not aligned to the job opportunities that are present.

The economic activities of the Province and District are summarised in Figure 6.5 below. Mining; government services; wholesale, retail, catering and accommodation; finance and business; community services; and agriculture, forestry and fishing sectors are the most dominant economic sectors.

(1) Stats SA, Quarterly Labour Force Survey, Quarterly 1, Jan- March 2012
Local Municipal Overview

Joe Morolong LM is the largest of the two project affected Local Municipalities, with an aerial extent of 5,813km²; while Gamagara LM is smaller comprising of 2,619km². Gamagara LM is located in the south-western section of the Province and District, along the N14 National Road between Upington and Vryburg; whereas Joe Morolong LM is located in the north-eastern side of the Province and shares a border with Botswana. Gamagara LM has five towns, namely Kathu, Sesheng, Dibeng, Dingleton and Olifantshoek. Joe Morolong LM has three towns namely, Hotazel, Santoy and Van Zylsrus as well as 190 smaller towns and villages.

A significant portion of Municipal land is used for mining (iron ore and manganese ore) and commercial farming (cattle and goats). The single most important factor that has guided the development in Gamagara LM is the iron ore mine at Sishen, which is one of the largest open-pit mines in the world.

Livestock farming predominantly consists of cattle and goats. Game farming and hunting are also increasing becoming popularity. At the same time, many of farmers in the Municipalities are selling entire farms and/or portions of their land to renewable energy developers (specifically solar power). According to the farms, sustaining agricultural activities in the area is hard due to water scarcity and selling portions or their entire farms to renewable energy developers helps generate additional income.

Table 6.3 shows that while the population of Gamagara LM has grown by six percent since the 2001 Population Census, the population of Joe Morolong LM has declined by one percent. This is attributed to the unmatched skills levels to the employment opportunities available in the areas. Outmigration is a common trend in the Province as a whole; while other people move into the
Province others move out. In addition, Joe Morolong LM has an estimated 77 percent of the population is considered as EIAP and employment figures stand at nine percent. There are no clear reasons for this trend.

Table 6.3 provides a statistical summary of the socio-economic indicators for the Municipalities.

Table 6.3  
Socio-economic Indicators: Gamagara and Joe Morolong Local Municipality

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Gamagara Local Municipality</th>
<th>Joe Morolong Local Municipality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DEMOGRAPHIC INDICATORS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population Size</td>
<td>41,617</td>
<td>89,530</td>
</tr>
<tr>
<td>Population Growth Rate</td>
<td>6%</td>
<td>-1%</td>
</tr>
<tr>
<td>Rural/Urban Split</td>
<td></td>
<td>Over 50% of the Municipalities’ area is rural and characterised by commercial agricultural activities (livestock) and mining activities.</td>
</tr>
<tr>
<td><strong>Racial Composition in %</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African/Black</td>
<td>55</td>
<td>97</td>
</tr>
<tr>
<td>Coloured</td>
<td>29</td>
<td>2</td>
</tr>
<tr>
<td>White</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>Indian/Asian</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other (incl. foreign national)</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>SOCI- ECONOMIC INDICATORS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levels of Education in %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Schooling</td>
<td>22</td>
<td>23</td>
</tr>
<tr>
<td>Primary Schooling (1)</td>
<td>26</td>
<td>32</td>
</tr>
<tr>
<td>Secondary Schooling</td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>Grade 12</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>Tertiary</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td><strong>Employment and Unemployment Rates in %</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment rate</td>
<td>49</td>
<td>9 (2)</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Economically Inactive People (EIAP)</td>
<td>34</td>
<td>77</td>
</tr>
</tbody>
</table>

6.2.4 Economic Sectors and Contribution

There is limited statistical data available regarding the sectoral contributions to the economy of the project affected LMs. According to LMs’ Integrated Development Plans (IDPs) the main economic sectors are mining, agriculture, tourism, transportation, and trade.

Mining Activities

Some of the mines currently operating in the LMs includes (refer to Figure 6.6 below):

(1) Includes those with some primary education and those who have completed primary education

(2) Joe Morolong Local Municipality Annual Report 2010-2011
• Mamatwane Manganese Mine and Sinter which is situated directly adjacent to the project site. It is owned by South African Manganese Corporation Limited (SAMANCOR’s) and BHP Billiton.
• Wessels Underground Manganese Ore Mine, and the railway terminus owned by Black Rock.
• The Tshipi Manganese Project (located directly west of Mamatwane Mine) owned by Jupiter Mines and Tshipi.
• United Manganese of Kalahari (UMK), located 13km south of Hotazel and 42km north of Kathu.
• Kumba Iron Ore Ltd/ or Sishen Iron Ore Mine is the principal mine operator in Kathu. Sishen Mine is one of the largest open-pit mines in the world and in 2011, the mine produced 38.9 million tonnes (Mtpa) of iron ore. The Sishen Mines have significantly contributed to the economic growth and diversification of the economy in the LM. These contributions include sports facilities, a golf club, country club, transportation services, personal and community services, conference facilities, shopping centres, civic works, catering and accommodation.

**Hospitality Sector**

The hospitality industry is well developed in the LMs. This is facilitated by the continuously growing mining industry and a lack of accommodation for the mine workers. The mining companies have resorted to long term booking of local hospitality accommodation to house its workers. Many people in the urban areas of the LMs have converted their homes into B&Bs as a means of capturing the benefits that come with the presence of the mines and its workers.

**Transportation Sector**

The road transport sector plays an important role in the economy of the LMs due to the mining sector. This sector contributes between four and five percent annually on the economy of the LMs. Currently the railway line services cannot meet the demand set by the mines. As a result, most mines likely transport a large portion of their minerals by road which has led to an increase in the road transportation industry. Even though the local businesses are benefitting from this, the public road infrastructure is being negatively affected due to the number and frequency of heavy loaded vehicles using it daily and road maintenance appears insufficient.

**Agricultural Sector**

The agricultural sector’s contribution to the economy is limited to 3.8 and 4 percent at a local and provincial level respectively, which is due to the shortage of water in the LMs and Province as well as the arid climate and semi-desert conditions that are prevalent in the region.
Location of Surrounding Mines in the Immediate Region

Legend
- Mines
- Proposed Compilation Yard
- Local Municipalities
- Cadastral Farm Portions

**Study Area**

**Legend**
- Mines
- Proposed Compilation Yard
- Local Municipalities
- Cadastral Farm Portions

**Transnet**

**DATE**: June 2013

**CLIENT**: Transnet

**PROJECT**: 0172056

**SCALE**: 1:175000

**DRAWN**: AB

**CHECKED**: MP

**APPROVED**: SHC

**RATIONALE**

Map Showing Mines.mxd

**Scale:** 1:175000

**Projection:** Transverse Mercator, CM 23, Datum: WGS 84

**Source:** Chief Directorate National Geo-Spatial Information

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**Transnet**
Great Waterford Building
240 Main Road
Rondebosch, 7725
Cape Town, SOUTH AFRICA
Tel: +27 21 681 5400
Fax: +27 21 686 073
6.2.5 Socio-economic Indicators of the Project Affected Farms

There are approximately ten people residing permanently on the project affected farms; including the landowners and their workers.

All the farms are used to breed livestock (sheep, cattle, and game farming), as well as horses. On the remainder of Portion 2 of farm Walton No. 390, the landowner mines the mineral diatomite, which is naturally occurring, silicon rich sedimentary rock made up of fossilized hard-shelled plant algae. According to the landowner, there is an estimated 40,000 tons of diatomite at present on this farm. The landowner processes it for sale as a flea and tick remedy for livestock and pets, as well as processing it to produce a multivitamin supplement suitable for human consumption.

Existing Infrastructure on the site and in close proximity to the Site

Below is a list of infrastructure on site, project affected farms, as well as infrastructure found within five kilometres of the site:

- Four main farm houses;
- Farm workers’ accommodation;
- Handling pens;
- Fenced off grazing areas (for rotational grazing) and property fences;
- Mamatwane Eskom substation;
- Eskom 132 kV overhead power line;
- Mamatwane station building;
- Vaal- Gamagara water pipeline which runs from Paarl River to Black Rock on Portion of remainder of portion 2 of farm Walton No 390; and
- Mamatwane Mine immediately adjacent to the north of the existing compilation yard; (see Section 6.2.4 and Figure 6.7).
**Solar Power Plant – future development close to the Project Area**

The Adams PV Solar Energy Facility is proposed on Farm Adams 328, directly opposite the Mamatwane Mine. The facility will have a generating capacity of 19MW and will cover an area of less than 20ha. The proposed facility is accessible via the R380, the same road used for access by the surrounding mines and surrounding landowners. A map outlining proposed renewable energy facilities in the region are presented below.
Location of Renewable Energy Facilities proposed in the Region

CLIENT: Transnet

Transnet
Great Waterford Building
240 Main Road
Rondebosch, 7725
Cape Town, SOUTH AFRICA
Tel: +27 21 681 5400
Fax: +27 21 686 073

DATE: June 2013
CHECKED/MP: SHC
PROJECT: 0172056
SCALE: 1:175 000
DRAWN: AB
CHECKED: MP
APPROVED: SHC

Projection: Transverse Mercator, CM 23, Datum: WGS 84
Source: Bing Maps ©2010 Microsoft Corporation
Inset: ESRI Data and Maps

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Legend

- Renewable Energy Facilities
- Proposed Compilation Yard
- Local Municipalities
- Cadastral Farm Portions

Study Area

Title: Map Showing REFs.mxd

Scale: 1:175 000
Projection: Transverse Mercator, CM 23, Datum: WGS 84
Source: Bing Maps ©2010 Microsoft Corporation
Inset: ESRI Data and Maps

Legend:

- Renewable Energy Facilities
- Proposed Compilation Yard
- Local Municipalities
- Cadastral Farm Portions

Study Area

Legend:

- Renewable Energy Facilities
- Proposed Compilation Yard
- Local Municipalities
- Cadastral Farm Portions

Study Area

Legend:

- Renewable Energy Facilities
- Proposed Compilation Yard
- Local Municipalities
- Cadastral Farm Portions

Study Area

Legend:

- Renewable Energy Facilities
- Proposed Compilation Yard
- Local Municipalities
- Cadastral Farm Portions

Study Area

Legend:

- Renewable Energy Facilities
- Proposed Compilation Yard
- Local Municipalities
- Cadastral Farm Portions
6.2.6 *Some Bulk Services and Infrastructure*

This section provides a description of the public services, specifically water sources and supply, roads and access as well as crime and policing levels.

*Water Supply*

The Northern Cape Province is one of the driest Provinces in the country due to limited rainfall. As such, the District relies heavily on the Vaal-Gamagara Scheme as its main water source. This scheme involves water being abstracted from the Vaal River and treated (at a water treatment works 60km west of Kimberley), before being piped as far north as Hotazel. The scheme therefore fulfils an important strategic role in supplying potable water to a number of towns, settlements and mines in the Northern Cape region. In addition to piped water, water is also supplied to the area through the various mining operations in the region.

Both project affected LMs receive water from the Vaal-Gamagara Water Scheme. The majority of the population in the Gamagara LM (80 percent) and in the Joe Morolong LM (72 percent) receive their water from the regional/local water schemes. This ensures that the three-quarters of the population have clean drinking water. The remaining quarter of the population in the LMs source its water from boreholes, water-tanks, dams and other sources. According to the Population Census 2011, six percent of the population in Gamagara LM and 16 percent of the population in Joe Morolong LM use underground water sources, specifically boreholes. This group comprises mainly of farmers who have on-site boreholes used to provide water for their livestock and households. The dissemination of water supply sources for both Municipalities is shown in Figure 6.9 below.

*Figure 6.9 Water Sources in Gamagara and Joe Morolong Local Municipalities*

![Water Sources in Gamagara and Joe Morolong Local Municipalities](image)

Source: Population Census 2011

The project affected farms predominantly use boreholes as a source of water for livestock and domestic uses. Two of the landowners use dams as an additional source of water, see Table 6.4.
Table 6.4  Directly affected farms and their sources of water

<table>
<thead>
<tr>
<th>Name of Farm</th>
<th>Water Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portion 3 of Remainder of the farm Moab No. 700</td>
<td>Boreholes, dams</td>
</tr>
<tr>
<td>Portion of Remainder of Portion 1 of the farm Shirley No 367</td>
<td>Boreholes</td>
</tr>
<tr>
<td>Portion of Remainder of Portion 2 of the farm Walton No 390</td>
<td>2 boreholes, 2 dams, &amp; Vaal-Gamagara Water Pipeline</td>
</tr>
<tr>
<td>Portion 2 of Remainder of the farm of Walton No 390</td>
<td>Boreholes</td>
</tr>
</tbody>
</table>

Source: Pers. Comms., with the affected landowners

Roads and Access

Major (national roads) and Regional roads in the LMs are tarred and maintained by SANRAL and Provincial authorities. Secondary roads used mostly by farmers, mines and Transnet are often not tarred but gravel and graded often.

The project area is located off the R380 (regional road) and is accessible via a gravel service road located next to the railway line. The R380 is tarred and extensively used by heavy loaded vehicles and passenger vehicles. The heavy load vehicles comprise mainly trucks from the various mines operating in the area. The road that leads to the railway service road is used extensively by the Mamatwane Mine to transport minerals from site. It is also used by the project affected landowners to access the R380.

Figure 6.10  Railway Service Road

6.2.7  Crime and Policing

According to the landowners the common crimes that occur in the area are poaching (game) and livestock theft. The landowners stated that poachers and thieves gain access to their farms through the fencing found along the railway reserve as it is poorly maintained. They are also concerned about the presence of construction workers on site as they fear that the workers might
steal some of their game and livestock. Furthermore, the landowners are concerned about the compensation for the stolen livestock and game.

6.3 **PALAEOLOGY, ARCHAEOLOGY AND CULTURAL HERITAGE**

6.3.1 **Cultural Heritage**

The broader stretch of railway line between Hotazel and Kimberley has previously been recognised to consist of a variety of archaeological and heritage resources. These artefacts/ resources include remains of diamond mining activities, stone walling and South African war fortifications. These types of artefacts are mainly situated outside of the railway line reserve.

6.3.2 **Palaeontology**

The project site is situated in the most southern part of the Kalahari Group deposit (refer to Figure 6.11). In general, the quality of fossil preservation may be compromised in areas due to intense tectonic deformation, while extensive dolerite intrusion has compromised fossil heritage in portions of the Karoo Supergroup sediments (e.g. Ecca Group) due to resulting thermal metamorphism. In addition, pervasive calcretisation and chemical weathering of many near-surface bedrocks in the Northern Cape has further compromised their original fossil heritage in many areas (e.g. Ecca Group outcrop).
Figure 5.1: Geology Map of the Transnet Mamathwane Compilation Yard

Legend:
- Mamathwane Mine
- Sishen Mine
- Proposed Compilation Yard
- Existing Railway
- National Freeway Route
- Arterial Route
- Main Road
- Secondary Road

Geology:
- Andesite
- Diamictite
- Dolomite
- Banded Ironstone Formation
- Sand
- Shale

Scale: 1:200 000
The fossil record of the Kalahari Group is generally sparse and low in diversity. The Gordonia Formation dune sands were mainly active during cold, drier intervals of the Pleistocene Epoch that were inimical to most forms of life, apart from hardy, desert-adapted species. Porous dune sands are not generally conducive to fossil preservation. However, mummification of soft tissues may have occurred and migrating lime-rich groundwater derived from the underlying bedrocks (including, for example, dolerite) may lead to the rapid calcretisation of organic structures such as burrows and root casts.

Occasional terrestrial fossil remains that might be expected within this unit include, calcretised rhizoliths (root casts) and termitaria (e.g. Hodotermes, the harvester termite), ostrich egg shells (Struthio) and shells of land snails (e.g. Trigonephrus) (Almond 2008, Almond & Pether 2008). Other fossil groups such as freshwater bivalves and gastropods (e.g. Corbula, Unio) and snails, ostracods (seed shrimps), charophytes (stonewort algae), diatoms (microscopic algae within siliceous shells) and stromatolites (laminated microbial limestones) are associated with local watercourses and pans. Microfossils such as diatoms may be blown by wind into nearby dune sands (Du Toit 1954, Dingle et al., 1983). These Kalahari fossils (or subfossils) can be expected to occur sporadically but widely, and the overall palaeontological sensitivity of the Gordonia Formation is therefore considered to be low.

Underlying calcretes of the Mokolanen Formation might also contain trace fossils such as rhizoliths, termite and other insect burrows, or even mammalian trackways. Mammalian bones, teeth and horn cores (also tortoise remains, and fish, amphibian or even crocodiles in wetter depositional settings such as pans) may be occasionally expected within Kalahari Group sediments and calcretes, notably those associated with ancient, Plio-Pleistocene alluvial gravels.

