



Draft Scoping Report

Proposed Mamathwane Compilation Yard, Northern Cape

Transnet SOC Limited

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

November 2012

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Transnet SOC Limited

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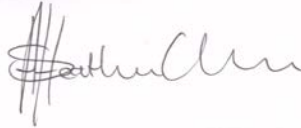
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ERM Reference: 0172056

Prepared by: Tania Swanepoel and Dean Alborough

For and on behalf of
Environmental Resources Management

Approved by: Stuart Heather-Clark



Signed:

Position: Partner

Date: 20 November 2012

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We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

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CONTENTS

	ACRONYMS	1
	ABBREVIATIONS	2
	TERMINOLOGY	3
1	INTRODUCTION	7
1.1	<i>PURPOSE OF THIS REPORT</i>	7
1.2	<i>PROJECT RATIONALE</i>	7
1.3	<i>PROJECT OVERVIEW</i>	8
1.4	<i>PROJECT APPLICANT</i>	11
1.5	<i>DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER</i>	11
1.5.1	<i>ERM Southern Africa</i>	11
1.5.2	<i>Project Team</i>	12
1.6	<i>OPPORTUNITY TO COMMENT ON THE SCOPING REPORT</i>	13
1.7	<i>STRUCTURE OF THIS REPORT</i>	14
2	ADMINISTRATIVE FRAMEWORK	15
2.1	<i>LEGISLATIVE FRAMEWORK</i>	15
2.1.1	<i>National Environmental Management Act (Act No. 107 of 1998)</i>	16
2.1.2	<i>NEMA EIA Regulations, 2010 (Government Notice No R543)</i>	16
2.1.3	<i>National Environmental Management: Waste Act (Act No. 59 of 2008)</i>	19
2.2	<i>REGIONAL PLANNING CONTEXT</i>	20
2.2.1	<i>Gamagara Local Municipality Integrated Development Plan (IDP)</i>	21
2.2.2	<i>Gamagara Local Municipality Spatial Development Framework (SDF)</i>	21
3	EIA PROCESS	23
3.1	<i>SCOPING PHASE</i>	24
3.1.1	<i>Initial Site Visit and Project Initiation</i>	24
3.1.2	<i>Stakeholder Engagement</i>	24
3.1.3	<i>Authority Consultation</i>	26
3.2	<i>SPECIALIST STUDIES PHASE</i>	26
3.3	<i>INTEGRATION AND ASSESSMENT PHASE</i>	26
3.3.1	<i>Proposed Timeframe for the EIA Process</i>	27
4	PROJECT DESCRIPTION	28
4.1	<i>PROJECT MOTIVATION</i>	28
4.2	<i>PROJECT LOCATION AND EXISTING LANDUSE</i>	28
4.3	<i>PROJECT COMPONENTS</i>	29
4.3.1	<i>Compilation Yard Infrastructure</i>	29
4.3.2	<i>Access and Internal Roads</i>	32
4.3.3	<i>Water Requirements</i>	32
4.3.4	<i>Borrow Pits</i>	32

4.4	CONSTRUCTION CAMPS AND LAYDOWN AREAS	33
4.5	WASTE MANAGEMENT	33
4.6	SOCIO-ECONOMIC ASPECTS	33
4.6.1	<i>Job Creation</i>	33
4.7	ALTERNATIVES	34
4.7.1	<i>Site Alternatives</i>	34
4.7.2	<i>Design Alternatives</i>	35
4.7.3	<i>Activity Alternatives</i>	35
4.7.4	<i>Process Alternatives</i>	35
4.7.5	<i>Material Alternatives</i>	36
4.7.6	<i>The No-go Alternative</i>	36
5	ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE	37
5.1	BIOPHYSICAL BASELINE	37
5.1.1	<i>Climate</i>	37
5.1.2	<i>Landscape and Topography</i>	37
5.1.3	<i>Geology and Soils</i>	37
5.1.4	<i>Hydrology - Surface Water and Ground Water</i>	40
5.1.5	<i>Flora and Fauna</i>	40
5.1.6	<i>Critical Biodiversity Areas and Broad-scale Processes</i>	44
5.1.7	<i>Protected Nature Conservation Areas</i>	44
5.2	SOCIOECONOMIC BASELINE	44
5.2.1	<i>Introduction</i>	44
5.2.2	<i>Administrative Structure</i>	44
5.2.3	<i>Provincial Level</i>	45
5.3	JOHN TAOLO GAETSEWE DISTRICT MUNICIPALITY	46
5.3.1	<i>The Municipal and Study Area</i>	47
5.3.2	<i>Description of the Project Site</i>	49
5.4	PALAEONTOLOGY, ARCHAEOLOGY AND CULTURAL HERITAGE	51
5.4.1	<i>Palaeontology</i>	51
5.4.2	<i>Archaeology</i>	51
6	PRELIMINARY IDENTIFICATION OF IMPACTS	53
6.1	INTRODUCTION	53
6.2	DESCRIPTION OF POTENTIAL IMPACTS	53
6.3	POTENTIAL IMPACTS	55
6.3.1	<i>Noise and Vibration</i>	55
6.3.2	<i>Air Quality and Dust</i>	56
6.3.3	<i>Loss of Agricultural Land</i>	56
6.3.4	<i>Loss of, or Damage to Palaeontology, Archaeological or Cultural Heritage Resources</i>	56
6.3.5	<i>Visual and Aesthetic Landscape Impacts</i>	57
6.3.6	<i>Impact on Flora, Fauna and Habitats</i>	57
6.3.7	<i>Impact on Traffic during Construction</i>	59
6.3.8	<i>Impacts Due to Waste Generation</i>	59
6.3.9	<i>Soils, Geology and Erosion Potential</i>	59
6.3.10	<i>Surface Water and Groundwater Contamination</i>	60
6.3.11	<i>Socio-Economic Impacts</i>	60
6.3.12	<i>Human Health and Safety</i>	61

6.4	SCREENING OF IMPACTS	61
6.5	CUMULATIVE IMPACTS	62
7	PLAN OF STUDY FOR EIA	63
7.1	INTRODUCTION	63
7.2	OVERVIEW OF EIA TASKS	63
7.2.1	<i>Specialist Study Phase</i>	63
7.2.2	<i>Integration and Impact Assessment Phase</i>	64
7.2.3	<i>Interaction with Authorities</i>	64
7.2.4	<i>Stakeholder Engagement Activities</i>	65
7.3	SPECIALIST STUDIES	65
7.4	IMPACT ASSESSMENT METHODOLOGY	69
7.4.1	<i>Assessing Impacts</i>	69
7.4.2	<i>Mitigation Potential and Residual Impacts</i>	73
7.5	PROJECT TIMING	74
8	NEXT STEPS	75
9	REFERENCES	76

ACRONYMS

BID	Background Information Document
BIF	Banded Ironstone Formation
DC	Direct Current
DEA	Department of Environmental Affairs
DENC	Department of Environment and Nature Conservation (Northern Cape)
DSR	Draft Scoping Report
DWA	Department of Water Affairs
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EMP	Environmental Management Programme
ERM	Environmental Resources Management
FSR	Final Scoping Report
GDP	Gross Domestic Product
GN	Government Notice
I&APs	Interested & Affected Parties
IDP	Integrated Development Plan
IFC	International Finance Corporation
LED	Local Economic Development
NEMA	National Environmental Management Act
PoS	Plan of Study
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SARDB	South African Red Data Book
SDP	Spatial Development Plan
SIBIS	Integrated Biodiversity Information System
SOC	State-owned Company
TFR	Transnet Freight Rail
TNPA	Transnet National Ports Authority
ToR	Terms of Reference
TPL	Transnet Pipelines
TPT	Transnet Port Terminals
TRE	Transnet Rail Engineering
WML	Waste Management Licence

ABBREVIATIONS

%	Percent
cm	Centimetres
CO ₂	Carbon Dioxide
ha	Hectares
kg	Kilograms
km	Kilometres
km ²	Square kilometres
kV	kilovolts
m	Metres
m ²	Square meters
R	South African Rand

TERMINOLOGY

Administrative Framework: The compendium 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 project's 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 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: Coarse, crushed stone laid to form a bed for the sleepers and rails.

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: To keep a road or railway line straight and/or flat, and where the comparative cost or practicality of alternate solutions (e.g. diversion) is prohibitive, a section of a hill or mountain is cut away to make way for the development.

Embankment: To keep a road or railway line straight and/or flat, and where the comparative cost or practicality of alternate solutions (e.g. diversion) is prohibitive, the land over which the road or rail line will travel is built up to form a large mound or embankment. Embankments are often constructed using material obtained from a cutting.

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

- i. the land, water and atmosphere of the earth;
- ii. micro-organisms, plant and animal life;
- iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. 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 an at-grade crossing (without recourse to a bridge or tunnel) of a railway line by a road or path.

Loop: A passing loop or crossing loop is a place on a single line railway where trains in opposing directions can pass each other. A passing loop is usually double ended and connected to the main track at both ends of the station.

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

Project Footprint: The area that may reasonably be expected to be physically touched by project activities, across all phases. 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 addresses 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, 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 (i.e. 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 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.

1 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

Transnet SOC (State-owned Company) Limited (Transnet) intends to construct a new compilation yard at Mamathwane, Northern Cape, as 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 from 12 Million tons per annum (Mtpa) to 16 Mtpa.

Transnet has appointed Hatch Africa (Pty) Ltd (Hatch) to project manage the planning and engineering aspects as well as the 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 new compilation yard at Mamathwane. It is intended that the compilation yard will be used to consolidate and deconsolidate up to 200 wagon trains in order to facilitate an increase in the carrying capacity of the existing railway line.

This Draft Scoping Report has been 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) (Act No. 107 of 1998), as amended and the National Environmental Management: Waste Act (NEMWA) (Act No. 59 of 2008). The objectives of this report are to provide information to stakeholders, including the public and authorities, about the project and the EIA process followed to date.

The Draft Scoping Report provides a description of the project activities, alternatives considered, the EIA methodology, and issues and concerns identified by the project team and/or raised by Interested and Affected Parties (I&APs). A Plan of Study for the EIA, which includes the terms of reference for specialist studies, is also included.

Please note, the proposed expansion of the manganese ore railway line also includes the extension of several existing rail loops in the Northern and Eastern Cape as well as the installation of new rail loops in the Northern Cape. These proposed activities require authorisation through an amendment process and a basic assessment process which are being undertaken concurrently with this Scoping/EIA process.

1.2 PROJECT RATIONALE

In 2008 Transnet, in association with the manganese ore mining industry identified the need to increase the capacity of the existing manganese ore

export railway line to beyond the current capacity of 5.5 Million tons per annum (Mtpa). An Environmental Authorisation process commenced in this regard and the project was authorised to proceed with construction in 2009. The project proposal on which this authorisation was issued was based on achieving an export capacity of 12 Mtpa. Subsequently Transnet, in conjunction with the manganese mining industry, has identified an export requirement of more than 12 Mtpa for long term growth driven by increased demand for manganese ore to supply the increasing steel manufacturing industry (manganese forms part of the product mix during steel manufacturing). Based on the increased demand of manganese ore, the mining industry has indicated the need for an increased export capacity of 16 Mtpa. As such, changes to the original development proposal necessitate additional environmental authorisation processes. As part of this, a new compilation yard for the consolidation and deconsolidation of wagon trains is required in the northern section of the existing line in order to increase the capacity of the line, hence the proposal to construct the Mamathwane Compilation Yard. The motivation for the project is touched on again in *Section 4*.