### 6.3.3 Archaeology

Archaeological resources in the Northern Cape include pre-historical and historical sites predominantly found adjacent to rivers, hilltops and pans. These include rock art, Iron Age sites as well as historical sites related to the railway system, diamond digging in Kimberley (1871 to 1914) and the South African War (1899 to 1902).

Although the project site is located adjacent to the existing manganese ore railway line and the area has been largely disturbed, the possibility of finding a high density of stone tools in areas is good based on archaeological work done in the vicinity of the site (Becker, 2012).
This Chapter identifies and evaluates the actual and potential environmental consequences of the proposed project. Furthermore, the potential for mitigation of negative impacts and enhancement of positive impacts (DEAT, 2003) are described.

7.1 SUMMARY OF IMPACTS IDENTIFIED

7.1.1 Bio-Physical and Socio-Economic Impacts Identified

The following impacts were identified in the Scoping Report as potentially significant:

- Impact on fauna and flora;
- Noise and vibration impacts;
- Impacts on air quality due to dust and emissions;
- Loss of agricultural land;
- Impact on surface and groundwater;
- Socio-economic impacts;
- Loss to archaeological, palaeontology and cultural heritage;
- Impact on traffic;
- Impacts of waste generation;
- Impact on soils, geology and erosion potential; and
- Health and safety.

Based on a review of the potential impacts identified, the following impacts have been assessed to be of negligible significance and have therefore been screened out with no further assessment:

- Visual and aesthetic landscape impacts;
- Impact on soils, geology and erosion potential; and
- Employee/ Occupational Health and safety.

Given their significance rating these impacts have been screened out of the impact assessment; however standard mitigation measures are included in the Environmental Management Program (EMPr) in Chapter 8. Please refer to the sections below for further discussion on each of the impacts mentioned above and the reason(s) for screening them out of the impact assessment.

Visual and Aesthetic Landscape Impacts

The main landscape feature in the area is the existing Mamatwane Mine, as well as a number of existing man-made features, including power lines, Eskom's Mamatwane substation, the existing railway line and station as well as adjacent services roads. The project infrastructure will result in an alteration to the character of the existing landscape; however, given the already disturbed
nature of this landscape and the height of existing infrastructure, it is not anticipated that the proposed facility would result in significant visual intrusion. The disturbed nature of the site also increases the visual absorption capacity of the landscape, thus reducing the expected visual impacts associated with this project. As such, no further assessment of this impact is deemed necessary.

Standard mitigation measures to further minimise the potential impact have been included in the EMPr (Chapter 8).

Soils, Geology and Erosion Potential

The potential effects on soils and geology from construction, operation and decommissioning may include:

- The potential for soil properties at the site to be permanently altered due to site preparation (e.g. compaction of soil);
- The potential for increased erosion caused by increase runoff from concreted surfaces; and
- Site preparation and vegetation clearance activities which could cause instability and increased erosion potential.

These impacts can be mitigated or managed through the implementation of various measures such as the correct placement of infrastructure to minimise erosion potential. The removal of vegetation and the development of access roads and hard standing surfaces may impact surface water flow and runoff within the site and surrounds, during both the construction and operational phases. The input of additional water, mainly during construction, may exacerbate these impacts.

Based on the impacted area, the surface topography is characterised as flat, not exceeding 1:10 slope. Due to the flat nature of the area, the potential for high velocity surface run-off is limited, which may negate the erosion potential of the site. Although vegetation clearance will increase the extent of exposed areas, the site is characterised by soils with a high infiltration potential. As such the soils’ absorption capacity will reduce the potential for surface flows and the likelihood of run-off is therefore limited. In order to reduce ground compaction, rehabilitation and remediation will be required during construction (and operation in the event of maintenance works).

Measures for the minimisation and management of soil erosion have been included in the EMPr (Annex D and E).
Employee/ Occupational Health and Safety

There is the potential for impacts on employee health and safety to occur as a result of accidents and unplanned events that may occur predominantly during the construction and decommissioning phases of the compilation yard.

During the construction phase, the risk of injury will be limited to the subcontractors as the site will be secured to avoid public incursion into the active development area. However, there remains some risk of injury to others. Basic safety precautions and protective measures (aligned with the Occupation Health and Safety Act (No 85 of 1993) have been included in the EMPr (Annex D and E), which, in turn, will be incorporated into subcontractor health and safety plans. The requirements of the EMPr will serve to minimise risk of injury or accidents, during the construction, operation and decommissioning phases. In doing so, this impact will not be assessed in detail.

7.1.2 Detailed Assessment of Impacts

In light of the screened impacts above, the following is a list of impacts which will be assessed in detail below.

- Impact on general ecology (including flora, fauna and avifauna);
- Impact on surface and groundwater quality;
- Noise and vibration impacts;
- Air quality impacts (including dust);
- Loss to archaeological and cultural heritage;
- Loss of palaeontological artefacts;
- Socio-economic impacts.

The detailed specialist impact assessment reports are attached as Annex F, for ease of reference. As mentioned previously, the Social Impact Assessment did not result in the production of a separate report, but was included directly into this EIA Report.

It is a legal requirement to assess the impacts associated with the decommissioning phase of this project. However, as this project forms part of infrastructure delivery, there are currently no plans to decommission the Mamatwane Yard or the Common User Facility. Should decommissioning be required, a separate environmental assessment process will need to be undertaken, based on the applicable legislation at the time. In doing so, this assessment is limited to the construction and operational impacts associated with this project.
### 7.1.3 Impact on Vegetation and Protected Trees

#### Table 7.1 Impact Characteristics: Vegetation and Protected Trees

<table>
<thead>
<tr>
<th>Summary</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Aspect/activity</td>
<td>Development of project, including activities associated with stripping, excavation and bulk works.</td>
<td>Operation activities such as movement of trains, consolidation and deconsolidation of wagons etc., and the loading of ore at the Common User Facility.</td>
</tr>
<tr>
<td>Impact Type</td>
<td>Direct</td>
<td>Direct</td>
</tr>
<tr>
<td>Stakeholders/Receptors Affected</td>
<td>Flora located within the development footprint.</td>
<td>Flora located on-site.</td>
</tr>
</tbody>
</table>

**Construction Phase: Impact Assessment and Description**

The site lies entirely within the Kathu Bushveld vegetation type, which is still largely intact. Less than two percent (2%) has been transformed by mining activity and it is classified as Least Threatened. It is, however, poorly conserved and does not currently fall within any formal conservation areas. Although no endemic species are restricted to this vegetation type, a number of Kalahari endemics are known to occur, as described in Section 6.1.5.

Within the site, the vegetation consists of a tree layer and a grassy understory consisting mainly of perennial grass species. There are some occasional shrubs present and large woody species occur as scattered individuals or localized clumps. Overall diversity at the site is low with little variation in the vegetation types. Apart from Grey Camel Thorn *Acacia haematoxylon* and Camel Thorn *Acacia erioloba*, there were no other threatened or protected species observed at the site. The habitats present at the project site are widely available across an extensive area surrounding the site and the potential for broad-scale fragmentation or loss of connectivity is low.

No fine-scale conservation planning has been conducted for this area. The site also does not fall within a National Protected Areas Expansion Strategy focus area, indicating that it has not been recognized as a potentially important area for future conservation efforts. The only feature of higher ecological significance that could be identified within the study area is the Vlermuisleegte drainage system towards the southern extent of the site. This is an ephemeral drainage system that carries water only during exceptional circumstances. There is currently a bridge over the river which will not be altered by the current development. As a result, this area is not likely to be significantly impacted by the development.

The ecological value of the site is already low and does not appear to have any ecological characteristics to distinguish it from the surrounding landscape or suggest that it would be of above average importance for biodiversity or ecological processes. Within the broader area the major sensitive feature is the abundance of protected tree species, which are ubiquitous across the site. It would not be possible to develop the site without some impact on these species.
However, given that neither species is actually rare and that there is a large number of similar, less disturbed habitats in the wider area, the impact on these species and their habitat is not seen as being highly significant. Furthermore, the impact of the development is likely to be local in nature and not of broader significance for the affected vegetation type or ecological processes.

Box 7.1 Summary of Construction Impact: Vegetation and Protected Trees

| Nature: The construction phase will have a **direct negative** impact on flora and protected trees. |
| Sensitivity/Vulnerability/Importance of Resource/Receptor: **Medium** |
| Irreplaceability: Although protected trees species may be impacted, these species are not considered rare these impacts are not likely to be of wider significance. The impact on irreplaceable resources is low. |
| **Impact Magnitude:** **Medium** |
| **Extent:** The extent of the impact is **Local** since it is confined to the site. |
| **Duration:** The expected impact associated with clearance will be **Permanent** (i.e. irreversible). |
| **Scale:** The impact will result in **Notable** changes to the receptor it would however not be of broader significance for the affected vegetation type or ecological processes. |
| **Frequency:** The frequency of the impact will be **Once-Off.** |
| **Likelihood:** Habitat loss will occur through planned activities, and is thus **Definite.** |

**IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE (-)**

**Degree of Confidence:** **High** - Habitats have been accurately mapped and the site sensitivity is well understood.

**Construction Phase: Mitigation**

- The areas to be cleared should be clearly demarcated so as to ensure that the development footprint is kept to a minimum.
- Topsoil (uppermost 20-30cm of soil) should also be set aside and replaced in areas where revegetation is desirable.
- No collection of plants or plant parts to be allowed by construction personnel. The EO should provide environmental induction to all construction staff to ensure that they are aware of this and other environmental sensitivities at the site.
- No fuelwood collection should be allowed on-site or off-site.
- No fires allowed on-site or off-site.

Construction phase mitigation measures are outlined in more detail in the EMPr in *Chapter 8*.

**Operational Phase: Impact Assessment and Description**

It is anticipated that the bulk of the vegetation disturbance and clearance at the site would occur at the construction phase with limited disturbance during operation. Day to day activities of the Compilation Yard and Common User Facility are likely going to require on-going maintenance. Repairs or servicing activities are unlikely to impact intact vegetation.
Box 7.2  
**Summary of Operational Impact: Vegetation and Protected Trees**

| Nature: The operational phase may have a **direct negative** impact on flora and protected trees. |
| Sensitivity/Vulnerability/Importance of Resource/Receptor: **Low** |
| Irreplaceability: The impact on irreplaceable resources is low. |

**Impact Magnitude:** Low  
**Extent:** The extent of the impact is **Local**.  
**Duration:** The expected impact will be **Permanent** (i.e. irreversible).  
**Scale:** The impact will result in **Slight** changes to the receptor.  
**Frequency:** The frequency of the impact will be **Periodic**, depending on maintenance activities.  
**Likelihood:** The impact on vegetation in **Likely**.  

**IMPACT SIGNIFICANCE (PRE-MITIGATION):** **MINOR (-)**  
**Degree of Confidence:** **High** - Habitats have been accurately mapped and the site sensitivity is well understood.  

**Operational Phase: Mitigation**

Any vegetation clearing that needs to take place should be done by hand and herbicides should not be used except for dense infestations of alien species which may be controlled with approved herbicides used in the applicable approved manner.
Ecological Sensitivity of the Project Area

Legend

- Dry Water Course Centre Line
- Main Roads
- Other Roads
- Track and Hiking Trail
- Railway
- Local Municipalities
- Cadastral Farm Portions
- Proposed Compilation Yard

Ecological Sensitivity

- High
- Medium
- Transformed/Low

Study Area

Scale: 1:45,000

Transnet

Great Waterford Building
240 Main Road
Rondebosch, 7725
Cape Town, SOUTH AFRICA
Tel: +27 21 681 5400
Fax: +27 21 686 073
Residual Impact

Some loss of vegetation is an inevitable consequence of the development. In addition the density of the protected tree species Grey Camel Thorn *Acacia haematoxylon* and Camel Thorn *Acacia erioloba* at the site is high and some loss of individuals of these species is likely to be unavoidable. The residual impact during the construction phase will reduce to Moderate- Minor negative. The residual impact of the operational phase will be minor negative.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MODERATE (-ve)</td>
<td>MODERATE (-ve)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MINOR (-ve)</td>
</tr>
<tr>
<td>Operation</td>
<td>MINOR (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
</tbody>
</table>

### Impact on Fauna and Avifauna

#### Table 7.3 Impact Characteristics: Fauna and Avifauna

<table>
<thead>
<tr>
<th>Project Aspect / activity</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of project, including activities associated with stripping, excavation and bulk works.</td>
<td>Operation activities such as movement of trains, consolidation and deconsolidation of wagons etc., and the loading of ore at the Common User Facility</td>
<td></td>
</tr>
<tr>
<td>Impact Type</td>
<td>Direct</td>
<td>Direct</td>
</tr>
<tr>
<td>Stakeholders/Receptors Affected</td>
<td>Fauna and avifauna located within and in the vicinity of the site.</td>
<td>Fauna and avifauna located within and in the vicinity of the site.</td>
</tr>
</tbody>
</table>

Construction Phase: Impact Assessment and Description

The ecological value of the site is already low and the site does not appear to have any ecological characteristics to distinguish it from the surrounding landscape or suggest that it would be of above average importance for biodiversity or ecological processes.

### Mammals

The mammalian diversity at the site is potentially high since the site falls within the distribution range of 48 terrestrial mammal species, and eight (8) bat species. Those species associated with rocky habitats are however not likely to occur at the site which is restricted to deep Kalahari sands. Five terrestrial mammal species of conservation concern may occur in the area, the Brown Hyena *Hyaena brunnea* (Near Threatened), Black-footed Cat *Felis nigripes* (Vulnerable), Leopard *Panthera pardus* (Near Threatened), Honey Badger *Mellivora capensis* (SARDB Endangered) and Ground Pangolin *Smutsia temminckii* (Vulnerable). The abundance of larger predators however such as Leopard and Brown Hyena in the area is likely to be very low as a result of
persecution from farmers. There is a high probability that the other listed species occur in the area as the habitat is broadly suitable for all three. The Black-footed Cat, Honey Badger and Ground Pangolin are however widely distributed across the arid and semi-arid parts of South Africa and the development of the site would not constitute significant habitat loss for these species.

Mammalian impacts are likely to be concentrated within the construction phase, with the major impact during operation being some habitat loss as a result of the presence of the facility itself as well as from the noise generated by the daily operational activities of the yard.

Avifauna

The avifauna in area around the site has not been well sampled in the past. Only 140 species have been recorded from the site area, but the list does not include any listed species, suggesting that less common species are not well represented. There are at least 10 listed species known from the broader Kathu area and these are likely to occur at the site, but several of these species have very low reporting rates suggesting that they are probably not resident in the area.

Given the mobility of avifauna, the absence of nesting sites on-site and the homogenous nature of the landscape surrounding the site, impacts on avifauna are likely to be localised in nature and not of a high significance.

Reptiles

The site lies in or near the distribution range of 33 reptile species, indicating that the reptile diversity at the site is likely to relatively low. The reptile fauna is likely to be characterised by species associated with sandy substrates or those with wide habitat tolerance. Based on the nature of the surrounding area and limited diversity expected, this development is unlikely to have significant impacts to reptile.

Amphibians

The site lies within the distribution range of eleven amphibian species, of which only about three or four are likely to occur at the site. There are limited natural surface water features at the site and no areas where water is likely to collect for any prolonged length of time. The Vlermuisleegte River has been previously disturbed through the construction of the existing culvert and therefore is likely to be in a disturbed condition, with limited flow. As a result, only those species able to persist away from perennial water are likely to occur at the site. The development of the site is not likely to have significant implications for amphibians.
**Box 7.3  Summary of Construction Impact: Fauna and Avifauna**

**Nature:** The construction phase will have a **direct negative** impact on fauna and avifauna.

**Sensitivity/Vulnerability/Importance of Resource/Receptor:** Medium

**Irreplaceability:** The impact on irreplaceable resources is low.

**Impact Magnitude:** Medium

**Extent:** The extent of the impact is Local.

**Duration:** The expected impact will be **Permanent** (i.e. irreversible).

**Scale:** The impact will result in **Notable** changes to the receptor.

**Frequency:** The frequency of the impact will be **Once off.**

**Likelihood:** The impact on fauna and avifauna is **Likely.**

**IMPACT SIGNIFICANCE (PRE-MITIGATION):** MODERATE (+)

**Degree of Confidence:** High - Habitats have been accurately mapped and the site sensitivity is well understood.

---

**Construction Phase: Mitigation**

- All construction staff should undergo an environmental induction from the EO or other suitably qualified persons.
- Any fauna directly threatened by the construction activities should be removed to a safe location by the EO or other suitably qualified person.
- No animals should be allowed on-site.
- All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises, as well as to minimize dust generation.
- All construction vehicles to remain on demarcated roads and access routes.
- If any part of the construction site, such as any construction camps, must be lit at night, this should be done with low-UV type lights (such as most LEDs), which do not attract insects and birds.

Construction phase mitigation measures are outlined in more detail in the EMP in Chapter 8.