1.3

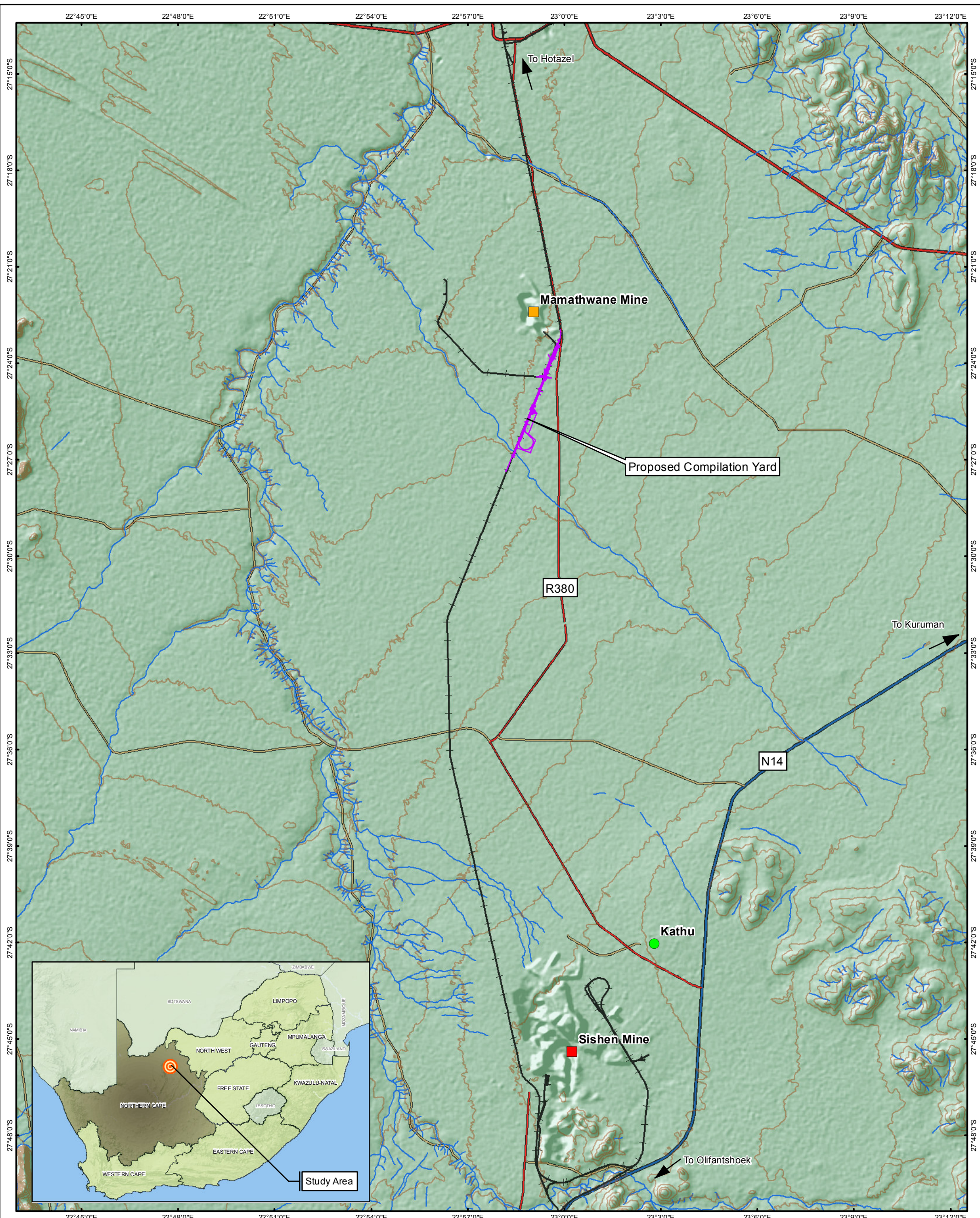
PROJECT OVERVIEW

The project site for the proposed compilation yard, located south of the Mamathwane Mine is located on the following land parcels (see *Figure 1.1* and *Figure 1.2* below):

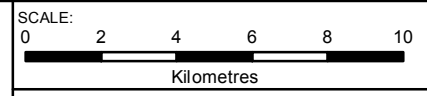
- Portion 3 of Remainder of the farm Moab No. 700, Administrative District Kuruman, (9.36 ha);
- Portion of Remainder of Portion 1 of the farm Shirley No. 367, Administrative District Kuruman, (103.40 ha); and
- Portion of Remainder of Portion 2 of the farm Walton No. 390, Administrative District Kuruman, (18.65 ha).

The new compilation yard will be constructed adjacent to the existing manganese ore railway line and will comprise five yard lines with crossovers at third points. As mentioned above, the compilation yard will allow the consolidation and deconsolidation of up to five 200 wagon trains. The yard will be electrified to three kilovolts (kV) Direct Current (DC) with tangential turnouts. The main compilation yard will be fully signalled with the rolling stock maintenance area of the yard being provided with automated yard signalling. In addition, the yard will also have a Common User Facility to cater for small mining operations. This facility will consist of a stockpile area where ore (manganese and iron ore) can be stored temporarily prior to loading onto trains.

A more detailed project description is given in *Section 4*.




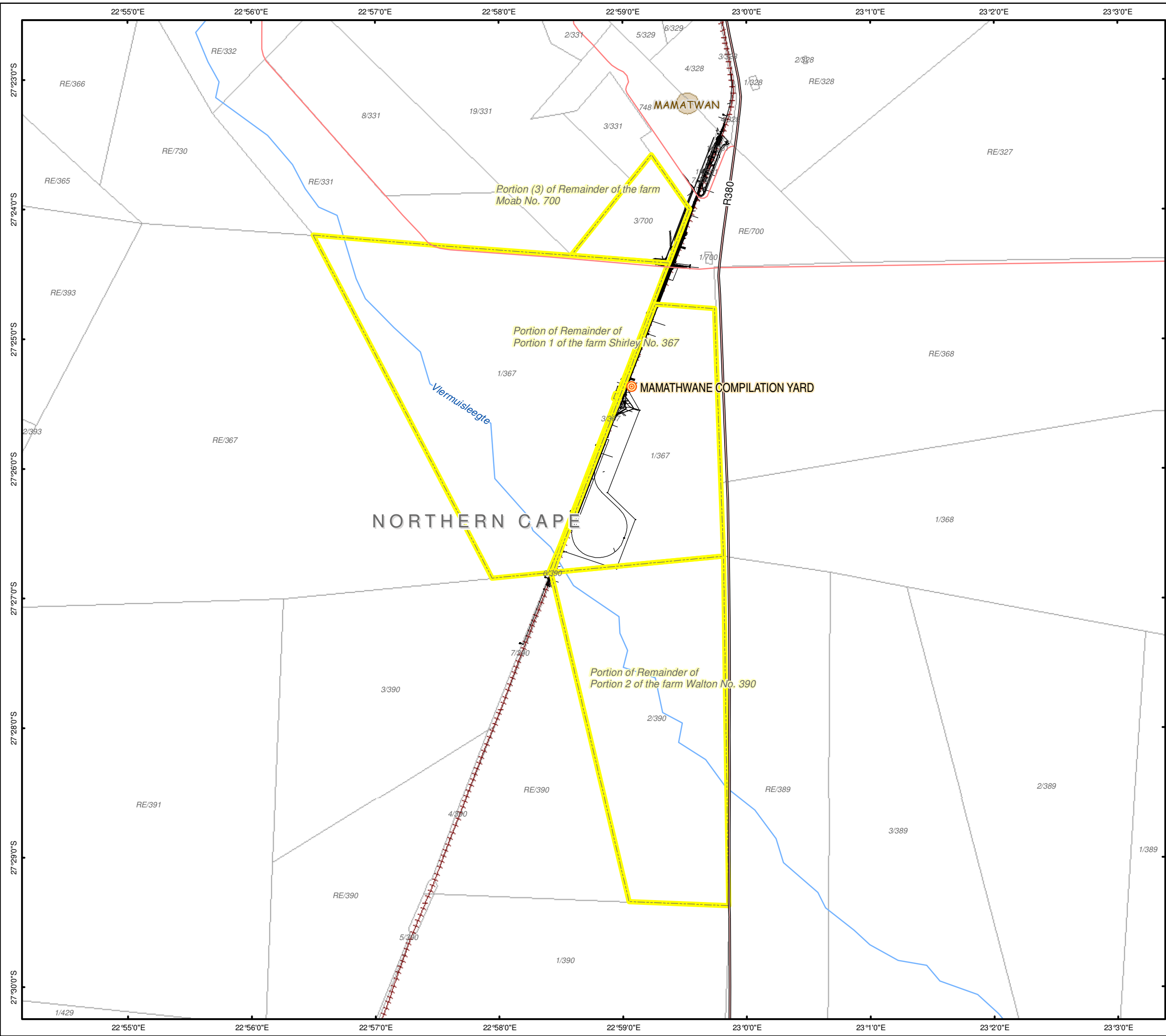
- Legend**
- Mamathwane Mine
 - Sishen Mine
 - Towns
 - Proposed Compilation Yard
 - +— Existing Railway
 - Contours (20m)
 - River
 - National Freeway Route
 - Arterial Route
 - Main Road
 - Secondary Road



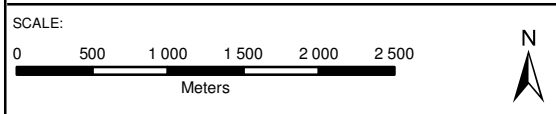
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Figure 1.1: Locality Map of the Transnet Mamathwane Compilation Yard