**Operational Phase: Impact Assessment and Description**

At an operational phase, the day to day activities of the compilation Yard, Common User Facility and associated infrastructure will require on-going maintenance. It is unlikely that repairs or servicing activities would impact directly on fauna and avifauna.
Box 7.4  Summary of Operational Impact: Fauna and Avifauna

| Nature: | The operational phase will have a **direct negative** impact on flora and protected trees. |
| Sensitivity/Vulnerability/Importance of Resource/Receptor: | **Low**. |
| Irreplaceability: | Maintenance and servicing activities are unlikely to result in loss of irreplaceable resources. |

**Impact Magnitude:** Low  
**Extent:** The extent of the impact is **Local**.  
**Duration:** The expected impact will be **Permanent** (i.e. irreversible).  
**Scale:** The impact will result in **Slight** changes to the receptor.  
**Frequency:** The frequency of the impact will be **Periodic**.  
**Likelihood:** The impact on the fauna and avifauna is **Likely**.

**IMPACT SIGNIFICANCE (PRE-MITIGATION):** **MINOR (-)**

**Degree of Confidence:** **High** - The site has been accurately mapped and the site sensitivities are well understood.

**Residual Impact**

Some loss of habitat and disturbance of fauna and avifauna associated with the construction and operation phases is an inevitable consequence of the development. However, fauna and avifauna are generally able to move away from the disturbance on-site to other areas. The residual impact, during construction, will reduce to **Moderate** – **Minor** negative and the residual impact for the operational phase will remain as **Minor** negative.

**Table 7.4  Pre- and Post- Mitigation Significance: Fauna and Avifauna**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MODERATE (-ve)</td>
<td>MODERATE (-ve)</td>
</tr>
<tr>
<td>Operation</td>
<td>MINOR (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
</tbody>
</table>

**7.1.5 Impact on Ecosystem Services and Ecological Degradation**

**Table 7.5  Impact Characteristics: Ecosystem Services and Ecological Degradation**

<table>
<thead>
<tr>
<th>Summary</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Aspect/ activity</td>
<td>Construction of project infrastructure, including activities associated with stripping, excavation and bulk works.</td>
<td>Operation and Maintenance activities associated with the Compilation Yard and the Common User Facility</td>
</tr>
<tr>
<td>Impact Type</td>
<td>Direct</td>
<td>Direct</td>
</tr>
<tr>
<td>Stakeholders/ Receptors Affected</td>
<td>Ecosystem services and ecological habitat located within the development area.</td>
<td>Ecosystem services and ecological habitat located or functioning on-site.</td>
</tr>
</tbody>
</table>
Construction Phase: Impact Assessment and Description

Disturbance created during the construction phase would leave the site vulnerable to various forms of ecological degradation, such as alien plant invasion and soil erosion.

Erosion risk is likely to increase due to the removal of plant cover and soil disturbance created during the construction phase. This may impact downstream riparian and wetland habitats by increasing the sediment load of drainage systems such as the Vlermuisleegte drainage line crossing the southern portion of the site. However, the potential for downstream riparian impacts are minimal given the topography and the limited disturbance which is likely to occur in the vicinity of the Vlermuisleegte drainage area. The flat site topography is also likely to reduce the erosive capacity of any runoff and the deep sandy soils have a high infiltration capacity, so any runoff is likely to be absorbed relatively quickly.

However, In terms of alien invasive plants, Honey Mesquite *Prosopis glandulosa* is common in the area and would be likely to invade disturbed areas if not controlled. Furthermore, the railway line forms a corridor for the dispersal and invasion of alien plant species and there are a number of alien and weedy forbs along the length of the railway line which could invade areas disturbed by construction activities.

In the long term these impacts lead to the loss of biodiversity and in turn, if these systems support ecosystem services then the benefit derived from the system would be impacted. Loss of biodiversity is anticipated to be confined to the development footprint provided erosion control measures are implemented where necessary and measures are put in place to manage and prevent colonisation by invasive alien and weed species.

### Box 7.5 Summary of Construction Impact: Ecosystem Services and Ecological Degradation

**Nature:** The construction phase will have a **direct negative** impact on ecosystem services and ecological degradation.

**Sensitivity/Vulnerability/Importance of Resource/Receptor:** Medium

**Irreplaceability:** The development would not result in loss of irreplaceable resources.

**Impact Magnitude:** Medium

**Extent:** The extent of the impact is Local.

**Duration:** The expected impact will be **Permanent** (i.e. irreversible).

**Scale:** The impact will result in **Notable** changes to the receptor.

**Frequency:** The frequency of the impact will be **Intermittent**.

**Likelihood:** The impact on ecosystem services and ecological degradation is **Likely**.

**IMPACT SIGNIFICANCE (PRE-MITIGATION):** **MODERATE (-)**

**Degree of Confidence:** High - Habitats have been accurately mapped and there is a sound understanding of the sensitivities of the site.
Construction Phase: Mitigation

- Disturbed areas and topsoil stockpiles should be checked for alien plant species on a regular basis and cleared where necessary.
- Measures to regulate runoff from cleared and hardened surfaces during construction should be put in place, where necessary.
- Disturbed areas that are no longer required for construction should be rehabilitated to prevent soil erosion.
- Regular monitoring for erosion during construction to ensure that no erosion problems have developed as result of the construction disturbance.
- All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.

Construction phase mitigation measures are outlined in more detail in the EMPr in Chapter 8.

Operational Phase: Impact Assessment and Description

The bulk of the clearance of vegetation would have taken place during construction however the presence of hardened/impermeable surfaces would likely increase surface water run-off thereby contributing to the risk of soil erosion (especially during high rainfall periods). Clearance of vegetation contributes to the growth (and possibly subsequent) spread of alien invasive species.
Figure 7.2 Typical vegetation present in the affected area
Box 7.6  

**Summary of Operational Impact: Ecosystem Services and Ecological Degradation**

| Nature: | The operational phase will have a **direct negative** impact on ecosystem services and ecological degradation. |
| Sensitivity/Vulnerability/Importance of Resource/Receptor: | Low |
| Irreplaceability: | Maintenance and servicing will not result in loss of irreplaceable resources. |

**Impact Magnitude:** Low  
**Extent:** The extent of the impact is Local.  
**Duration:** The expected impact will be Permanent (i.e. irreversible).  
**Scale:** The impact will result in Slight changes to the receptor.  
**Frequency:** The frequency of the impact will be Periodic.  
**Likelihood:** The impact on ecosystem services and ecological degradation is Likely.

**IMPACT SIGNIFICANCE (PRE-MITIGATION):** MINOR (-)

**Degree of Confidence:** High - Habitats have been accurately mapped and there is a sound understanding of the sensitivities of the site.

**Operational Phase: Mitigation**

- There should be a runoff and stormwater management system in place for the facility. Regular monitoring (biannually) for alien plants within the development area during operation and removal thereof.
- Regular monitoring for erosion to ensure that no erosion problems are occurring at the site as a result of the roads and other infrastructure. All erosion problems observed should be rectified as soon as possible, using the appropriate flow management and erosion control structures.

**Residual Impact**

The loss of ecosystem services (if any) and overall degradation of the ecological habitat is an inevitable consequence of the development. On-going operational management would be required, specifically with regard to alien invasive management, to try to maintain the ecological integrity of the affected environment. The residual impact for the construction and operational phase will be reduced to Minor negative.

**Table 7.6  Pre- and Post- Mitigation Significance: Ecosystem Services and Ecological Degradation**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MODERATE (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
<tr>
<td>Operation</td>
<td>MODERATE (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
</tbody>
</table>
7.1.6 Impact of Potential Contamination on Water Resources (Surface and Groundwater)

Table 7.7 Impact Characteristics: Potential Contamination of Water Resources (Surface and Groundwater)

<table>
<thead>
<tr>
<th>Summary</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Aspect/activity</td>
<td>Construction activities such as clearance of vegetation and compaction of soils may likely result in increased surface run-off, resulting in soil erosion, or alternatively, the accidental release of hazardous substances to ground and the subsurface.</td>
<td>Compacted areas and concrete hard-standing may likely result in surface run-off, resulting in soil erosion, and the accidental release of hazardous substances to ground and the subsurface.</td>
</tr>
<tr>
<td>Impact Type</td>
<td>Direct and indirect.</td>
<td>Direct and indirect.</td>
</tr>
<tr>
<td>Stakeholders/Receptors Affected</td>
<td>Surface water and groundwater features.</td>
<td>Surface water and groundwater features.</td>
</tr>
</tbody>
</table>

Construction and Operational Phase: Impact Assessment and Description

Surface Water Contamination

It is recognised that surface water and groundwater pollution potential is likely to be similar during construction and operational phases. The construction phase is likely to include the temporary storage of hydrocarbons, oil, lubricants and other hazardous substances. Similar products will also be utilised during the operational phase, especially during periods of maintenance and servicing.

The potential for surface water contamination is low given that the site is very flat and the bulk of the infrastructure of the Compilation Yard and the Common User Facility is located between 1.5 and 2.5km from the Vlermuisleegte drainage channel found along the southern border of the site (see Figure 7.3 below).
Ground Water Contamination

The potential for groundwater contamination is associated with uncontrolled spills of fuels and/or lubricants during the construction and operational phases. The high infiltration capacity of the deep sandy soils increases the potential for subsurface ingress of contamination unless appropriate mitigation measures, such as bunding for fuel storage facilities, are in place.

Box 7.7 Summary of Construction and Operational Impact: Potential Contamination on Water Resources (Surface and Groundwater)

| Nature: | Construction and operational phases of the project would likely result in a negative impact on surface and groundwater resources. |
| Sensitivity/Vulnerability/Importance of Resource/Receptor: | Moderate |
| Irreplaceability: | The impact will not include the loss of irreplaceable resources. |

| Impact Magnitude: | Moderate |
| Extent: | The extent of the impact is Local. |
| Duration: | The expected impact will be Long-term. |
| Scale: | The impact will result in Slight changes to the receptors. |
| Frequency: | The frequency of the impact will be once-off during construction, and Periodic during operation. |
| Likelihood: | The impact would Likely occur. |

IMPACT SIGNIFICANCE (PRE-MITIGATION): MODERATE (-)

Degree of Confidence: The degree of confidence is high.
Construction and Operational Phase: Mitigation

- Activities within the Vlermuisleegte drainage system will need to be managed during construction of the Compilation Yard and the Common User Facility. No equipment, vehicles or material stockpiles, hazardous substances are allowed within the bed and banks and riparian zone of the watercourse unless required for installation of the culvert extension. Detailed construction method statements will be required and approved by the Environmental Officer, prior to commencement of said activity.

- Removal of vegetation will be limited to the construction areas only, to reduce sediment loaded run-off and areas will be re-vegetated according to specific site conditions as soon as the construction activity is completed at each of the respective sites and in accordance with the operational or post-construction utilisation of that particular portion of the site, as soon as the construction activity is complete.

- All hazardous substances on-site shall be stored at a secure area which will be bunded, during the construction and operational phase.

- Vehicles or machines will not be serviced or refuelled on site except at designated servicing or refuelling locations and no oil or lubricant changes shall be made except at designated locations, or in case of breakdown or emergency repair.

- Spill response plans must be in place in case of spillages.

Residual Impact

Should the aforementioned mitigation measures be implemented, the potential impacts to natural resources are likely to be limited. The residual impact, for both the construction and operational phase, will be reduced to Minor negative.

Table 7.8  Pre- and Post- Mitigation Significance: Potential Contamination on Water Resources (Surface and Groundwater)

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction and Operation</td>
<td>MODERATE (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
</tbody>
</table>
7.1.7 Noise and Vibration Impacts

Table 7.9 Impact Characteristics: Noise and Vibration

<table>
<thead>
<tr>
<th>Summary</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Aspect/activity</td>
<td>This phase of the project would result in the generation of noise and vibration, resulting from bulk work activities, operation of heavy machinery, drilling, vehicle movement and general construction noise.</td>
<td>This phase of the project would result in the generation of noise and vibration, resulting from the operation of the Compilation Yard.</td>
</tr>
<tr>
<td>Impact Type</td>
<td>Direct</td>
<td>Direct</td>
</tr>
<tr>
<td>Stakeholders/Receptors Affected</td>
<td>Road users and adjacent property owners.</td>
<td>Road users and adjacent property owners.</td>
</tr>
</tbody>
</table>

Construction Phase: Impact Assessment and Description

Noise

The Compilation Yard is proposed adjacent to the Mamatwane Manganese Mine and sinter plant. As such the noise environment around the site is of an industrial nature, with high constant noise levels. The noise environment further away from the R380 and the Sinter plant and mine is that of a typical rural area. Two farm houses, which belong to Transnet, are situated next to the alignment, on the western side, and two farm houses approximately 4 km south of the yard.

The average baseline measured daytime and night-time noise levels were 53.0 dB and 50.3 respectively, and fell well within the SANS guidelines for industrial districts of 70 dB(A) and 60 dB(A). The noise environment was dominated by vehicular traffic on the R380, the mining operations, as well as the train operations to and from the manganese plant and mine.

The noise levels during the construction phase, taking into consideration the expected equipment mix were calculated. As a worst-case scenario, it was assumed that all of the equipment would operate on-site simultaneously. The noise levels further than 500 m from the site were found to be around 45 dB(A). Therefore, the construction activities at receptors outside the 500 m zone from the main working area will be heard but will not constitute a disturbing noise. For receptors located further than 1.0 km away, the construction noise will barely be audible. As such, the noise impact associated with construction activities is estimated to be Low.

Vibration

It is generally accepted that for the majority of people vibration levels of between 0.15 and 0.3 mm/s peak particle velocity are just perceptible. The table below details the distances at which certain construction activities give rise to a
perceptible level of vibration. The activities and equipment listed below are the ones that typically generate the highest levels of vibration at construction sites.

**Table 7.10 Vibration Levels of Construction Sources**

<table>
<thead>
<tr>
<th>Construction activity</th>
<th>Distance from activity when vibration may just be perceptible (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation</td>
<td>10 - 20</td>
</tr>
<tr>
<td>Hydraulic breaker</td>
<td>15 - 20</td>
</tr>
<tr>
<td>Vibratory rollers</td>
<td>15 - 25</td>
</tr>
</tbody>
</table>

None of the above-mentioned activities during construction will take place outside the project site or closer than 10 m from the boundary. As such, the threshold of perception for human reaction (0.15 - 0.3 mm/s) is not expected to be exceeded outside the site.

**Box 7.8 Summary of Construction Impact: Noise and Vibration**

**Nature:** Construction activities would result in a **negative direct** impact on the vibration levels and noise environment around the compilation yard.

**Sensitivity/Vulnerability/ Irreplaceability of Resource/Receptor** - **Medium**

**Sensitivity:** The activity will increase the noise and vibration levels at receptors. However, receptors are sparsely distributed around the site.

**Impact Magnitude:** **Medium**

**Extent:** The extent of the impact is **local**.

**Duration:** The expected impact will be **short-term** (i.e. for the duration of construction).

**Scale:** The impact will **not** result in **notable changes** to the noise levels at receptors situated more than 500 m from the compilation yard.

**Frequency:** The frequency of the impact will be **periodic**.

**Likelihood:** The noise levels during construction are **likely** to increase during the construction period.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MODERATE**

**Degree of Confidence:** The degree of confidence is **high**.

**Construction Phase: Mitigation**

- Proper design and maintenance of silencers on diesel-powered equipment, systematic maintenance of all forms of equipment, training of personnel to adhere to operational procedures that reduce the occurrence and magnitude of noise generated by equipment.
- Transnet will implement a grievance procedure that is easily accessible to local communities, through which complaints related to contractor or employee behaviour can be lodged and responded to. Transnet will respond to all such complaints.
- Construction should take place during daylight hours that are reasonable and practicable to the conditions on-site however if activities are required to be undertaken at night, compliance with relevant legislation will be required.
Operational Phase: Impact Assessment and Description

Noise
The current baseline daytime and night-time noise levels around the Compilation Yard site are within the SANS standards. The noise levels on-site are primarily associated with the existing mining activities and sinter plant, as well as the existing rail operations and traffic on the R380.

The operational noise levels at the Compilation Yard were modelled indicating day- and night-time noise levels (see Figure 7.4 and Figure 7.5, below). The 45 dB(A) zone around the yard reaches approximately 650 m on either side of the existing railway line during daytime. Receptors are indicated on the figures as R01, R02, R03 and R04. The only receptors at which the 45 dB(A) noise level will be exceeded are the two Transnet farm houses adjacent to the existing Mamatwane Station (marked as R02), since they are situated very close to the railway line, i.e. within 40 m. The current daytime noise level at this location is 53 dB(A), due to the Manganese mine and plant, railway activity to the mine and traffic on the R380. With the proposed Mn Ore Line upgrade and establishment of the Mamatwane Compilation Yard and Common User Facility, the level will reach more than 64 dB(A), which is within the SANS industrial zone guideline, but well above the one for residential dwellings. Similar levels are expected for night-time at that location and therefore relocation of the occupants (if any) would be recommended.