CLIENT:
Transnet SOC Ltd

DATE: Oct 2012	CHECKED: NB	PROJECT: 0172056
DRAWN: AT	APPROVED: SHC	SCALE: 1 : 200 000
DRAWING: Transnet_Locality_Map1A3_Portrait.mxd.mxd		REV: X
ERM ERM Southern Africa 175 Lunnon Road Hillcrest, Pretoria Tel: +27 12 362 0008 Fax: +27 12 362 8368		 ERM
Projection: Geographic, Datum: WGS 84 Source: NGI Inset Map: ESRI Data and Maps		SIZE: A3



- Legend**
- Mamathwane Compilation Yard
 - National Roads
 - Main Roads
 - Secondary Roads
 - Proposed Railway Extension
 - Railway Lines
 - Dams
 - Mine
 - Cadastral Farm Portions
 - Directly Affected Landowners



TITLE:
**Figure 1.2:
 Map showing Directly Affected
 Land Parcels**

CLIENT:
Transnet SOC Ltd

DATE: Oct 2012	CHECKED: NB	PROJECT: 0172056
DRAWN: LDT	APPROVED: SHC	SCALE: 1 : 60 000

DRAWING:
**Fig 1.2. Map showing Directly Affected
 Land Parcels.mxd**

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



Projection: Geographic , Datum: Wgs84
 Source: ENPAT (2001)
 Inset Map: Esri Data and Maps

SIZE:
A3

1.4 *PROJECT APPLICANT*

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, within acceptable benchmarks (Transnet Sustainability Report, 2012).

Transnet, operating as an integrated freight transport company, contains five divisions as follows:

- Transnet Freight Rail (TFR),
- Transnet Rail Engineering (TRE),
- 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 the above is supplemented by specialist units including: Transnet Property; Transnet Foundation and Transnet Capital Projects.

1.5 *DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER*

1.5.1 *ERM Southern Africa*

ERM has been appointed by Hatch to undertake the EIA for the new compilation yard at Mamathwane. ERM and specialists 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.

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.

1.5.2 Project Team

The project team includes ERM consultants, support staff and external specialists. Details of the external specialists that form part of the team are provided in Section 7.3. Details of ERM's core project team are provided below.

Table 1.1 Expertise of EA

Stuart Heather Clark	Partner in Charge:	<ul style="list-style-type: none"> BSc Civil Engineering – Univ. of Cape Town (1992) MPhil. Environ Science – Univ. of Cape Town (1996). <p>EAPSA Certified</p>	<p>Stuart Heather-Clark is a Partner in the Impact Assessment and Planning Team within ERM Southern Africa based in Cape Town, South Africa.</p> <p>Mr Heather-Clark's has over 17 years of experience in industrial, oil & 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.</p>
Tania Swanepoel	Project Manager:	<ul style="list-style-type: none"> BSc Hons (Engineering & Environmental Geology), University of Pretoria, 2000. BSc Hons (Geology and Geohydrology), University of the Western Cape, 1997. BSc (Geology, Mathematics), University of the Western Cape, 1996. <p>Registered Natural Scientist (Pr Sci Nat).</p>	<p>Tania Swanepoel is a Principal Consultant in the Impact Assessment and Planning team based in Cape Town, South Africa.</p> <p>Tania has over thirteen years of broad 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.</p>
Dean Alborough	Project Consultant:	<ul style="list-style-type: none"> Bsc Hons (Zoology and Environmental 	<p>Dean Alborough is a Consultant in the Impact Assessment and Planning team based in Cape Town, South Africa.</p>

- Science),
University of
Cape Town,
2004.
 - MSc
Environmental
Science,
University of
Cape Town,
2007.
- Dean has more than 5 years of relevant experience in Integrated Environmental Management, and more than 6 years in environmental science. Dean's experience includes larger environmental and social impact assessments (ESIAs), management plans, public participation, environmental site investigations, monitoring, auditing and risk assessments.
-

1.6 OPPORTUNITY TO COMMENT ON THE SCOPING REPORT

Interested and Affected Parties (I&APs) and authorities are provided with an opportunity to comment on any aspect of the project. The Draft Scoping Report which will be made available for review at the Kathu Public Library and on the project website www.erm.com/transnet-expansion. A notification letter will be sent to registered and identified I&APs to inform them of the release of the Draft Scoping Report and where the report can be reviewed. A public meeting will be held in Kathu on 05 December 2012.

Comments can be provided to ERM at the address, tel. /fax numbers or e-mail address shown below. The comment period ends 09 January 2013. Stakeholder comments and concerns will be captured in a Comments and Responses Report in the Final Scoping Report.

Attention: Tougheeda Aspeling
Transnet Mamathwane Compilation Yard
DEA Ref: 14/12/16/3/3/2/405
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1.7 STRUCTURE OF THIS REPORT

The remainder of this Draft Scoping Report is structured as follows:

Table 1.2 *Draft Scoping Report Structure*

Section	Contents
Section 2 Administrative Framework	Overview of applicable legislation, international conventions and standards and policy.
Section 3 EIA Process	Outlines the approach to the EIA study and summarises the process undertaken for the project to date.
Section 4 Project Description	Includes the project justification, a detailed description of the project activities and the consideration of project alternatives.
Section 5 Environmental and Socio-economic Baseline	Describes the receiving environment, including biophysical and socio-economic aspects.
Section 6 Preliminary Identification of Issues and Impacts	Provides a summary of key issues raised and the identified potential impacts associated with the project.
Section 7 Plan of Study for EIA	Provides concluding comments about the project and outlines the terms of reference for specialist studies to address identified key issues and impacts.
Section 8 Next Steps	Describes the next steps in the EIA process.
Section 9 References	Provides all references used in the Draft Scoping Report.

In addition, the report includes the following annexes:

- *Annex A: Administrative Framework*
- *Annex B: Site Photolog*
- *Annex C: Public Participation Documentation*
- *Annex D: Communication with the DEA*

This Chapter outlines the legislative, policy and administrative requirements relevant to this project. A detailed review of the relevant Administrative Framework is contained in *Annex A*.

2.1

LEGISLATIVE FRAMEWORK

The proposed project is subject to legislative and policy requirements at a national and provincial level. A detailed description of relevant legislation pertaining to the Scoping/EIA process for the proposed project and the permitting thereof, is contained in *Annex A*. Relevant legislation/guidelines that are applicable to the project include, *inter alia*, the following:

National:

- National Environmental Management Act (NEMA) (Act No. 107 of 1998), as amended;
- NEMA EIA Regulations (2010);
- National Water Act (Act No. 36 of 1998);
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004);
- National Environmental Management: Waste Act (Act No. 59 of 2008);
- National Environmental Management: Air Quality Act (Act No. 39 of 2004);
- National Forest Act (Act No. 84 of 1998);
- National Heritage Resources Act (Act No. 25 of 1999);
- Occupational Health and Safety Act (Act No. 85 of 1993);
- Subdivision of Agricultural Land Act (Act No. 70 of 1970);
- Department of Environmental Affairs and Tourism (DEAT) Integrated Environmental Management Information Series No.2, Scoping, 2002;
- 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; and
- Conservation of Agricultural Resources Act (Act No. 43 of 1983).

Provincial – Northern Cape:

- Northern Cape Planning and Development Act (Act No. 7 of 1998); and
- Northern Cape Nature Conservation (Act No. 9 of 2009).