During night-time, the 35 dB(A) zone extended approximately 1.7 km away from the yard. This zone is not expected to reach either of the two farm houses (R03 and R04) situated south of the site. As such the impact there is considered to be minor.

The modelled noise levels at the receptors around the site are shown in Table 7.11, below.

**Table 7.11 Modelled Noise Levels around Mamatwane Compilation Yard**

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Description</th>
<th>Noise Level (dB(A))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Day</td>
</tr>
<tr>
<td>MP11</td>
<td>Measurement Point</td>
<td>73.9</td>
</tr>
<tr>
<td>R01</td>
<td>Mamatwane Mine Offices</td>
<td>44.1</td>
</tr>
<tr>
<td>R02</td>
<td>Transnet Farm Houses</td>
<td>64.8</td>
</tr>
<tr>
<td>R03</td>
<td>Farm House</td>
<td>31.3</td>
</tr>
<tr>
<td>R04</td>
<td>Farm House</td>
<td>23.3</td>
</tr>
</tbody>
</table>

The night-time noise levels at receptors R03 and R04 will reach 33 dB(A) and 25 dB(A) respectively, which is below the SANS rural guideline of 35 dB(A). The zone exceeding the SANS daytime guideline of 45 dB(A) for rural districts will
reach between 600 m to 700 m on either side of the Mamatwane Compilation Yard (see Figure 7.4, below).

**Figure 7.4  Daytime Noise Contours: Mamatwane Compilation Yard** (Source: Noise Specialist Study)
Vibration

The operational vibration levels are not expected to exceed the limit for structural damage beyond a 10m zone around the railway line, or 25m zone for sensitive or historical buildings. The vibration impact associated with the project is considered to be Very Low. No further assessment and associated mitigation is considered necessary other than “good practice” maintenance of the train wheels and rail surfaces.

The operational noise and vibration impact assessment is summarised below.
Box 7.9  Summary of Operational Impact: Noise and Vibration

Nature: The Compilation Yard will result in a negative direct impact on the noise environment on-site.

Sensitivity/Vulnerability/Irreplaceability of Resource/Receptor – Low
Sensitivity: The site is located in a rural area, adjacent to the Mamatwane Mine and sinter plant. There are very few receptors i.e. two Transnet farm houses (informally occupied) immediately next to the railway line and two farm houses further south, 2 km from the railway alignment.

Impact Magnitude: Medium
Extent: The extent of the impact is Local.
Duration: The expected impact will be Long-term (i.e. the duration of the operation).
Scale: The impact will result in Notable changes to the noise levels at receptors situated within 100 m from the alignment. For receptors outside a 2 km zone there will be no notable changes to the existing noise levels.
Frequency: The frequency of the impact will be Periodic.
Likelihood: The noise levels during operation are Likely to increase during the operational period.

Residual Impact

Despite the implementation of the aforementioned mitigation measures, the residual noise and vibration impacts for the construction phase will reduce to Minor negative. During the operational phase, noise and vibration impacts will remain Minor negative.

Operational Phase: Mitigation

- Perform appropriate and timeous maintenance of rolling stock and locomotive engines.
- Ensure proper maintenance of wheel and rail surfaces, in order to reduce operational vibrations.
- Proper design and maintenance of silencers on diesel-powered equipment, systematic maintenance of all forms of equipment, training of personnel to adhere to operational procedures that reduce the occurrence and magnitude of individual noisy events.
- Transnet will implement a grievance procedure that is easily accessible to local communities, through which complaints related to contractor or employee behaviour can be lodged and responded to. Transnet will respond to such complaints, where required.
### Table 7.12 Pre- and Post-Mitigation Significance: Noise and Vibration

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MODERATE (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
<tr>
<td>Operation</td>
<td>MINOR (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
</tbody>
</table>

### 7.1.8 Air Quality Impacts

### Table 7.13 Impact Characteristics: Air quality

<table>
<thead>
<tr>
<th>Summary</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Aspect/activity</td>
<td>Dust and particulate matter PM$_{10}$ generation through site clearance, establishment of the construction camps, laydown and assembly areas.</td>
<td>Consolidation and deconsolidation of locomotives, including windblown dust from exposed/bare surfaces.</td>
</tr>
<tr>
<td>Impact Type</td>
<td>Direct</td>
<td>Direct</td>
</tr>
<tr>
<td>Stakeholders/Receptors Affected</td>
<td>Local ambient air quality.</td>
<td>Local ambient air quality.</td>
</tr>
</tbody>
</table>

The air quality assessment identified the following operational phase emissions to be of concern and assessed each aspect individually in the specialist report:

- Benzene emissions from fuel storage;
- Diesel locomotive emissions;
- Emissions from manganese ore storage and handling; and
- Emissions from manganese ore transport.

Due to expected operational phase air quality impacts being rated equally in the specialist report, all four aspects are presented in a consolidated impact assessment below. Note that the specialist report has presented a consolidated construction phase impact assessment, related to the aforementioned emission sources (see the specialist report is attached as Annex F).

**Construction Phase: Impact Assessment and Description**

In general, civil construction activities generate dust and the emission of particulates into the atmosphere. These emissions are primarily attributed to vegetation clearing and levelling, vehicle dust entrainment and excavation. In most cases the dust is relatively coarse, but may include fine respirable particles (PM$_{10}$ and PM$_{2.5}$). Emissions are generally released close to ground level and have little or no buoyancy, which limits their dispersion. The coarse particulates generally settle relatively close to the emission source whereas finer particulates may be transported further from the emissions source, as they are easily carried by wind. Exhaust emissions from construction vehicles and equipment typically include particulates (including PM$_{10}$ and PM$_{2.5}$), carbon monoxide (CO), nitrogen oxides (NO$_x$), sulphur dioxide (SO$_2$) and volatile organic compounds (VOCs) (including benzene).
As part of the air quality specialist study, measured concentrations of manganese ore were taken at two residential sites. These samples were below the WHO annual ambient air quality guideline of 0.15 µg/m³ and the fraction of manganese ore in the airborne dust is consistently less than 2% at both sites. With no major sources of air pollution in the project area other than the mining activities, and on the evidence of the monitoring results, the air quality is expected to be relatively good at Mamatwane.

The construction phase is expected to last approximately 2.5 years, and the intensity of the emissions are expected to be low, with pollutants released close to ground level. The dispersion of pollutants is likely to be limited to the construction site, with resultant ambient concentrations likely to remain very low. In light of these factors and uninhabited nature of the immediate area surrounding the Compilation Yard, the expected impact will likely remain within acceptable standards.

Box 7.10 \hspace{2cm} \textbf{Summary of Construction Impact: Air Quality}

| Nature: | Construction activities would result in a \textbf{negative direct impact} on existing ambient air quality in the project site. |
| Sensitivity/Vulnerability/Importance of Resource/Receptor: | \textbf{Low} |
| Impact Magnitude: | \textbf{Small} |
| Extent: | The extent of the impact is \textbf{On-site} |
| Duration: | The expected impact will be \textbf{Temporary} |
| Scale: | The impact will result in \textbf{Slight} changes to the receptor |
| Frequency: | The frequency of the impact will be \textbf{Once-off} |
| Likelihood: | Ambient air quality will \textbf{Likely} be affected |

\textbf{IMPACT SIGNIFICANCE (PRE-MITIGATION): \textbf{NEGLIGIBLE}}

\textbf{Degree of Confidence: The degree of confidence is \textbf{high}.}

\textbf{Construction Phase: Mitigation}

- Wet suppression or chemical dust suppressants will be used in exposed surface areas, materials handling points and stockpile areas to reduce dust emission, where required.
- Soil stockpiles shall not exceed 2m in height. During windy conditions, appropriate, reasonable and practical dust suppression measures will be implemented.
- Legal speed restrictions will be implemented on-site and on access roads to limit dust entrainment by vehicles.
- Maintenance programme for construction vehicles to ensure optimum performance reduced emissions.

\textbf{Operational Phase: Impact Assessment and Description}

The consolidation and deconsolidation of wagon trains by diesel locomotives in the compilation yard will result in exhaust emissions which include particulates, oxides of nitrogen (NOx) and volatile organic compounds (VOCs).
Air quality impacts are also associated with evaporative losses of VOCs from fuel handling and storage in bulk above-ground tanks. The VOCs typically associated with diesel are benzene, toluene, ethylbenzene and xylene.

The movement of vehicles and equipment in the Compilation Yard may generate dust. Dust may also be entrained by the wind from the manganese ore stockpiles in the Common User Facility, from stacking and reclaiming activities as well as from open areas. Air pollutants will result in the Common User Facility from exhaust emissions and from haulage vehicles.

**Benzene emissions from fuel storage**

In South Africa, benzene is classified as a criteria pollutant and ambient air quality standards have been set for this compound. As mentioned above, fuel storage results in evaporative emissions. The locomotive refuelling facility at the Compilation Yard is proposed to be relatively small with a total capacity of 124 m³. The fuel will be stored in two 62 300 litre storage tanks. The combined capacity of the fuel storage facility is well below the threshold of 500 m³ for which depots require an Atmospheric Emissions License in terms of the National Environmental Management: Air Quality Act (No 39 of 2004).

The intensity of the benzene emissions from the fuel storage facility is expected to be very low and since the pollutants will be released relatively close to ground level, dispersion is likely to be limited to the immediate vicinity of the tanks and the Compilation Yard. The resultant ambient concentrations are expected to be limited. Considering these factors and uninhabited nature of the area surrounding the Compilation Yard the activity is unlikely to result in unacceptable impacts.

**Diesel locomotive emissions**

Locomotive exhaust emissions contain particulate matter, including respirable particulate matter (PM₃₀ and PM₂.₅), oxides of nitrogen (NOₓ), sulphur dioxide (SO₂) and benzene. The predicted ground-level ambient and the annual average for NOₓ and SO₂ concentrations will be well below the South African ambient air quality standards. In addition, the predicted ground-level ambient and annual average concentrations for PM₃₀ and PM₂.₅ will be well below the current and future 2015 South African ambient air quality standards.

The intensity of the emissions from locomotives in the Compilation Yard is expected to be limited and the proposed activities would not result in unacceptably high impacts.

**Emissions from manganese ore storage and handling**

Windblown dust and dust generated from handling and storing the manganese ore contains respirable particulate matter containing manganese oxides. The resultant ambient concentrations of PM₁₀, PM₂.₅, manganese and dust from the storage area emissions may pose a health risk if they exceed the South African...
ambient air quality standards and other health-based guidelines. The resultant
deposition of dust from the storage area may pose a nuisance risk if it exceeds
the South African dust deposition limits although water cannons will be used to
damp down stockpile surfaces and water sprays will be installed at conveyor
transfer points.

Predicted 30-day average maximum dust deposition rates resulting from the
common user facility are shown in Figure 7.6. The predicted ground-level
deposition rates are well below the current South African dust fallout standards
of 1200 mg/m²/day for non-residential areas and for the 600 mg/m²/day
standard for residential areas.

![Figure 7.6](image)

**Figure 7.6** Predicted 30-day average dust deposition rates in mg/m²/day resulting from
dust generating activities at the Common User Facility

The predicted 24 hour PM₁₀ and PM₂.₅ ground-level ambient and annual
average concentrations are well below the current and future 2015 South
African ambient air quality standards.

The predicted ground-level ambient concentrations for manganese exceed the
WHO ambient air quality guideline of 0.15 µg/m³ up to 1.6 km from the source
however the South African occupational standard for exposure to respireable
manganese is 1 mg/m³ (1 000 µg/m³). It is clear that the modelled
concentration is lower than the South African occupational standard.

The intensity of the emissions from the Common User Facility is expected to be
generally low. With the exception of manganese, the resultant ambient
concentrations are expected to be very low. The ground-level ambient
concentrations for manganese are likely to remain within South African
standards.

Considering these factors and uninhabited nature of the area surrounding the
Common User Facility, the proposed activities are unlikely to result in
unacceptably high impacts.
Emissions from manganese ore transport

Windblown manganese ore dust from the moving wagons contains respirable particulate matter and manganese oxides. The resultant ambient concentrations of respirable particulate matter (PM$_{10}$ and PM$_{2.5}$) may pose a health risk in the ambient environment if they exceed the South African ambient air quality standards.

Ore is brought to Mamatwane from the mines via train or via road to the Common User Facility before being loaded onto wagon trains for the long freight haul to the Port of Ngqura. It is assumed that the ore wagons pass under a spray of water or chemical surfactant to capture any dust onto the ore, prior to leaving the mines. The wagons arriving at Mamatwane are therefore not expected to be a significant source of dust. Trains will leave the Mamatwane Common User facility once loaded when it is assumed that the ore is sprayed. The wagons departing from Mamatwane are therefore not expected to be a significant source of dust.

The intensity of the emission of windblown dust from the wagon trains is expected to be limited due to generally low wind speeds and the ore being sprayed with water or chemical suppressants. The expected impact will be limited to the immediate vicinity of the railway line and the Common User Facility. The resultant ambient concentrations are therefore expected to be very low. Considering these factors and uninhabited nature of the area surrounding the Compilation Yard and Common User Facility, the activity is unlikely to result in unacceptably high standards.

**Box 7.11 Summary of Operational Impact: Air Quality**

| Nature: Operational activities would result in a negative direct impact on existing ambient air quality in the project site. |
| Sensitivity/Vulnerability/Importance of Resource/Receptor: Low |
| Impact Magnitude: Small |
| Extent: The extent of the impact is On-site |
| Duration: The expected impact will be Long term (during of operations) |
| Scale: The impact will result in Slight changes to the receptor |
| Frequency: The frequency of the impact will be Continuous |
| Likelihood: Ambient air quality will Likely be affected |
| IMPACT SIGNIFICANCE (PRE-MITIGATION): MINOR (-) |
| Degree of Confidence: The degree of confidence is high |

**Operational Phase: Mitigation**

- Design and implement a spill management programme to effectively clean spilt ore.
- Implement wetting programme for unpaved roads and open areas using chemical surfactant.
• Re-vegetate open unused areas in accordance with the operational or post-construction utilisation of that particular portion of the site.
• Wet suppression or chemical dust suppressants will be used in exposed surface areas, materials handling points (i.e. conveyor transfer points) and stockpile areas to reduce dust emission.
• Legal speed restrictions shall be abided to on gravel roads within the site, at an operational level.
• Maintenance programme for equipment and operational phase vehicles to ensure optimum performance reduced emissions.
• The current regulation (DEA, 2010) requires vapour recovery systems to be fitted and operated on fuel facilities with an annual throughput of 5 000 m³. Assuming this regulation is not amended, with the threshold increased, a vapour recovery system shall be implemented. DEA shall be contacted to confirm the way forward, at the time of operation.

Residual Impact

The residual impacts for both the construction and operational phases will remain negligible and minor negative, respectively.

Table 7.14  Pre- and Post- Mitigation Significance: Air quality

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>NEGLIGIBLE (-VE)</td>
<td>NEGLIGIBLE (-VE)</td>
</tr>
<tr>
<td>Operation</td>
<td>MINOR (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
</tbody>
</table>

7.1.9 Archaeological Artefacts and Cultural Heritage

Table 7.15  Impact Characteristics: Archaeological and Heritage Resources

<table>
<thead>
<tr>
<th>Summary</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Aspect/ activity</td>
<td>Loss of archaeological resources through landscape/site disturbance.</td>
<td>Management of archaeological resources during periods of maintenance and servicing.</td>
</tr>
<tr>
<td>Impact Type</td>
<td>Direct.</td>
<td>Direct.</td>
</tr>
<tr>
<td>Stakeholders/ Receptors Affected</td>
<td>Archaeological and cultural heritage resources.</td>
<td>Archaeological and cultural heritage resources.</td>
</tr>
</tbody>
</table>

Construction and Operational Phase: Impact Assessment and Description

Construction of the section of the railway line along which the Compilation Yard and Common User Facility will be developed began in 1959 and the line was electrified in 1966. No buildings or structures of cultural heritage significance were identified at the site proposed for the Compilation Yard and the Common User Facility.

Although the site is already disturbed from an archaeological perspective, because of railway activities and mining activities in the area, it must be
emphasized that in terms of previous archaeological impact assessment reports, a high density of stone tools were identified in the close vicinity of the site.