A more detailed description of the applicability of NEMA, the EIA Regulations and the Waste Act, to the project is given below with additional regulatory aspects addressed in *Annex A*. The competent authority in terms of decision-making 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.

2.1.1 *National Environmental Management Act (Act No. 107 of 1998)*

Section 24 (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 EIA process and public participation specifically are described in Part 2 of the Act and include the following:

- Development must be socially, environmentally and economically sustainable;
- Environmental management must be integrated;
- Decisions concerning the environment must take into account the needs, interests and values of all I&APs;
- Community well-being and empowerment must be promoted through environmental education and awareness, and the sharing of knowledge and experience; and
- Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with law, etc.

The planning and implementation of the project must, therefore, take these principles into account at all stages.

2.1.2 *NEMA EIA Regulations, 2010 (Government Notice No R543)*

On 18 June 2010 revised EIA Regulations (Government Notice No R. 543, 544, 545 and 546) were promulgated in terms of Section 24(5) of NEMA. These regulations came into effect on 01 August 2010, replacing the regulations of 21 April 2006.

The EIA Regulations, June 2010 (Government Notice R544, R545 and R546) identify activities which may have a detrimental effect on the environment and the listed activities which may be triggered by the project are included in *Table 2.1* below.

Table 2.1 Relevant Listed Activities (EIA Regulations, 2010)

Relevant Notice	Activity Numbers (in terms of Relevant Notice)	Description of Listed Activity
GN545, 2010	11	<p><i>The construction of railway lines, stations or shunting yards, excluding:</i></p> <p><i>(ii) railway lines, shunting yards and railway stations in industrial complexes or</i></p> <p><i>(ii) underground railway lines in a mining area; and additional railway lines within the reserve of an existing railway line;</i></p> <p>The proposed activity comprises the construction of a new compilation yard with associated infrastructure including railway lines and shunting areas at Mamatwane in the Northern Cape.</p>
GN545, 2010	15	<p><i>Physical alteration of undeveloped, vacant or derelict land to commercial, recreational, industrial or institutional use where transformation is 20 hectares or more:</i></p> <p><i>Except where such physical alteration takes place for:</i></p> <p><i>linear development activities: or agriculture or afforestation where activity 16 in this Schedule will apply.</i></p> <p>The compilation yard will involve the transformation of undeveloped land over an extent of 20 hectares or more; the dimensions of which is being confirmed during the Scoping Phase.</p>
GN544, 2010	2	<p><i>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).</i></p> <p>The Common User Facility at the compilation yard will require the storage of manganese and iron ore.</p>
GN544, 2010	11	<p><i>The construction of infrastructure or structures covering 50 square metres or more within 32 metres of a watercourse.</i></p> <p>Certain components of the proposed activity may be located with 32 metres of a watercourse; this is being confirmed during the Scoping Phase.</p>

Relevant Notice	Activity Numbers (in terms of Relevant Notice)	Description of Listed Activity
GN544, 2010	13	<p><i>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.</i></p> <p>Diesel storage with a combined capacity in excess of 80 cubic meters but not exceeding 500 cubic metres will be required.</p>
GN544, 2010	18	<p><i>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 from</i></p> <p>(i) <i>a watercourse;</i> (ii) <i>the sea;</i> (iii) <i>the seashore;</i> (iv) <i>the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater.</i></p> <p>Construction related activities in the vicinity of the river (Vlermuislaagte River) south of the compilation yard may trigger this listed activity. This is being confirmed during the Scoping Phase.</p>
GN544, 2010	22	<p><i>The construction of a road, outside urban areas,</i></p> <p>(i) <i>with a reserve wider than 13,5 meters or,</i> (ii) <i>where no reserve exists where the road is wider than 8 metres, or</i> (iii) <i>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.</i></p> <p>It is anticipated that the construction of the compilation yard may include road construction, the layout and dimensions is being confirmed during the Scoping Phase.</p>
GN544, 2010	23 (ii)	<p><i>The transformation of undeveloped land to industrial use, outside an urban area bigger than 1 hectare.</i></p> <p>The compilation yard is proposed to be located outside of an urban area over an area of more than one hectare; the dimensions of the affected areas are being confirmed during the Scoping Phase.</p>

Relevant Notice	Activity Numbers (in terms of Relevant Notice)	Description of Listed Activity
GN544, 2010	24	<p><i>The transformation of land bigger than 1000 square metres in size to industrial land where such land was zoned open space or conservation.</i></p> <p>The proposed compilation yard may encroach on areas zoned as open space however; this is being confirmed during the Scoping Phase.</p>
GN546, 2010	12	<p><i>The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetation cover constitutes indigenous vegetation.</i></p> <p><i>a. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</i></p> <p><i>b. Within critical biodiversity areas identified in bioregional plans.</i></p> <p>The presence of endangered ecosystems/critical biodiversity areas and the potential effect clearing may have on these areas, will be confirmed by the ecologist.</p>

2.1.3 *National Environmental Management: Waste Act (Act No. 59 of 2008)*

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, a full Scoping/EIA process is being undertaken for the Mamathwane Compilation Yard and therefore the WML application process will be incorporated into the Scoping/EIA process. The aim is to ensure that all aspects of the project are considered in an integrated manner and to facilitate informed decision-making.

The WML activities which may be triggered by the project are included in *Table 2.3* below.

Table 2.2 *Currently Applied For Listed Activities (NEMWA, 2008)*

Relevant Notice	Activity Numbers (in terms of Relevant Notice)	Description of Listed Activity
No. 718, 3 July 2009	Category A: Activity 1	<p><i>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.</i></p> <p>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.</p>
	Category A: Activity 2	<p><i>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.</i></p> <p>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.</p>
	Category A: Activity 11	<p><i>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.</i></p> <p>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.</p>
	Category A: Activity 18	<p>The construction of facilities for activities listed in Category A of this Schedule (not in isolation to associated activity).</p>

2.2 REGIONAL PLANNING CONTEXT

Certain activities related to the project may, in addition to national legislation, be subject to control by municipal by-laws for aspects such as planning, dust control, noise control and roads. Certain aspects of the John Taolo Gaetsewe District Municipality¹'s Integrated Development Plan (IDP) may apply as well. Relevant legislation, policies and plans will be identified as part of the various specialist studies during the EIA Phase.

¹ The project site falls within the John Taolo Gaetsewe District Municipality which forms part of the greater Gamagara District Municipality.

2.2.1

Gamagara Local Municipality Integrated Development Plan (IDP)

The IDP is a legal requirement under Section 5 of the Municipal Systems Act No. 32 of 2000. The aim of the IDP process is to align the vision and objectives of the local municipality's management to the strategic objectives of the council in order to optimise service delivery. The IDP guides and informs the local municipality in all planning, budgeting, management and decision making (Gamagara Local Municipality, 2011).

The IDP stipulates the following development goals for the Gamagara Local Municipality (Gamagara Local Municipality, 2011):

- Infrastructure and Basic Service Delivery;
- Local Economic Development;
- Financial Viability and Financial Management;
- Good Governance and Community Public Participation; and
- Municipal Transformation and Institutional Development.