Box 7.12 Summary of Construction and Operational Impact: Archaeological and Cultural Resources

<table>
<thead>
<tr>
<th>Nature: Construction and operational activities would result in a <strong>direct negative impact</strong> on archaeological resources.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensitivity/Vulnerability/Importance of Resource/Receptor – Low.</strong></td>
</tr>
<tr>
<td>Irreplaceability: The activity will result in the loss of irreplaceable resources.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact Magnitude: <strong>Low.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extent:</strong> The extent of the impact is <strong>on-site.</strong></td>
</tr>
<tr>
<td><strong>Duration:</strong> The expected impact will be <strong>permanent</strong> (i.e. irreversible).</td>
</tr>
<tr>
<td><strong>Scale:</strong> The impact will result in <strong>severely altered changes</strong> to the resource/receptor.</td>
</tr>
<tr>
<td><strong>Frequency:</strong> The frequency of the impact will be <strong>once off.</strong></td>
</tr>
<tr>
<td><strong>Likelihood:</strong> Archaeological resources would likely be lost.</td>
</tr>
</tbody>
</table>

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MINOR (-).**

| Degree of Confidence: The degree of confidence is **Medium.** |

**Construction and Operational Phase: Mitigation**

- Construction workers and the EO must be educated in terms of the type of heritage objects that may be discovered during earthmoving operations, who to contact in such an event and what to do before a professional archaeologist attends to the site.
- Monitoring on-site for the presence of stone tools prior to and during construction by the EO.
- A chance-find procedure will be implemented so that in the event of graves or stone age artefacts being uncovered, the EO/Site Engineer will take the appropriate action, which includes:
  - Stopping work in the immediate vicinity and fencing off the area with tape to prevent further access;  
  - Reporting the discovery to the provincial heritage agency and/or SAHRA;  
  - Appointing a local archaeological/palaeontological expert to inspect the artefacts/fossils;  
  - Implementing further mitigation measures proposed by the expert; and  
  - Allowing work to resume only once clearance is given in writing by the relevant authorities.

**Residual Impact**

The implementation of the above mitigation measures would reduce the decommissioning phase impacts from **Minor** to **Negligible** significance. The pre- and post-mitigation impacts are compared below.
### Table 7.16 Pre- and Post-Mitigation Significance: Archaeological and Cultural Resources

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction and Operation</td>
<td>MINOR (-ve)</td>
<td>NEGLIGIBLE (-ve)</td>
</tr>
</tbody>
</table>

### 7.1.10 Impact on Palaeontological Artefacts

While important features of palaeontological interest were not explicitly identified on site, the palaeontological value and the potential for disturbing such resources was acknowledged, especially in the potentially more fossiliferous fluvial/stream deposits associated with ephemeral watercourse (i.e. Vlermuisleegte drainage channel) south of the project site.

### Table 7.17 Impact Characteristics: Palaeontological Resources

<table>
<thead>
<tr>
<th>Project Aspect/ activity</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disturbance of or damage to palaeontology heritage resources associated with site preparation and construction activities.</td>
<td>Negligible impacts associated with site expansions and services and maintenance activities. These are not expected to increase the proposed developments footprint on site.</td>
</tr>
<tr>
<td>Impact Type</td>
<td>Direct negative</td>
<td>Direct negative</td>
</tr>
<tr>
<td>Stakeholders/ Receptors Affected</td>
<td>Palaeontological artefacts within site clearance areas.</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>On-site fossils.</td>
<td></td>
</tr>
</tbody>
</table>

**Construction and Operational Phase Impact Assessment and Description**

Project activities undertaken predominantly during the preparation and construction phases of the project will have the greatest potential to interfere with or disturb palaeontological resources on site. These construction phase activities include:

- Site and vegetation clearance;
- Levelling, compacting and grading activities;
- Trenching and excavations for infrastructure and pipelines; and
- The laying of foundations for buildings and structures.

At an operational phase, maintenance and servicing activities may result in forms of excavation, but will be limited to previously disturbed footprints.

The extent to which construction and operational activities are likely to interfere with such resources is expected to be minimal owing to the sparse distribution of fossils in the dominant rock formation underlying the site. Despite this, mammalian bones, teeth and horn cores (also tortoise remains, and fish, amphibian or even crocodiles in wetter depositional settings such as pans) may
be expected occasionally within Kalahari Group sediments and calcrites, notably those associated with ancient, Plio-Pleistocene alluvial gravels.

**Box 7.13 Construction and Operational Impacts: Damage to or Destruction of Palaeontological Artefacts**

**Nature:** Construction and operational activities such as earthworks have the potential to have a direct negative impact on palaeontological artefacts on site.

**Sensitivity/Vulnerability/Importance of Resource/Receptor:** Low.

**Irreplaceability:** The activity is unlikely to result in the loss of irreplaceable heritage resources.

**Impact Magnitude:** Small

**Extent:** The extent of the impact is On-site, as the extent of their disturbance is limited to the site.

**Duration:** The duration would be Permanent, as palaeontological resources are irreplaceable and any loss would be permanent.

**Scale:** The impact will result in small changes to the resource/receptor.

**Frequency:** The frequency of the impact would be Once-off.

**Likelihood:** Due to the sparse, very patchy distribution of fossils in the subsurface, the probability of a significant fossil find is rated Unlikely.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – NEGLIGIBLE (-).**

Degree of Confidence: The degree of confidence is medium given the paucity of rock outcrop on-site.

**Construction and Operational Phase: Mitigation**

- The EO responsible for the development must remain aware that all sedimentary deposits have the potential to contain fossils and he/she should thus monitor all substantial excavations into sedimentary bedrock for fossil remains. If any fossils are found during construction SAHRA should be notified immediately.

- A chance-find procedure will be implemented so that in the event of fossils being uncovered, the EO/Site Engineer will take the appropriate action, which includes:
  
  - Stopping work in the immediate vicinity and fencing off the area with tape to prevent further access;
  - Reporting the discovery to the provincial heritage agency and/or SAHRA;
  - Appointing a local archaeological/palaeontological expert to inspect the artefacts/fossils;
  - Implementing further mitigation measures proposed by the expert; and
  - Allowing work to resume only once clearance is given in writing by the relevant authorities.

- During maintenance and servicing of infrastructure, if excavation is required, it shall be limited to the disturbed footprint as far as practicable.
Should bulk works exceed the existing disturbed footprint, SAHRA shall be notified.

**Residual Impact**

If the above-mentioned mitigation is adhered to, the residual impact significance on any construction and operational phase impacts to palaeontological resources is considered to be *Negligible*.

**Table 7.18 Pre- and Post- Mitigation Significance: Palaeontological Artefacts**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Impact Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>NEGLIGIBLE</td>
<td>NEGLIGIBLE</td>
</tr>
<tr>
<td>Operation</td>
<td>NEGLIGIBLE</td>
<td>NEGLIGIBLE</td>
</tr>
</tbody>
</table>

**7.1.11 Creation of Employment**

The project is expected to provide direct and indirect employment opportunities, as well as opportunities within the supply chain at both a local and national scale during the construction and operation phase of the project.

**Table 7.19 Impact Characteristics: Creation of Employment Opportunities**

<table>
<thead>
<tr>
<th>Summary</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Aspect/activity</td>
<td>Creation of employment opportunities.</td>
<td>Creation of employment opportunities.</td>
</tr>
<tr>
<td>Impact Type</td>
<td>Direct and indirect.</td>
<td>Direct and indirect.</td>
</tr>
<tr>
<td>Stakeholders/Receptors Affected</td>
<td>Job seekers.</td>
<td>Job seekers.</td>
</tr>
</tbody>
</table>

**Construction and Operational Phase: Impact Assessment and Description**

The entire Mn Ore Line Upgrade Project is expected to create employment opportunities, of which 12,171 will be direct, and 9,128 will be indirect positions. The Project will require highly skilled, semi-skilled and unskilled workers during the construction phase. Due to the technical nature of the construction phase, a large proportion of the workforce will be highly skilled and semi-skilled employees. Transnet is planning to employ people from the local areas (areas closest to each Project site) for construction work; which will result in a large number of people benefiting from the Project in a broader area.

Some of the positions that will be created as part of the construction activities will include security guards, engineers, as well as skilled and semi-skilled construction workers. Construction jobs will be temporary in nature over 30 months.
Education and Skills

Tertiary education is limited with eight percent (8%) of the population in the Gamagara LM and four percent (4%) in the Joe Morolong LM having received education beyond Grade 12. A significantly high number of people are classified as being economically inactive (Gamagara LM has 34 percent and Joe Morolong LM has 77 percent). Furthermore, the main skills are elementary skills which are often unaligned with the employment needs of various developments occurring in the District and LMs. This has resulted in many developers importing skilled labour from elsewhere in the Province and country.

The population of the project affected LMs are likely to secure mainly semi-skilled and unskilled positions given the low level of tertiary education in the area. Although health and safety training will be offered prior to commencement of the project, upfront training as part of the project is unlikely. It is therefore assumed that the majority (if not all) of the highly skilled employment opportunities will be filled by workers from elsewhere in the Province and South Africa.

In addition to the direct employment opportunities available to local people, there will be a large number of indirect employment through the supply chain and local procurement of goods and services especially the hospitality and accommodation industry as well as civic works. Induced employment will be created through increased spending in the economy by people employed to work on the project.

During operation of the upgraded Mn Ore Line, a limited number of jobs will be created, estimated at 570. The type of jobs that will be created include administrators, sundry workers, section managers, train drivers and assistants, train control officers, service drivers and general workers.

In-direct employment opportunities (temporary and permanent) will be created in the manufacturing of wagons and equipment for the railway line. These jobs require skilled and semi-skilled workers with experience in the relevant fields.

The impact related to the creation of employment opportunities is assessed in below.
### Box 7.14 Summary of Construction and Operation Impact: Creation of Employment

| Nature: | The impact will be positive and direct, indirect as related to supply chain jobs. |
| Sensitivity / Vulnerability / Importance of Resource / Receptor: | Medium |
| Irreplaceability: | The impact will not include the loss of irreplaceable resources. |

#### Impact Magnitude: Small

- **Extent:** The impact will extend to the local, regional, and national levels.
- **Duration:** The impact will be short-term for construction and long-term to permanent for operations.
- **Scale:** The impact will result in small to notable changes to the receptor.
- **Frequency:** The frequency will be occasional during construction and constant for operation.
- **Likelihood:** The impact will certainly occur.

**IMPACT SIGNIFICANCE (PRE-ENHANCEMENT): MINOR POSITIVE (construction) and MINOR to NEGLIGIBLE (operation).**

**Degree of Confidence:** The degree of confidence is medium.

### Construction and Operational Phase: Enhancement Measures

- All project Contractors will be required to recruit in line with Transnet’s job creation and supplier development objectives. One of the key conditions of will be that “no employment will take place at the entrance to the site, only formal channels for employment will be used”.
- Transnet will work closely with relevant local authorities, community representatives and organisations to ensure that the use of local labour and procurement is maximised. This may include:
  - Sourcing and using available databases on skills/employment-seekers that local authorities may have; and
  - Advertising job opportunities and criteria for skills and experience needed through local and national media.

### Residual Impact

With the implementation of the above mitigation measures, the anticipated impact is likely to remain that of minor positive significance for construction and operation phases of the project.

### Table 7.20 Pre- and Post- Mitigation Significance: Creation of Employment

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Impact Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction and operation</td>
<td>MINOR (+ve)</td>
<td>MINOR (+ve)</td>
</tr>
</tbody>
</table>

### 7.1.12 Procurement of Goods and Services

The project’s construction and operations phases will generate large contracts for the purchase of equipment and other goods and services.

### Table 7.21 Impact Characteristics: Procurement and Services

<table>
<thead>
<tr>
<th>Summary</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Summary</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Aspect/activity</td>
<td>Increase in procurement and services.</td>
<td>Increase in procurement and services.</td>
</tr>
<tr>
<td>Impact Type</td>
<td>Direct, in-direct</td>
<td>Direct and in-direct.</td>
</tr>
<tr>
<td>Stakeholders/Receptors Affected</td>
<td>Local and regional communities.</td>
<td>Local and regional communities.</td>
</tr>
</tbody>
</table>

Construction and Operational Phase: Impact Assessment and Description

Procurement opportunities will be available to local businesses. However, those benefits will be limited, as most of the goods/services required are highly specialised and are unlikely to be available in the local areas. Local procurement will, therefore, primarily benefit the civils and construction industry, hospitality and service industries, such as accommodation, catering, transport, vehicle servicing and security services.

The majority of the goods and services needed for the realisation of the project will be highly technical / specialised and will be provided by specialist providers of goods and services. Table 7.22 provides an overview of the major goods and services that will be procured costs/spending, as well as the anticipated origin thereof.

Table 7.22 Goods and Services to be Procured

<table>
<thead>
<tr>
<th>Origin</th>
<th>Goods and Services to be procured</th>
</tr>
</thead>
<tbody>
<tr>
<td>International</td>
<td>• Rail and turnout components;</td>
</tr>
<tr>
<td></td>
<td>• Traction substation equipment; and</td>
</tr>
<tr>
<td></td>
<td>• Signalling and telecommunication equipment.</td>
</tr>
<tr>
<td>National (Gauteng)</td>
<td>• Traction substation equipment;</td>
</tr>
<tr>
<td></td>
<td>• Signalling and telecommunication equipment;</td>
</tr>
<tr>
<td></td>
<td>• Sleepers and fastenings;</td>
</tr>
<tr>
<td></td>
<td>• Overhead traction equipment; and</td>
</tr>
<tr>
<td></td>
<td>• Telecommunication contractors.</td>
</tr>
<tr>
<td>Regionally (Provincial)/Locally</td>
<td>• Ballast and layer works material;</td>
</tr>
<tr>
<td></td>
<td>• Civil and earthworks contractors; and</td>
</tr>
<tr>
<td></td>
<td>• Plate laying contractors.</td>
</tr>
</tbody>
</table>

Based on the above, the vast majority of goods and services will either be procured nationally (predominantly Gauteng)/ and internationally (Europe). Local contractors and businesses are expected to primarily benefit from civils and construction industry, hospitality and service industries, such as accommodation, catering, transport, vehicle servicing and security services.

The hospitality industry is expected to benefit from the housing of highly skilled workers from elsewhere in the Province and country; as Transnet has opted not to have an on-site housing facilities for construction camps workforce camp site for construction activities. Local labour used as far as possible and they will be able to return to their homes at the end of the work day; while, skilled labour sourced outside of the local area will require accommodation for the duration of construction. The hospitality industry in the LMs and DM are growing significantly due to mine operators choosing to house their workforce.
in the local hospitality establishment (whilst they (mines) are constructing houses for their workforce). Most of the mine related bookings are long-term and workers reside in these from Mondays to Thursdays. Some local residents in the towns of Kathu, Hotazel, Kuruman, and Postmasburg have converted their homes to B&Bs to capture the business opportunities; even so bookings to the areas need to be done two to three weeks in advance. Transnet will have to ensure that they have secured accommodation for their workers before construction begins.

People who manage to secure employment opportunities with the project are likely to increase their spending at local businesses due to availability and/ increased disposable income; thus inducing the benefits of the project in the enhancement of the local economy.

Overall, the procurement requirements during the operational phase will be limited to routine maintenance of the railway lines and signal equipment. This project will have a nominal increase on the existing manufacturing industry. The impact assessment related to the procurement of goods and services is assessed below.

**Box 7.15 Construction and Operation Impact: Procurement of Goods and Services**

<table>
<thead>
<tr>
<th>Nature: The impact will be <strong>positive</strong> and <strong>direct, indirect</strong>.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity/ Vulnerability/ Importance of Resource / Receptor: <strong>Medium</strong></td>
</tr>
<tr>
<td>Irreplaceability: The impact will not include the loss of irreplaceable resources.</td>
</tr>
</tbody>
</table>

**Impact Magnitude:** Small

**Extent:** The impact will extend to the **local, regional, national and international level**.

**Duration:** The duration will be **short-term** for construction. During operation the duration will be **long term**.

**Scale:** The impact will have **minimal** to **notable** effect on the receptor.

**Frequency:** Frequency of procurement during construction will be **once off** and during operation it will be **rare**.

**Likelihood:** The impact will **certainly** occur.

**IMPACT SIGNIFICANCE (PRE-ENHANCEMENT)** – The impact significance will be **MINOR POSITIVE** (construction) and **NEGLIGIBLE** (operation).

**Degree of Confidence:** The degree of confidence is **high**.

**Construction and Operational Phase: Enhancement Measures**

- Transnet will establish a Procurement Policy. All project Contractors will be required to procure goods and services in terms of Transnet’s procurement policy. The key objectives of the policy will be:
  - To maximise the local purchases, by directly working with local enterprises and by incentivising the project’s contractors to contract locally; and
  - To set a criteria for prioritising, where possible, local suppliers over regional or national suppliers.
• Transnet will ensure that the appointed project Contractors and suppliers have access to Health, Safety, Environmental and Quality training as required by the project. This will help to ensure that they have future opportunities to provide goods and services to the sector.

Residual Impact

If Transnet commits to maximising opportunities for South Africans, specifically for local labour, by implementing the enhancement measures, the positive impacts will be realised. The post-mitigation significance rating will remain one of minor positive significance during construction and negligible during operation, as shown in Table 7.23.

Table 7.23  Pre- and Post- Mitigation Significance: Procurement of Goods and Services

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Impact Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MINOR (+VE)</td>
<td>MINOR (+VE)</td>
</tr>
<tr>
<td>Operation</td>
<td>NEGLIGIBLE</td>
<td>NEGLIGIBLE</td>
</tr>
</tbody>
</table>

7.1.13 Disruption of Agricultural Activities

The project is expected to affect four commercial and privately-owned farms which are used to breed livestock (sheep, cattle, and game) and one of the affected farms is also used to breed horses. In addition, the mineral diatomite (1) is mined on Remainder of Portion 2 of farm Walton No 390. The majority of the disruption will be experienced during construction, which will include site clearance, removal of fences (which can lead to loss of stock through theft), abstraction of water, assembly and installation of rail and other associated infrastructure. The risk of veld fires may be associated with the operational activities of the project.

Table 7.24  Impact Characteristics: Disruption to Agricultural Activities

<table>
<thead>
<tr>
<th>Summary</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Aspect/activity</td>
<td>Construction activities.</td>
<td>Increased road traffic.</td>
</tr>
<tr>
<td></td>
<td>Road traffic.</td>
<td>Access through farm gates.</td>
</tr>
<tr>
<td></td>
<td>Access through farm gates.</td>
<td></td>
</tr>
<tr>
<td>Impact Type</td>
<td>Direct, negative.</td>
<td>Direct, negative.</td>
</tr>
<tr>
<td>Stakeholders/Receptors Affected</td>
<td>Directly affected farmers, and neighbouring farmers.</td>
<td>Neighbouring farmers.</td>
</tr>
</tbody>
</table>

(1)Diatomite is a naturally occurring, silicon rich sedimentary rock made up of fossilized hard-shelled plant algae.
Construction Phase: Impact Assessment and Description

Disruption to Livestock Farming

The farmers’ practice rotational farming as the grazing land requires time to regenerate. This is achieved through the division of the farm into camps which are individually fenced and gated; the farms are large enough to enable such rotational methods. During construction, the farmers will need to keep their livestock in alternate camps to the construction area in order to ensure that the stock are not harmed or lost as a result of the intensive construction methods.

As mentioned above, the farms are divided into camps and in order to access the full project site it will be necessary for the construction team to travel between camps; requiring them to open and close gates as they move. They will, at times, also be required to travel across/alongside neighbouring farms to reach the selected sites. It is critical that the gates are always closed once the team has passed in order to secure the stock. The high volume of vehicles that will be passing through the farm camps may cause damage to the gates and fencing. Damage to infrastructure could also lead to stock losses, as stock might escape through broken gates or fences.

Landowners have mentioned that they often lose sheep and goats during railway line maintenance. They are concerned that extended construction activities will result in increased livestock losses. In addition, landowners stated that certain types of livestock escape through the current fences and are often killed by the passing trains; they suggested that the construction site should be fenced off and that the fences are maintained during the operation.

Impact of Water Abstraction

Water will be sourced from surrounding mining operations and from three proposed boreholes which will be located on Transnet-owned land. Therefore, water abstraction activities associated with the project will have limited impact on farming activities.

The impact related to the disruption of agricultural activities is assessed in Box 7.16.
**Box 7.16 Summary of Construction Impact: Disruption of Agricultural Activities**

<table>
<thead>
<tr>
<th>Nature:</th>
<th>The impact will be <strong>negative</strong> and <strong>direct</strong>.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity / Vulnerability / Importance of Resource / Receptor:</td>
<td><strong>Medium</strong></td>
</tr>
<tr>
<td>Irreplaceability:</td>
<td>The impact will not include the loss of <strong>irreplaceable</strong> resources.</td>
</tr>
</tbody>
</table>

**Impact Magnitude:** **Medium.**

**Extent:** The extent of the impact is **on-site** and **immediate surroundings** (i.e. the directly affected farms).

**Duration:** The duration will be **short-term.**

**Scale:** The impact will result in **notable** changes to the receptor.

**Frequency:** The frequency of the impact will be **once-off.**

**Likelihood:** There is a **possibility** of the impact occurring.

**IMPACT SIGNIFICANCE (PRE-ENHANCEMENT): MODERATE NEGATIVE**

**Degree of Confidence:** The degree of confidence is **high.**

---

**Operation Phase: Impact Assessment and Description**

**Risk of Veld Fires**

Operational activities are not expected to cause any disruption to agricultural activities. However, during the initial stakeholder consultation, the landowners and neighbours raised concerns related to the risk of veld fires. According to the stakeholders, trains cause sparks which sometimes cause veld fires that kill livestock and destroy crops. The management and prevention of colonisation by invasive and weed species will be important in mitigating this risk.

The impact related to the disruption of agricultural activities is assessed in **Box 7.17.**

**Box 7.17 Summary of Operation Impact: Disruption of Agricultural Activities**

<table>
<thead>
<tr>
<th>Nature:</th>
<th>The impact will be <strong>negative</strong> and <strong>direct.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity / Vulnerability / Importance of Resource / Receptor:</td>
<td><strong>Medium</strong></td>
</tr>
<tr>
<td>Irreplaceability:</td>
<td>The impact will not include the loss of <strong>irreplaceable</strong> resources.</td>
</tr>
</tbody>
</table>

**Impact Magnitude:** **Medium.**

**Extent:** The extent of the impact is **on-site** and **immediate surroundings.**

**Duration:** The duration will be **short-term** to **long-term to permanent.**

**Scale:** The impact will result in **medium/notable** changes to the receptor.

**Frequency:** The frequency of the impact will be **rare.**

**Likelihood:** Impact can **possibly** occur.

**IMPACT SIGNIFICANCE (PRE-ENHANCEMENT): MODERATE NEGATIVE**

**Degree of Confidence:** The degree of confidence is **high.**
Construction Phase: Mitigation

- Construction workers to ensure that the gates are closed at all times and that any damage to the infrastructure is repaired immediately.
- Any damage to natural vegetation (specifically grazing land) will be rehabilitated in accordance with mitigation proposed for the rehabilitation of natural vegetation after construction on the project affected sites.
- Transnet to minimise the damage to farmland caused by construction activities by ensuring strict compliance with construction plans.
- Transnet will implement a ‘Code of Conduct’ governing workers.

The Code of Conduct must address the following aspects:

- Respect for local residents;
- Respect for farm infrastructure and agricultural activities;
- No hunting or unauthorised taking of products or livestock;
- Compliance with the traffic management plan and all road regulations; and
- Description of disciplinary measures for infringement of the code and company rules.

- If workers are found to be in contravention of the Code of Conduct, which they signed at the commencement of their contract, they will face disciplinary procedures.
- Transnet will ensure that measures to manage and prevent colonisation by invasive alien and weed species are adhered to (see Chapter 8).
- Transnet will implement a grievance procedure to ensure that complaints related to project activities can be lodged and responded to promptly.

Residual Impact

The implementation of the above mitigation measures would reduce the construction impacts from moderate to low negative significance and the operation impacts will be reduced from moderate to negligible significance. The pre- and post-mitigation impacts are compared below.

Table 7.25 Pre- and Post- Mitigation Significance: Disruption of Agricultural Activities

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Impact Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MODERATE (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
<tr>
<td>Operation</td>
<td>MODERATE (-ve)</td>
<td>NEGLIGIBLE (-ve)</td>
</tr>
</tbody>
</table>

7.1.14 Loss of Grazing Land

Grazing land will be lost to the project due to the additional land take that is required outside of the existing railway reserve. In order to mitigate for the shortage of land, Transnet is planning to purchase only the required pieces of land for construction of the Compilation Yard, Common User Facility and associated infrastructure.
Table 7.26 Impact Characteristics: Loss of Grazing Land

<table>
<thead>
<tr>
<th>Project Aspect/activity</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land acquisition</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Impact Type

Direct

Stakeholders/Receptors Affected

Four directly affected landowners

Table 7.26

Construction Phase: Impact Assessment and Description

The land to be acquired for the project and its associated infrastructure is approximately 124.4 ha (1.24 km²) or 3.5 percent of the four combined farm areas. The largest piece of land that will be acquired from the four landowners will be at the Remainder of Portion 1 of the farm Shirley No. 367 (Shirley) where approximately 104.43 ha of land will be required. Table 7.27 shows the sizes of four affected farms and the size of land to be acquired on each farm.

Table 7.27 Required Land

<table>
<thead>
<tr>
<th>Name of Farm</th>
<th>Size of Farm</th>
<th>Land Required for the Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portion 3 of Remainder of the farm Moab No. 700</td>
<td>100ha</td>
<td>0.6779ha</td>
</tr>
<tr>
<td>Portion of Remainder of Portion 1 of the farm Shirley No 367</td>
<td>1,700ha</td>
<td>103.4004ha</td>
</tr>
<tr>
<td>Portion of Remainder of Portion 2 of the farm Walton No 390</td>
<td>856ha</td>
<td>18.6472ha</td>
</tr>
<tr>
<td>Portion 2 of Remainder of the farm of Walton No 390</td>
<td>900ha</td>
<td>1.6722ha</td>
</tr>
</tbody>
</table>

Based on the above, the overall loss of grazing land due to the land acquired for the project will be minimal. The land to be acquired on Shirley farm is expected to increase as the landowner is currently negotiating with Transnet to purchase the entire section of the land on the eastern side of the railway line. The landowner stated that his land is divided into two sections (west and east) by the railway line. The landowner anticipates that the proposed layout of the Compilation Yard will further add restrictions to access of the eastern section of the farm.

Furthermore, the affected landowners will be compensated for the loss of land to the project.

The key issues that affect decision-making regarding any proposed changes to land use, from agricultural use to other use, are the following:

- Compatibility of farming and the proposed project: The authorities would want to determine if the agricultural land will be maintained alongside the extended railway line. If the project is going to impact negatively on the sustainability of the farm the authorities are unlikely to give a permit for the change in land use.

The soil in the project area is of poor quality, and the project affected landowners have stated that the required land acquisition will have limited to
no effect on their agricultural activities. The loss of grazing land is therefore, considered to be of minor or minimal impact. The impact related to the loss of grazing land is assessed below.

**Box 7.18 Summary of Construction Impact: Loss of Grazing Land**

<table>
<thead>
<tr>
<th>Nature: The impact will be experienced as a direct, negative.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity / Vulnerability / Importance of Resource / Receptor: Low</td>
</tr>
<tr>
<td>Irreplaceability: The impact will not include the loss of irreplaceable resources.</td>
</tr>
<tr>
<td>Impact Magnitude – Low</td>
</tr>
<tr>
<td>Extent: The impact will have an on-site extent.</td>
</tr>
<tr>
<td>Duration: The impact duration will be permanent.</td>
</tr>
<tr>
<td>Scale: The impact will result in medium/notable changes to the receptor.</td>
</tr>
<tr>
<td>Frequency: The impact will be once off.</td>
</tr>
<tr>
<td>Likelihood – There is a high likelihood that this impact will occur.</td>
</tr>
<tr>
<td>IMPACT SIGNIFICANCE (PRE-MITIGATION) - MINOR NEGATIVE *</td>
</tr>
<tr>
<td>Degree of Confidence: The degree of confidence is high.</td>
</tr>
</tbody>
</table>

**Construction Phase: Mitigation**

- Transnet will consult the affected landowners to discuss sensitive areas on their property and design the infrastructure layout in a manner that limits loss of agricultural land.
- Transnet will implement a grievance procedure that ensures that complaints related to project activities can be lodged and responded to promptly.

**Residual Impact**

The implementation of the above mitigation measures would ensure that the construction impact is reduced from minor negative to negligible significance. The pre- and post-mitigation impacts are compared in Table 7.28.

**Table 7.28 Pre- and Post- Mitigation Significance: Loss of Grazing Land**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Impact Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MINOR (-ve)</td>
<td>NEGLIGIBLE(-ve)</td>
</tr>
</tbody>
</table>
7.1.15 Waste Generation

Table 7.29 Impact Characteristics: Waste Generation

<table>
<thead>
<tr>
<th>Summary</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Aspect/activity</td>
<td>Waste generation during construction</td>
<td>Waste generation and handling during operation include maintenance of the oil/water separator</td>
</tr>
<tr>
<td>Impact Type</td>
<td>Direct.</td>
<td>Direct.</td>
</tr>
<tr>
<td>Stakeholders/Receptors</td>
<td>Receptors on- and off-site</td>
<td>Receptors on- and off-site</td>
</tr>
<tr>
<td>Affected</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Construction and Operational Phase: Impact Assessment and Description

Waste from the project may arise from a range of sources during the installation activities including the following:

- Excavated material (e.g. rock, sand, vegetation);
- Construction activities (rubble, packaging, etc.); and
- Fuel spills and the clean-up thereof.

Following the construction phase, there will be minimal waste production (other than general waste generated from the normal operation of the Compilation Yard). During construction a combination of domestic and hazardous wastes will be produced. All waste products or contaminated areas would be contained, collected and disposed of a registered domestic or hazardous landfill site (depending on nature of wastes), with proof of disposal provided.

At an operational level, it is anticipated that solid waste will be produced and stored in plastic bins, collected and disposed of by an authorised waste contractor. This waste will be disposed of at a registered waste disposal site, with proof of disposal provided. An oil/water separator will be installed at the refuelling area to treat potentially contaminated surface water run-off from that area.
Box 7.19  Summary of Construction and Operational Impact: Waste Generation

<table>
<thead>
<tr>
<th>Nature: Construction and operational activities would result in a <strong>direct negative</strong> impact.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity/Vulnerability/Importance of Resource/Receptor: <strong>Low</strong>.</td>
</tr>
<tr>
<td>Irreplaceability: The activity <strong>will</strong> result in the loss of <strong>irreplaceable</strong> resources.</td>
</tr>
<tr>
<td>Impact Magnitude: <strong>Low</strong>.</td>
</tr>
<tr>
<td>Extent: The extent of the impact is <strong>on-site</strong>.</td>
</tr>
<tr>
<td>Duration: The expected impact will be <strong>permanent (ie irreversible)</strong>.</td>
</tr>
<tr>
<td>Scale: The impact will result in <strong>severely altered changes</strong> to the resource/receptor.</td>
</tr>
<tr>
<td>Frequency: The frequency of the impact will be <strong>continuous</strong>.</td>
</tr>
<tr>
<td>Likelihood: Waste generation is <strong>likely</strong> to occur.</td>
</tr>
<tr>
<td>IMPACT SIGNIFICANCE (PRE-MITIGATION) – <strong>MINOR (-)</strong>.</td>
</tr>
<tr>
<td>Degree of Confidence: The degree of confidence is <strong>Medium</strong>.</td>
</tr>
</tbody>
</table>

**Construction and Operational Phase: Mitigation**

Standard measures for the minimisation and management of wastes have been included in the EMPr *(see Chapter 8 and Annex D and E)*.

- A hierarchical approach to waste management is encouraged starting with prevention, recycling, treatment followed lastly by disposal.
- The oil/water separator must be inspected regularly to ensure it is in good working order.
- A safe and appropriately enclosed waste storage area will be established on-site to store materials for recycling, general and hazardous waste before removal from site.

**Residual Impact**

The residual impact associated with waste generation is minor.

**Table 7.30  Pre- and Post-Mitigation Significance: Waste Generation**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Significance (Post-mitigation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction and Operation</td>
<td>MINOR (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
</tbody>
</table>

**7.1.16  Community Health and Safety**

The implementation of the project will result in increased road and rail traffic. The increased road traffic is will be facilitated by the transportation of construction materials, goods and other services to site; whereas increased rail traffic will be experienced during the operational phase of the project. Each of these impacts are discussed and assessed below.
### Table 7.31 Impact Characteristics: Community Health and Safety

<table>
<thead>
<tr>
<th>Summary</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Aspect/activity</td>
<td>Increase in traffic (associated with construction vehicles) onsite and the R380.</td>
<td>Transportation of manganese ore from the Northern Cape to the Eastern Cape</td>
</tr>
<tr>
<td>Impact Type</td>
<td>Direct.</td>
<td>Direct.</td>
</tr>
<tr>
<td>Stakeholders/Receivers Affected</td>
<td>Provincial and Local Road Authorities, Local commuters; Project affected landowners and their neighbours.</td>
<td>Project affected landowners/farmers, their neighbours and local commuters.</td>
</tr>
</tbody>
</table>

**Construction Phase: Impact Assessment and Description**

**Increased Road Traffic**

Construction materials, goods and other services will be transported to site by road. The project area is located off the R380 (regional road); currently this road carries a significant number of heavy vehicles from the various surrounding mines as well as passenger vehicles. The introduction of additional heavy and light vehicles associated with construction may have the following impacts:

- Increased risk of accidents and injuries to people and livestock due to increased traffic volumes;
- Increased wear and tear on roads resulting in uneven surfaces and potholes; and
- Increased nuisance factors such as dust and noise.