The IDP report also stipulates the vision, mission and values of the Gamagara Local Municipality. The Gamagara Local Municipality vision is *'To be a prosperous and harmonious Gamagara municipality with a safe and healthy environment and to provide equal facilities for all'* (Gamagara Local Municipality, 2011). The Gamagara Local Municipality mission is stated to (Gamagara Local Municipality, 2011):

- *'Render quality, effective and sufficient services*
- *Promote the general well being through a safe and healthy environment amongst all residents*
- *Promote equality and fairness in the allocation of resources, and*
- *Promote sound and sustainable economic growth in the municipal area'*

2.2.2

Gamagara Local Municipality Spatial Development Framework (SDF)

One of the main objectives of an IDP is to formulate a clear understanding and indication of development aspects and projects that need to be undertaken over time, within the jurisdictional area of the local municipality. Projects, future developments and other forms of investment are influenced by not just financial costs and time, but also in space. It is this spatial aspect that the SDF seeks to manage and set the spatial goals of the municipality (Gamagara Local Municipality, 2010).

The SDF is seen as a core component of a municipality's economic, sectoral, spatial, social, institutional and environmental vision. Essentially, the SDF is viewed as a tool to achieve the desired spatial form of the municipality (Gamagara Local Municipality, 2010).

The Gamagara Local Municipality SDF outlines the following aims of the SDF (Gamagara Local Municipality, 2010):

- *'Align the spatial development goals, policies etc. with the relevant provincial and national guidelines, principles and policies.*
- *Provide a long-term vision for the spatial form that Gamagara Municipality wishes to achieve in the future.*
- *Help to spatially coordinate, prioritise and align public investment within the municipality.*
- *Identify areas not suited for development, along with areas where development must be closely monitored and managed.*
- *Provide a framework that guides decision making regarding the nature, form, scale and location of urban development, land use change, infrastructure development and resource utilisation and protection.'*

The SDF recognises that the municipal area is primarily known for its mining activities and that linked to this the maintenance, upgrade and extension of transport corridors (ie railway lines) are imperative to ensuring sustainable development. The SDF also highlights the potential issues such as traffic congestion resulting from a large portion of goods transportation by road. The proposed project therefore fits with the objectives of the SDF for the municipality in that it is key in facilitating the expansion of the capacity of the existing manganese ore railway line.

The EIA process is illustrated in *Figure 3.1* and consists of the following three phases:

- Scoping Phase;
- Specialist Study Phase; and
- Integration and Assessment Phase.

Figure 3.1 EIA Process Flow Diagram



3.1 SCOPING PHASE

The first phase of the EIA process is the Scoping Phase, with an emphasis on public involvement. This project is currently in this phase of the EIA process. The various tasks and consultation activities undertaken thus far by ERM are described and summarised below.

3.1.1 *Initial Site Visit and 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. English, Afrikaans, and Tswana site notices were put up at the site, local library and frequently visited shops within the area (see *Section 3.1.2* below).

3.1.2 *Stakeholder Engagement*

An integrated stakeholder engagement process is being undertaken; *Table 3.1* details the stakeholder engagement tasks that have been undertaken to date as well as those planned for the Scoping Phase.

Table 3.1 Stakeholder Engagement Tasks: Announcement and Scoping Phase

Activity	Details	Reference in Scoping Report
Announcement Phase/Stakeholder Consultation		
Field visit to towns and compilation yard.	Field visit during 1 - 5 October 2012 for the Northern Cape to gather baseline information, consult with key stakeholders, gather additional stakeholder information and put up site notices.	N/A
Distribution of project announcement letter and Background Information Document (BID).	BID and announcement documentation emailed and posted in English and Afrikaans to stakeholders on Wednesday 2 October and Thursday 3 October 2012.	Annexure C BID, letters, registration and comment sheet, adverts, site notices.
Placing of adverts.	Newspaper adverts, in English and Afrikaans, were placed in: <ul style="list-style-type: none"> • 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. 	Annexure C BID, letters, registration and comment sheet, adverts, site notices.
Putting up of site notices.	English, Afrikaans, Xhosa and Tswana site notices were put up at the project site, local library and frequently visited shops within the study area.	Annexure C BID, letters, registration and comment sheet, adverts, site notices.

Identification of stakeholders.	Stakeholder database includes information from existing ERM databases, information provided by Transnet and stakeholder information gathered during the field visit.	Annexure C Stakeholder database.
Consultation with relevant stakeholders.	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 will be captured in the Comment and Response Report.	A Comment and Response Report will be included in the Final Scoping Report.
Obtained comments from stakeholders.	Comments, issues of concern and suggestions received from stakeholders will be captured in the Comment and Response Report.	A Comment and Response Report will be included in the Final Scoping Report.

Scoping Phase

Announcement of Draft Scoping Report.	<p>Draft Scoping Report announcement will be sent to I&APs on the stakeholder database during November 2012 together with a schedule and venues for public meetings.</p> <p>The public review period will extend from the 19 November 2012 to 09 January 2012 (thus excluding the period of 15 December to 02 January)</p> <p>A newspaper advert will be placed in the Kathu Gazette to invite stakeholders to public meetings and to announce the availability of documents for review.</p>	Annexure C Public Participation material.
Making Draft Scoping Report available to I&APs.	<p>Draft Scoping Report and accompanying documents will be placed at the Kathu Public Library.</p> <p>The Draft Scoping Report will also be available on the project website: www.erm.com/transnet-expansion.</p>	Annexure C Public Participation material.
Stakeholder meetings.	<p>The public meeting will be held in the town of Kathu. The meeting will be held in the Kathu Community Hall on 05 December 2012.</p> <p>The public meeting will be announced together with the announcement of the Draft Scoping Report availability.</p>	A Comment and Response Report and Meeting Minutes will be included in the Final Scoping Report.
Obtain comments from stakeholders.	Comments, issues of concern and suggestions received from stakeholders during the Draft Scoping Report public review period will be captured in the Comment and Response Report, which will be included in the Final Scoping Report.	A Comment and Response Report will be included in the Final Scoping Report.

Making Final Scoping Report available to I&Ps	The Final Scoping Report will be simultaneously submitted to competent authority and made available to I&APs in the first quarter of 2013. Thereafter a public review period of 21 days will be provided for I&APs to provide comments directly to DEA.	N/A
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3.1.3 *Authority Consultation*

Authority consultation and involvement up until the release of the Draft Scoping Report included:

- Submission of an EIA Application for Authorisation form to 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 Reference 14/12/16/3/3/2/405, and is attached in *Annex E*.
- A WML Application form has also been submitted to DEA, this reference number will be included on public participation documents for the EIA process going forward.

3.2 *SPECIALIST STUDIES PHASE*

A number of specialist studies have been identified to address key issues of concern. The findings of these studies will be incorporated into the Environmental Impact Report (EIR). Further information related to the approach to the specialist studies and the impact assessment is contained in the Plan of Study for EIA in *Section 7*.

3.3 *INTEGRATION AND ASSESSMENT PHASE*

The final phase of the EIA process is the Integration and Assessment Phase, which is described in detail in the Plan of Study for EIA (*Section 7*). 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.

A synthesis of the specialist studies, which addresses the key issues identified during the Scoping Phase, will be documented in a Draft EIREIR. Relevant technical and specialist studies will be included as appendices to the Draft EIR which will be made available for the legislated public and authority comment

period and I&APs will be notified of the release of the report and where it can be reviewed.

Comments received on the Draft EIR will be assimilated and the EIA project team will provide appropriate responses to all comments. A Comments and Responses Report will be 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.

3.3.1 *Proposed Timeframe for the EIA Process*

The estimated schedule for the EIA process is presented in *Table 3.2*. *Section 7* of this report presents a more detailed Plan of Study for the EIA.

Table 3.2 *Estimated EIA Process Schedule*

Task	Date
Stakeholder Comment on Draft Scoping Report and Plan of Study for EIA	November 2012 – January 2013
Finalise Scoping Report and Plan of Study for EIA and submit to DEA	March 2013
Acceptance of Scoping Report received from DEA	March 2013
Specialist studies	February 2013
Prepare Draft EIR and EMP	March – May 2013
Stakeholder Comment on draft reports	May – June 2013
Finalise and submit reports to DEA	July 2013

This Chapter provides an overview of the proposed Mamathwane Compilation Yard. Project activities and requirements for the construction, operation and decommissioning of the compilation yard are discussed in this section as well as the motivation for the project and the alternatives considered.

4.1**PROJECT MOTIVATION**

Transnet is responsible for South Africa's rail infrastructure network and has strategic aims to reduce the cost of doing business, building capacity, operating safely and improving efficiency. The company's growth vision relies heavily on optimising rail corridors in collaboration with its customers.

The existing railway infrastructure between the Port of Ngqura and Hotazel currently has an insufficient export capacity. There is therefore scope to increase the volumes transported along this rail line provided infrastructure upgrades and expansions are undertaken.

Transnet, in conjunction with the manganese mining industry, has identified an export requirement of up to 16 Mtpa for long term growth driven by increased demand for manganese ore to supply the increasing steel manufacturing (manganese form part of the product mix during steel manufacturing). This increase in global demand means that there is a need for larger volumes of manganese ore to be transported along the existing railway line to the Port of Ngqura. The need to meet the demands from the mining sector has led to Transnet's decision to upgrade the existing railway line between the Hotazel and the Port of Ngqura and the establishment of the proposed Mamathwane Compilation Yard is key in facilitating this increased capacity.

4.2**PROJECT LOCATION AND EXISTING LANDUSE**

The project site is located at Mamathwane, Gamagara Local Municipality which falls within the John Taolo Gaetsewe District Municipality, in the Northern Cape Province. The Mamathwane Compilation Yard will be located approximately 3.5km south of the existing Mamathwane yard, adjacent to the Mamathwane mine which forms part of the Kalahari manganese fields.

Approximately 131ha of the project site is currently designated for agricultural use, with current agricultural practices comprising sheep and cattle farming. Land use in the surrounding area includes further sheep and cattle farming and extensive mining.

4.3

PROJECT COMPONENTS

The compilation yard will cover an area of 120ha and will be constructed adjacent to the existing manganese ore rail line. This will allow Transnet to receive train wagons from the various manganese mines and consolidate them into 200 wagon trains that will travel to the facilities proposed at the Port of Ngqura. Similarly empty wagon trains will be received at the compilation yard and deconsolidated to be returned to the manganese mines.

The compilation yard layout is indicated in *Figure 4.1*. Included in the compilation yard is a wagon servicing slab for the servicing of wagons, and a diesel refuelling facility for locomotives. A triangle is included in the layout to allow for locomotives to turn around. A locomotive maintenance shed will be used for some minor servicing of locomotives. Yard signalling will be automated. A Common User Facility will be constructed allowing the storage and loading of ore from smaller mining operations. Additionally, a dirty/oily water treatment facility is included. The project components are listed in more detail below.

4.3.1

Compilation Yard Infrastructure

The compilation yard will comprise of five rail lines and a balloon loop. The following buildings/facilities are included in the design of the compilation yard:

- Security building;
- Wagon servicing slab;
- Diesel refuelling facility;
- Oil/water separator;
- Locomotive maintenance shed;
- Relay rooms;
- Two shunter cabins; and
- Main TFR operations building.

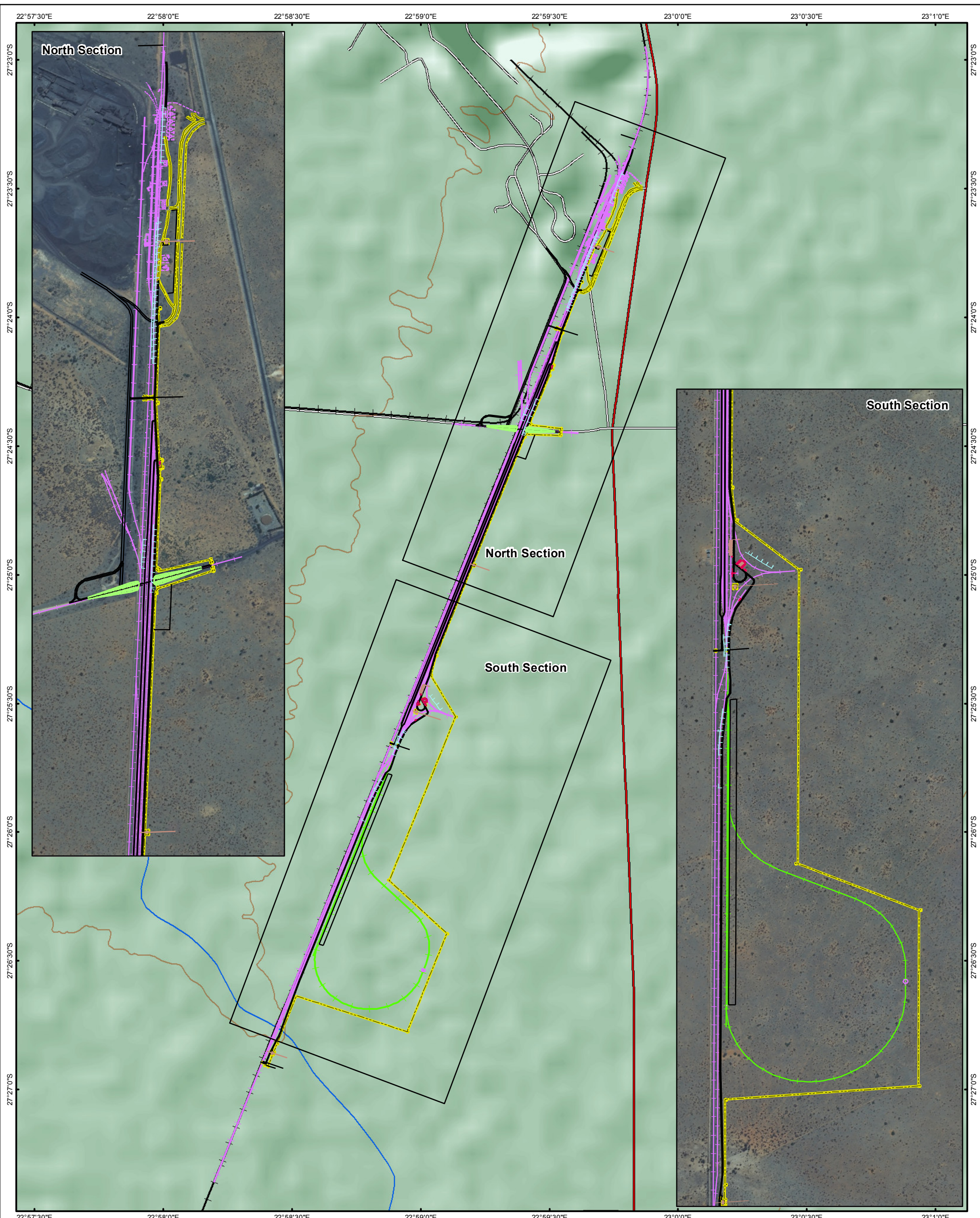
In addition, the following associated components will also be developed as part of the compilation yard:

- Level crossings;
- Parking facilities;
- Extension of an existing culvert;
- Four metre wide maintenance road;
- New run-off railway line;
- New boundary fence;
- Permanent and temporary laydown areas;
- Sanding facility;
- New road over rail bridge;
- Mine access road; and
- Common User Facility.