Given that there is existing heavy vehicle traffic on R380 and the access road to site, it is not anticipated that the increase in traffic due to the project activities will impact significantly on community health and safety and the road surface.

**Operation Phase: Impact Assessment and Description**

During the operation phase light vehicles will continue to use the roads to the project site, and although there will be a decrease in construction vehicle traffic, there will be an increase in traffic associated with haul trucks transporting ore to the Common User Facility. The impact related to increased road traffic is assessed below.
Box 7.20 Summary of Construction and Operation Impact: Increased Road Traffic

<table>
<thead>
<tr>
<th>Nature: The impact on community health and safety caused by an increase in traffic is an indirect and negative impact.</th>
<th>Sensitivity/ Vulnerability /Importance of Resource/Receptor: Medium.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irreplaceability: The activity will not result in the loss of irreplaceable resources.</td>
<td></td>
</tr>
</tbody>
</table>

**Impact Magnitude** – Medium

**Extent**: The impact extent is on-site, immediate surrounds and regional level.

**Duration**: Impacts will be continuous.

**Scale**: The impact will result in notably altered traffic conditions.

**Frequency**: The impact is likely to occur during construction.

**Likelihood**: The impact will certainly occur.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MODERATE NEGATIVE**

**Degree of Confidence**: The degree of confidence is high.

Operation Phase: Impact Assessment and Description

**Increased Rail Traffic**

During the operation phase, there will be an increase in rail traffic throughout the length of the railway line. The trains will be longer in length than what is currently used for the transport of manganese ore which will result in extended waiting times at road level crossings. There will be a possibility of increased accidents as members of the public become impatient at level crossings while seeking to cross the railway line. In addition, the railway line reserve is fenced off; however, most of these fences are old and in need of repair making it easy for people and livestock to enter the reserve and further increasing the potential for injuries to both humans and livestock.

The impact related to increased rail traffic is assessed below.

Box 7.21 Summary of Operation Impact: Increased Rail Traffic

<table>
<thead>
<tr>
<th>Nature: The impact of increased train traffic and longer waiting times at level crossings will be indirect and negative.</th>
<th>Sensitivity/ Vulnerability /Importance of Resource/ Receptor: Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irreplaceability: The impact will not include the loss of irreplaceable resources.</td>
<td></td>
</tr>
</tbody>
</table>

**Impact Magnitude**: Medium

**Extent**: The impact will have a regional extent.

**Duration**: The impact duration will be long-term to permanent.

**Scale**: The impact will result in notably.

**Frequency**: The impact is constant to occur during operations.

**Likelihood**: The increase in train traffic will certainly occur.

**IMPACT SIGNIFICANCE (PRE-MITIGATION) – MODERATE NEGATIVE**

**Degree of Confidence**: The degree of confidence is high.
Construction and Operational Phase: Mitigation Measures

- Transnet will communicate with the Provincial and District Roads Department about the project and the scheduled transportation of goods and services to sites and determine the best way forward that will have limited impacts on the major roads and other road users.
- Arrangements and routes for abnormal loads (if required) will be agreed in advance with the relevant Provincial Authorities and the appropriate permit will be obtained for the use of public roads.
- During construction, Transnet will maintain secondary roads should they deteriorate as a result of project activities.
- Transnet will define and visibly display speed limits along all routes and enforce these amongst all project-related vehicles. Transnet drivers will be sensitised about potential accident risks to local users.
- Transnet will ensure correct and safe loading of vehicles to avoid accidents.
- Transnet will maintain the grievance procedure that ensures that complaints related to project activities can be lodged and responded to promptly.
- Transnet and its contractor/s will ensure that all drivers adhere to the Code of Conduct.
- Transnet will inform directly affected and neighbouring landowners of the expected increase in waiting time at the relevant level crossings.
- Level crossings must be appropriately signed.

Residual Impact

The increase in traffic during the construction and operation phases brings with it a number of key risks to the local communities, road users and road infrastructure; however, with the implementation of the above mitigation measures, the impact on community health and safety can be reduced from moderate to minor negative significance during both phases.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Significance (Pre-mitigation)</th>
<th>Residual Impact Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>MODERATE (-VE)</td>
<td>MINOR (-VE)</td>
</tr>
<tr>
<td>Operation</td>
<td>MODERATE (-VE)</td>
<td>MINOR (-VE)</td>
</tr>
</tbody>
</table>

7.2 CUMULATIVE IMPACTS

Impacts directly associated with the project are discussed in the preceding sections. In this section the impacts associated with cumulative effects of the project and other development are described. Evaluation of potential cumulative impacts is an integral element of an impact assessment.

The overarching piece of legislation governing the EIA process within a South African context (ie NEMA) also requests for the consideration of cumulative impacts within the EIA process.
Cumulative impacts in relation to an activity are defined in the EIA Regulations (Government Notice R543) as meaning “the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area”

7.2.1 Assumptions and Limitations

It is recognised that identifying and assessing cumulative impacts are challenging processes and are based on the following assumptions:

- Cumulative effects are difficult to predict as they are the result of complex interactions between multiple projects or activities. Further, prediction of effects of future development has an inherent error in that the fine details of a future development are not generally known and whether a future development actually occurs is dependent on a number of factors. This assessment is thus restricted to consideration of other development that is ‘reasonable and foreseeable’.
- Lastly, mitigation and management of cumulative effects are frequently beyond the ability of a single action or stakeholder and the mitigations developed in this EIA Report have focussed on actions that the project can take to avoid or control direct project impacts. Management of cumulative effects often requires mitigation in cooperation with other stakeholders or at a government level.
- It is assumed that proposed renewable energy facilities identified in the region will be approved in terms of NEMA and be allowed to proceed with construction and operation.
- It is assumed that due to the mineral rich nature of the region, additional mining activities are likely to be established in the foreseeable future.

7.2.2 Key Challenges in the Region

According to the John Taolo District Municipality IDP (2010-2011), the main economic sectors are mining, agriculture, tourism and retail. Mining is the most dominant of these sectors. This is due to an abundance of manganese ore and iron ore within the Local Municipalities. Mining is said to have also contributed to the establishment of the tourism sector as most mine managers and skilled labour from outside the area are housed in the local Bed and Breakfasts and hotels on a long term basis.

Other important sectors within the Gamagara LM include trade, transport, finance, and agriculture. These sectors experienced growth of between four and five percent. Similarly to the situation for the Province, the agricultural sector is limited to livestock farming due to the shortage of water and the arid climate and semi-desert conditions.

These key economic sectors are the primary contributors of employment opportunities in the region. Notwithstanding, current employment levels in the
local municipality is approximately 9%, however, this is primarily related to the high level of out-migration in search of employment opportunities.

7.2.3 Baseline Conditions

The baseline information presented below has been focussed on key issues identified and assessed in this report.

Agricultural Activities

In order to construct the Compilation Yard, additional land is acquired. The land-use on adjacent properties is characterised by livestock farming due to the limited rainfall in the area (223 mm annually). As a result of the low annual rainfall, there is a greater level of dependency on water provision from existing mining operations, municipal supply and (to a lesser extent), groundwater (due to varying quality).

Mining Activities

The proposed Compilation Yard is located adjacent to the existing Mamatwane open pit mine and associated concentrator plant. The mine results in the generation of dust, noise and vibration and increased road traffic. Furthermore, this open pit operation will increase its physical footprint, as production increases. The region is characterised with high concentrations of ore bodies, and therefore additional mining activities in the region are likely to be established in the foreseeable future.

On farm Portion of Remainder of Portion 2 of farm Walton No 390, the landowner mines the mineral Diatomite. Diatomite is a naturally occurring, silicon rich sedimentary rock made up of fossilized hard-shelled plant algae. There is an estimated 40,000 tons of diatomite at present on this farm. The landowner processes the diatomite for sale as a flea and tick remedy for livestock and pets, as well as processing it to produce a multivitamin supplement suitable for human consumption. At this time, it is not known if there are any plans to expand the existing operation.

Renewable Energy Facilities

Based on initial review, the Adams Photovoltaic Solar Energy Facility is proposed on Farm Adams 328, directly opposite the Mamatwane Mine. The facility will have a generation capacity of 19MW and will cover an area of less than 20ha. No further renewable energy applications were identified in the immediate surrounds, however, it is recognised that the region has been prioritised and the development of renewable energy facilities is being encouraged. As such, it is likely that additional renewable energy facilities will be developed into the future.

Following from the description above, the following key aspects will be qualitatively assessed from a cumulative perspective:
• Loss of agricultural land.
• Deterioration of sense of place and associated property values.
• Loss of ecological habitat.
• Project expenditure and skills development.

7.2.4 **Loss of Agricultural Land**

Current activities in the region, including the establishment of the proposed Compilation Yard, mining activities and renewable energy facilities, are likely to contribute to the loss of existing agricultural land. Dust generation and deposition from existing and foreseeable mining activities in the area are also likely to contribute to the loss of land designated for grazing.

Furthermore, construction and operational phase employees of current and future development could also contribute to an increase in cattle theft. The loss of cattle can impact the financial viability of existing farming activities.

7.2.5 **Loss of Sense of Place**

Current air quality in the region is likely to vary, based on the location of large scale industrial and mining development coupled with vast stretches of rural landscape and livestock farming. Existing ambient air quality is likely to deteriorate in future as a result of new and expansion of existing mining activities. Changes to ambient air quality, generation of noise, dust and emissions will impact the visual aesthetic and sense of place.

The value of surrounding agricultural land is primarily driven by the productive potential of the land and, to a lesser degree, by its other 'lifestyle' or non-productive factors which essentially determine how pleasant it is to live on the land. These can include visual appearance, noise levels and pollution levels etc.

Based on the synopsis of impacts above, it seems most reasonable to conclude that there would be a minor to moderate risk of decreases in value related to losses in production or productive potential. In addition, the actual change in the character of the area would likely result in very limited interest in nearby properties from buyers that place importance on lifestyle factors.

7.2.6 **Loss of Ecological Habitat**

According to the national vegetation map (Mucina & Rutherford, 2006), the site lies entirely within the Kathu Bushveld vegetation type which is still largely intact. Less than 2% has been transformed by mining activity and it is classified as Least Threatened. It is, however, poorly conserved and does not currently fall within any formal conservation areas.

The habitats present at the site are widely available across an extensive area surrounding the site and the potential for broad-scale fragmentation or loss of connectivity is low.
The cumulative effect of the establishment of current and foreseeable developments could likely result in the further loss of ecological habitat, disruption of ecological services, connectivity and long term deterioration of habitat.

7.2.7 Project Expenditure and Skills Development

The combined effect of current and foreseeable projects will have a significant cumulative impact on expenditure in the region and associated benefits. However, these positive impacts should be enhanced at a local and district level to ensure local communities benefit directly. Strong measures and commitments are required from project developers in terms of maximising local employment and downstream economic activities such as supplier, secondary industries etc. Collaborating closely with the local and district municipalities in supporting the objectives of the IDPs will also be important to maximise these benefits.

The proposed renewable energy facilities are likely to contribute to the surrounding communities through community trusts and employment. This will not only increase the opportunities for employment in the surrounding area, but also diversifies the potential opportunities for alternative means of employment. As the district is characterised with mining, this will ensure that the skills based can be diversified from the mining sector.

The combined effect of the existing/foreseeable projects is likely to have a significant positive cumulative impact on skills developments and expenditure in the region. It is important that the project applicant’s work together with the local and district municipality to identify the skills gaps present in the District. Furthermore, the project applicants should try to align their corporate social responsibilities with skills development objectives and plans identified by the local and district municipality.

7.2.8 Conclusion

The expected negative cumulative impacts are likely to exacerbate the existing challenges experienced by the agricultural sector. These challenges include the loss of land for grazing, as well as social ills in the form of stock theft (specifically related to construction workers). Furthermore, current noise and vibration levels will increase, as a result of this project as well as other foreseeable mining activities. The current and foreseeable developments will also result in further deterioration of air quality, in the form of emissions. Lastly, in light of current and foreseeable development, projects in the region will also result in the further loss of ecological habitat. Varying scales of development will likely result in further losses to ecological habitat in the region. The loss of ecological habitat, deteriorating air quality and increased criminal element will impact the visual aesthetic and overall tourism potential of the region.
From a cumulative perspective, the current and foreseeable developments in the region will contribute to increasing employment opportunities in the region, and thus reduce the level of out-migration in the Municipality. Employment generated from the proposed project is likely to contribute to an increase in local procurement of goods and services. Small businesses and local suppliers would likely benefit from the increase in employment opportunities in the region.

The effective on-going management of these cumulative impacts is strongly dependant on the relationship between the individual developers and the local and district municipality. Close cooperation between the various developers and the local authorities is essential to mitigating and managing potential future cumulative impacts.
In order to manage the construction phase impacts associated with the establishment of the Compilation Yard and the Common User Facility, the following Project Environmental Specification was developed.

Transnet has created an Environmental Management Programme (EMP) that consists of three documents and is applied to all Transnet projects. The three EMP documents are:

- The Construction Environmental Management Plan (CEMP) (refer to Annex D);
- The Standard Environmental Specification (SES) (refer to Annex E); and
- The Project Environmental Specification (PES) (this Chapter).

In brief, the CEMP outlines the roles and responsibilities during the construction phase. The SES provides generic guidance and mitigation for potential impacts while the PES outlines potential impacts and their mitigation that are specific to the project. All three documents are used by the contractor to draw up detailed method statements outlining their approach to construction taking all the potential generic and specific impacts into account.

The potential operational phase impacts are addressed in the generic Transnet Environmental Management System (EMS) and as such no operational impacts will be addressed in this chapter.

8.1 SITE ESTABLISHMENT

Refer to Section 3.1, 3.2, 3.4 and 3.6 of the SES (Annex E).

8.2 WASTE MANAGEMENT

Refer to Section 3.3 of the SES (Annex E).

8.3 VEHICLE AND EQUIPMENT REFUELLING

Refer to Section 3.5 of the SES (Annex E).

8.4 SPRAY PAINTING AND SANDBLASTING

Refer to Section 3.7 of the SES (Annex E).
8.5 **DUST MANAGEMENT**

Refer to Section 3.8 of the SES (Annex E) for management measures, project specific mitigation measure are included below.

- The removal of vegetation will be limited to the construction areas only;
- Strip and store topsoil in separate stockpiles with mounds not exceeding 2m in height to prevent wind-blown dust;
- Apply dust suppression that is appropriate, reasonable and practicable to the scale of the stock piles (it is anticipated that these will be small) that are based on accepted principles such as wetting. This would restrict the consumption of water and allow the contractor to implement other appropriate measures that could be equally effective e.g. dust suppressors, shade cloth etc.;
- Access roads should be wetted down where reasonable and practicable to limit dust generation;
- Legal speed restrictions will be implemented on construction sites and access roads to limit dust entrainment by vehicles;
- Verges, cuttings, lay-down areas and construction areas will be re-vegetated according to specific site conditions as soon as the construction activity is completed and in accordance with the operational or post-construction utilisation of that particular portion of the site;
- Material in transit will be loaded and contained within the load bin of the vehicle in such a way as to prevent any spillage onto the roads and the creation of dust clouds. If necessary, the load bin of the vehicle will be covered with a tarpaulin to prevent dust; and
- Minimise haulage distances, if possible.

8.6 **STORM WATER AND DEWATERING**

Refer to Section 3.9 of the SES (Annex E).

8.7 **REHABILITATION**

Refer to Section 3.11 of the SES (Annex E).

8.8 **NOISE MANAGEMENT**

Refer to Section 3.12 of the SES (Annex E) for management measures, project specific mitigation measure are included below.

- Drive at the legal speed limit on public, gravel and private roads to limit the noise generated; and
- Restrict construction activities to daylight hours that are reasonable and practicable to the specific site conditions and compliance with the relevant...
legislation is required in cases where activities are to be undertaken at night.

8.9 PROTECTION OF HERITAGE RESOURCES

Refer to Section 3.13 of the SES (Annex E) for management measures, project specific mitigation measure are included below.

- A chance-find procedure will be implemented so that in the event of graves or stone age artefacts/fossils being uncovered, the Environmental Officer (EO)/Site Engineer will take the appropriate action, which includes:

  - Stopping work in the immediate vicinity and fencing off the area with tape to prevent further access;
  - Reporting the discovery to the provincial heritage agency and/or SAHRA;
  - Appointing a local archaeological/palaeontological expert to inspect the artefacts/fossils;
  - Implementing further mitigation measures proposed by the expert; and
  - Allowing work to resume only once clearance is given in writing by the relevant authorities.

- In the case of a chance-find of a grave, the South African Heritage Resources Agency (SAHRA) will be contacted and arrangements made for an undertaker to carry out exhumation and reburial. The undertaker will, together with SAHRA, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred. A detailed process would be stipulated by SAHRA prior to undertaking any form of exhumation.

8.10 FIRE PREVENTION

Refer to Section 3.14 of the SES (Annex E).

8.11 WATER PROTECTION AND MANAGEMENT

Refer to Section 3.15 of the SES (Annex E).

8.12 PROTECTION OF FAUNA AND THE COLLECTION OF FIREWOOD

Refer to Section 3.16 of the SES (Annex E).
8.13 **ENVIRONMENTAL AWARENESS TRAINING**

Refer to Section 3.17 of the SES *(Annex E)*.

8.14 **PREVENTION OF VEGETATION LOSS OR DISTURBANCE**

Project specific management measures to prevent loss or disturbance of vegetation are included below. Also refer to Section 3.10 of the SES *(Annex E)* with regard to erosion control.

Prevent the loss of or disturbance to vegetation communities, conservation worthy plant species and riparian vegetation due to construction related activities including site clearance and the establishment of construction camps. Specific measures include:

8.14.1 **Vegetation Communities**

- Establish the footprint of laydown areas as far as possible on existing disturbed areas as opposed to “greenfield” areas;
- The extent of the laydown/construction area will be demarcated and all materials and equipment will be restricted to this work area;
- The extent of the construction site will be demarcated on the site layout plans, and no construction personnel or vehicles will be allowed to encroach beyond the demarcated area without prior authorisation to do so. Those areas surrounding the construction site that are not part of the demarcated development area will be marked as “no-go” areas for employees, personnel or machinery.
- A qualified local botanist will be appointed to supervise the identification, marking and transferring of plant taxa, where required. This is only anticipated to be necessary in areas on the site where protected vegetation species and communities are directly impacts or require removal;
- Regular checks will be carried out by the EO or Site Engineer to identify areas where erosion is occurring as a result of the vegetation removal. Appropriate remedial action, including the rehabilitation of the eroded areas, and where necessary, the relocation of the paths/sources causing the erosion, will be undertaken;
- Where necessary, special erosion prevention/protection measures will be implemented.
- Vehicles transporting materials to and from a designated offloading area will be restricted to designated roads;
- Stockpiles of sand and earthworks material that is susceptible to wind erosion will be covered during windy periods;
- Harvesting of firewood or any plant material will be prohibited. The immediate surrounding area will be regularly monitored by the EO for evidence of wood collection. Fines could be implemented to discourage firewood collection;
- Contractors, labourers and visitors will be familiarised with the regulations and good practice regarding general housekeeping and the
ecological process, biodiversity value and function of the area, during awareness building and capacity building/training exercises/induction programmes or their first visit to the site (in the form of a pamphlet or training session); and
• Topsoil removed (during levelling of areas or topsoil removal at access roads) should be kept separate and used for vegetation rehabilitation purposes.

8.14.2 **Riparian Zone**

The objective of mitigation is to minimise the impacts on the riparian vegetation and prevent pollution/degradation of adjacent or nearby river systems. Specific measures include:

• All construction activities near watercourses will be restricted to the railway reserve, as far as practically possible;
• Areas adjacent to the riparian vegetation will be demarcated on layout plans as no-go areas;
• The extent of the construction work area will be fenced-off and no unauthorised access will be allowed outside of the rail reserve and designated work areas;
• Ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles will be located as far away as possible from the riparian zone and any water courses;
• Vehicles transporting materials to and from a designated offloading areas will be restricted to designated roads;
• Stockpiles susceptible to wind erosion will be covered during windy periods;
• Harvesting of firewood or any plant material will be prohibited. The immediate surrounding area will be regularly monitored by the EO for evidence of wood collection. Fines could be implemented to discourage firewood collection;
• Contractors, labourers and visitors will be educated on the regulations and good practice regarding general housekeeping and the ecological process, biodiversity value and function of the area, during induction or their first visit to the site (in the form of a pamphlet or training session); and
• Legislative requirements in terms of Section 21 of the National Water Act (No. 36 of 1998) will be applied.

8.15 **MANAGEMENT AND PREVENTION OF COLONISATION BY INVASIVE ALIEN AND WEED SPECIES**

Project specific measures required for managing and preventing colonisation by invasive alien and weed species are outlined below.

Manage and prevent the spread/colonisation of invasive alien plant and weed species that may result from construction activities that will leave terrestrial vegetation areas significantly disturbed and altered.
Minimise the impacts on vegetation communities, faunal habitats and species diversity. Specific measures include:

- An alien invasive and weedy species removal programme will be implemented throughout the construction phase and the site will be regularly (biannually) inspected for the re-establishment of invader species and the follow-up removal thereof;
- All declared invader and weed species occurring on site and within the rail reserve will be eradicated;
- All plant material that is cleared should be removed from the site, to a designated storage area (in the case of replanting) or waste site so that seeds cannot disperse; and
- Cleared areas will be succeeded by proper soil stabilisation procedures and rehabilitation to prevent soil erosion.

8.16 PREVENTION OF LOSS IN FAUNA/INVERTEBRATE DIVERSITY AND RICHNESS

Refer to Section 3.19 of the SES (Annex E).

Project specific measures aimed to prevent loss in fauna/invertebrate diversity and richness are outlined below.

Prevent the loss of, or disturbance to, faunal and invertebrate species diversity and richness due to construction related activities including site clearance and the establishment of construction camps.

Minimise the impacts on faunal diversity and species richness within and adjacent to the project area. Specific measures include:

- Establish the footprint of laydown areas on existing disturbed areas as opposed to “greenfield” areas;
- The extent of the laydown/construction area will be fenced-off and all materials and equipment will be restricted to this work area;
- The extent of the construction site will be demarcated on the site layout plans, and no construction personnel or vehicles will leave the demarcated area without authorisation to do so. Those areas surrounding the construction site that are not part of the demarcated development area will be marked as “no-go” areas for employees, personnel or machinery. These no-go areas will be demarcated on the ground with tapes or pegs to prevent unauthorised access to them;
- Construction vehicles should be restricted to driving during daylight hours only. This will reduce the likelihood of “road kills”; As a minimum, the legal speed limit on public, private and gravel roads will be enforced on all drivers;
- Hunting, the unnecessary destruction of burrow systems or nesting sites and any direct interactions with wildlife will be prohibited;
• Littering at work sites and in adjacent areas will be prohibited. Suitable facilities will be provided for waste management; and
• Contractors, labourers and visitors will be educated on the regulations and good practice regarding general housekeeping and the ecological process, biodiversity value and function of the area, during induction or their first visit to the site (in the form of a pamphlet or training session).

8.17 **SOCIAL ISSUES**

Refer to Section 3.23 of the SES (*Annex E*).

Project specific measures aimed at addressing and mitigating social issues are outlined below.

The scope with respect to social issues is as follows:

• Ensure that the project activities do not place any direct pressure on the already strained local infrastructure and services;
• Minimise the transmission of diseases and reduce their impact on the health of employees/contractors to the lowest possible level, through effective control measures;
• Limit, where possible, social pathologies brought about by in-migration into the project area; and
• Ensure that Transnet and contractors manage their employees in such a way that the impacts on local communities are limited.

8.17.1 **Disruption to Agricultural Activities**

• Transnet to minimise the damage to farmland caused by construction activities by ensuring strict compliance with construction plans to minimise the development footprint and to implement a ‘Code of Conduct’ governing workers.

• The Code of Conduct must address the following aspects:
  
  o respect for local residents;
  o respect for farm infrastructure and agricultural activities;
  o no hunting or unauthorised taking of products or livestock;
  o compliance with the Traffic Management Plan and all road regulations; and
  o description of disciplinary measures for infringement of the Code of Conduct and company rules.

• If workers are found to be in contravention of the Code of Conduct, which they signed at the commencement of their contract, they will face disciplinary procedures that could result in dismissal.
• Transnet will consult the affected landowners to discuss sensitive areas on their property and design the infrastructure layout in a manner that limits impact on agricultural activities or infrastructure.

• Any damage to natural vegetation (specifically grazing) will be rehabilitated in accordance with mitigation proposed for the rehabilitation of natural vegetation.

• Construction activities to be undertaken according to a schedule that is agreed upon with the landowners.

• Construction workers to ensure that the gates are closed at all times and that any damage to the infrastructure is repaired immediately.

• Transnet will implement a grievance procedure that is easily accessible to local communities, through which complaints related to contractor or employee behaviour can be lodged and responded to. Transnet will respond to all such complaints. Key steps of the grievance mechanism include:

  o Circulation of contact details of ‘grievance officer’ or other key Transnet contact.
  o Awareness raising among local communities (including all directly affected and neighbouring farmers) regarding the grievance procedure and how it works.
  o Establishment of a grievance register to be updated by Transnet, including all responses and response times.

8.17.2 Loss of Agricultural Land

• Transnet will consult the directly affected landowners to discuss sensitive areas on their property and design the infrastructure layout in a manner that limits impacts on agricultural activities and infrastructure.

• Any damage to natural vegetation (specifically in grazing areas) will be rehabilitated in accordance with mitigation proposed for the rehabilitation of natural vegetation.

8.18 TRAFFIC HAZARDS AND DISRUPTION

Project specific measures to manage traffic hazards and disruption are outlined below.

Minimise the potential traffic hazards and disruption as a result of increased construction related traffic within the project area and surrounding arterials and access roads, including national and provincial roads. Specific measures include:

• The impacts of delivery trucks during construction can be reduced by transporting more construction materials via rail;

• The impacts on the existing traffic can be reduced by scheduling the arrivals and departures of construction vehicles;

• Educate both the construction crew and the local community on traffic safety and possible hazards arising from the construction activities;
• All warning, regulatory and prohibition signs recommended by the National Department of Transportation, South African Roads Traffic Signs Manual (SARTSM) should be implemented;
• All regulatory and warning signs recommended by the SARTSM should be adhered to; and
• All plans and specifications should provide details on how the traffic control operations are to be carried out.

8.19 **DOCUMENTATION**

Refer to Section 4 of the SES (*Annex E*).

8.20 **RECORDS**

Refer to Section 5 of the SES (*Annex E*).
CONCLUSIONS & RECOMMENDATIONS

9.1 CONCLUSION

The aim of the EIA for this Project is to provide information to inform decision-making that will contribute to environmentally and socially sound and sustainable development. This report is submitted to the DEA to enable them to consider whether or not to grant authorisation to the proposed development in terms of NEMA and NEM:WA and if granted, to assist them in defining under what conditions the development should go ahead.

Through the EIA process which has included various stakeholder and specialist input, ERM has identified and assessed a number of issues relating to the Project. This Chapter provides an overview of the key findings and associated mitigation measures.

9.1.1 Potential Construction Phase Impacts

Two potential negative impacts of Moderate - Low negative significance (post mitigation) has been identified in the EIA Report. These impacts relate to the loss of vegetation and protected trees as well as impacts to fauna and avi-faunal habitat. Despite the expected impacts, mitigation measures have been identified to effectively reduce the impact significance rating to an acceptable level of Low negative significance.

The expected loss of grazing land and disruption to agricultural activities are considered to have a Moderate negative impact. However, based on the mitigation measures proposed, the post mitigation significance rating is expected to be reduced to a Low negative significance.

A Minor positive impact associated with the construction phase of the Project is related to employment and procurement opportunities. However, these will be limited to the construction phase, and can reduce should there be a lack of skills available to meet the technical requirements of construction. Despite the proposed enhancement measures, the positive impact will remain Minor.

9.1.2 Potential Operation Phase Impacts

At an operational level, biodiversity impacts are likely to be reduced, as compared to construction. The potential impacts to vegetation and protected trees and impacts to faunal and avi-faunal habitats are expected to be rated of Moderate negative significance (pre-mitigation). However, this is expected to reduce to an acceptable level of Low negative significance, upon implementation of the recommended mitigation measures.
The expected loss of grazing land and disruption to agricultural activities are expected to have a **Moderate** negative impact at an operational level (pre-mitigation). However, based on the mitigation measures proposed, the post mitigation significance rating is expected to be reduced to a **Low** negative significance. These negative impacts are likely to result within acceptable levels of impacts.

A **Minor** positive impact associated with the operational phase of the Project is related to employment opportunities. Despite the proposed enhancement measures, the positive impact will remain **Minor**.

A key positive impact pertains to the regional and national economic benefits associated with increased export of manganese. The Project would likely have positive implications in terms of local procurement of goods and services along the supply chain as well as the generation of foreign revenue from export. These benefits would be experienced at a national and provincial level. The “no-go” or “do nothing” alternative for the project would have negative implications for the economy through direct loss of foreign exchange generation and indirect impacts on the supply chain.

An impact assessment summary table is included below for ease of reference.
Table 9.1  Impact Assessment Summary Table

<table>
<thead>
<tr>
<th>Biophysical Impacts</th>
<th>Construction Phase</th>
<th>Operational Phase</th>
<th>Significance Ratings</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Pre-mitigation Significance</td>
<td>Residual Impact Significance</td>
<td>Pre-mitigation Significance</td>
</tr>
<tr>
<td>Impact on vegetation &amp; protected trees</td>
<td>MODERATE (-ve)</td>
<td>MODERATE (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
<tr>
<td>Impact on fauna and avi-fauna</td>
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<td>MODERATE (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
<tr>
<td>Impact on ecosystem services &amp; ecological degradation</td>
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<td>MINOR (-ve)</td>
<td>MODERATE (-ve)</td>
</tr>
<tr>
<td>Impact of potential contamination on water resources</td>
<td>MODERATE (-ve)</td>
<td>MINOR (-ve)</td>
<td>MODERATE (-ve)</td>
</tr>
<tr>
<td>Impact of noise &amp; vibration</td>
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<td>MINOR (-ve)</td>
<td>MODERATE (-ve)</td>
</tr>
<tr>
<td>Impact on air quality</td>
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<td>NEGLIGIBLE (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
<tr>
<td>Creation of employment opportunities</td>
<td>MINOR (+ve)</td>
<td>MINOR (+ve)</td>
<td>MINOR (+ve)</td>
</tr>
<tr>
<td>Procurement of goods &amp; services</td>
<td>MINOR (+ve)</td>
<td>MINOR (+ve)</td>
<td>NEGLIGIBLE (+ve)</td>
</tr>
<tr>
<td>Loss of grazing land</td>
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<td>NEGLIGIBLE (-ve)</td>
<td>NOT APPLICABLE</td>
</tr>
<tr>
<td>Disruption of agricultural activities</td>
<td>MODERATE (-ve)</td>
<td>MINOR (-ve)</td>
<td>MODERATE (-ve)</td>
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<td>Community health and safety</td>
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<td>Waste generation</td>
<td>MINOR (-ve)</td>
<td>MINOR (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
<tr>
<td>Impact on archaeological &amp; cultural heritage</td>
<td>MINOR (-ve)</td>
<td>NEGLIGIBLE (-ve)</td>
<td>MINOR (-ve)</td>
</tr>
<tr>
<td>Impact on palaeontological artefacts</td>
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<td>NEGLIGIBLE (-ve)</td>
<td>NEGLIGIBLE (-ve)</td>
</tr>
</tbody>
</table>

Significance Ratings

| NEGLIGIBLE (-ve)                                      |
| MINOR (-ve)                                           |
| MODERATE (-ve)                                        |
| MAJOR (-ve)                                           |
| MINOR (+)                                             |
| NEGLIGIBLE (+ve)                                      |
| NOT APPLICABLE                                        |
9.2 RECOMMENDATIONS

A number of recommendations have been made in Chapters 7 and 8 regarding mitigation and management measures to either reduce the negative impacts or to enhance the positive impacts. These recommendations/mitigation measures should be written into the authorisation, should it be approved. Further to these measures, it is worthwhile pointing out the following:

- The significance of the impacts can only be reduced/enhanced if Transnet effectively implements the mitigation measures that have been outlined;

- The EMP and the typical mitigation measures outlined in Transnet’s generic documents in Annex E only apply to the construction phase. It is expected that measures to manage operational phase impacts will be drawn into the Environmental Management System for the Project, which will be implemented following construction;

- The Project Environmental Specification provided in Chapter 8 needs to be regularly updated to adapt to changes in the project;

- Should decommissioning of any infrastructure associated with the project occur at a later stage, the general mitigation measures outlined in Transnet’s generic EMP documents should be adhered too and applied (assuming no further legal requirements at the time of decommissioning); and

- It is Transnet’s responsibility to ensure that other permitting/licensing requirements in terms of the National Heritage Resources Act, National Water Act, and National Environmental Management: Biodiversity Act are complied with outside of this EIA process, prior to the commencement of construction.

Finally, it is a requirement of the EIA Regulations under NEMA that the independent environmental assessment practitioner provides a recommendation on whether the Project should be authorised or not. Based on the potential impacts identified and mitigation measures developed, ERM is of the opinion that the construction of the Mamathwane Compilation Yard and Common User Facility be authorised, on condition of the implementation of the recommended mitigation measures.
REFERENCES

Address by MEC for Finance and Economic Affairs, Pakes Dikgetsi, during the tabling of the budget vote for the Department of Economic Affairs, 22 June 2006.


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