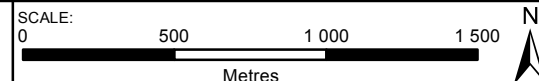
Associated infrastructure located on the project site includes the following:

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

The yard will be electrified and the design will incorporate stormwater drainage as well as sewerage systems.



Legend	
	Centreline Track
	Future Track
	Buildings
	Fence
	Roads
	Side Drains
	Structures
	Proposed Earthworks
	Existing Railway
	Contours (20m)
	River
	Main Road
	Other Roads
	Buildings




TITLE:
Figure 4.1: Project Site Layout of the Transnet Mamathwane Compilation Yard - North and South Sections

CLIENT:
Transnet SOC Ltd

DATE: Oct 2012	CHECKED: NB	PROJECT: 0172056
DRAWN: AT	APPROVED: SHC	SCALE: 1 : 25 000

DRAWING: Transnet_Project_Site_Layout_Map3A3_Portrait.mxd	REV: A
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Projection: Geographic, Datum: WGS 84 Source: NGI - 2722BD_15_2009_143_RGB_RECT.tif Inset Map: ESRI Data and Maps	SIZE: A3
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4.3.2 *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 rail bridge will be constructed and a deviate mine access road will be constructed.

4.3.3 *Water Requirements*

The water required at the project site during the construction phase is estimated to be 153 300m³ while water requirements during operation are likely to be in the order of 64kl/day. It is envisaged that water will be sourced locally (from existing boreholes) or trucked in by road. Authorisation for water abstraction, if required, will be applied for separately to the Department of Water Affairs (DWA) by Transnet.

4.3.4 *Borrow Pits*

Geotechnical investigations will be undertaken to identify suitable sources of material to be used for construction. An explanation of the different material types is given in *Box 4.1*.

Box 4.1 Materials that can be extracted from borrow pits

Ballast – Coarse, crushed stone laid to form a bed for the sleepers and rails.

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

Sub-base material – This material is used to construct the top layers of the rail prism onto which the ballast is then placed.

4.4 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.

All electricity will be provided by mobile generators. Electricity will be used for lighting and industrial use such as welding and powering electrical equipment.

4.5 WASTE MANAGEMENT

Transnet is applying for a WML under the National Environmental Management: Waste Act (Act No. 59 of 2008) for storage, transfer and treatment facilities. An oil/water separator approximately with a capacity of 49m³ will be installed adjacent to the locomotive maintenance shed. A waste storage area of 400m² will also be established adjacent to the maintenance shed. This area will be used to store waste at the site before removal by an appropriately licenced contractor.

All wastes will need to be managed and disposed of in a manner to prevent potential impacts on the environment and risks to human health and the principles of waste minimisation at source, segregation for reuse, recycling, treatment or disposal will apply to the handling of waste.

4.6 SOCIO-ECONOMIC ASPECTS

A number of jobs will be created by the proposed project. Job creation during the construction and operational phases of the project as well as aspects of skills development is elaborated on in the section below.

4.6.1 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, including the Eastern and Northern Cape, and semi-skilled and unskilled labour will be sourced locally as far as practicable.

Construction Phase (Temporary Labour)

The construction of the compilation yard will require both skilled and unskilled personnel, the numbers of which will be confirmed as part of the EIA Phase. 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 tasks.

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. In addition, both temporary and permanent jobs may be created in the manufacture of wagons and equipment for the railway line.

Potential socio-economic impacts associated with employment are identified for assessment in the EIA Phase (see *Section 6*).

4.7

ALTERNATIVES

In terms of the EIA Regulations, Section 28(1)(c) and NEMA, Section 24(4), 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)’.*

This section outlines the alternatives considered in for the project.

4.7.1

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 of export of manganese ore. The existing ore line to the Port of Saldanha is used extensively for iron ore transport and 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, 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, potentially negating the need for the compilation yard. However, this option was rejected due to cost, environmental risks 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 than the Mamathwane site from the mines and will require less efficient shunting and hauling operations due to the compilation and de-compilation 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 required.

4.7.2 *Design Alternatives*

Layout alternatives for the Mamathwane site were considered, with the length and number of lines in the compilation yard being determined by the compilation yard's function of enabling the compilation and de-compilation of 200 wagon manganese trains.

4.7.3 *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 consolidated and deconsolidation of wagons for 16 Mtpa (i.e. a compilation yard with sufficient capacity). An activity alternative would, therefore, relate to transportation of these goods 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 of goods 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.

4.7.4 *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. The schedule would then slowly get more and more congested which would require additional loops to be extended or built to alleviate the problem, 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 burden and potential environmental and social risks.

4.7.5 *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.

4.7.6 *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. 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 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 and container handling sectors and would affect South Africa's export capabilities. This suggests direct negative consequences for the provincial and national economy. Local effects would be related to a lack of stimulation in terms of employment and opportunities for small and medium enterprises, which would benefit from the project.

The environment consists of interacting geological, biological, social, economic and cultural factors. It is essential that the effects of any proposed development on all aspects of the environment be assessed before a decision to proceed is taken. The environmental and socio-economic baseline conditions of the study area for this EIA are described briefly in this section. This description is based on a combination of desk-top research, analysis of maps and aerial photography and an initial site inspection. Further specialist studies will explore issues such as vegetation, noise and vibration, air quality, heritage resources and socio-economic considerations during the next phase of the EIA. The findings of these studies will inform the assessment of the impacts that the proposed development may have on these environmental and social aspects.

5.1 *BIOPHYSICAL BASELINE*

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

5.1.1 *Climate*

The study area normally receives about 223mm of rain per year. Most rainfall occurs during the summer months. The area receives the lowest average rainfall (0mm) in June and the highest average rainfall (50mm) in February. 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⁾.

5.1.2 *Landscape and Topography*

The area is characterised by a very flat topography on the floodplain of a valley, dominated by Karoo farms. The Ga-Mogara River runs in a south to north direction approximately 13.5km from the project site. There are north south running mountains approximately 40km to the west and approximately 30km east of the project site.

5.1.3 *Geology and Soils*

Superior-type banded iron formations (BIF) of the Transvaal Supergroup crop out along the western margin of the Kaapvaal craton in the Northern Cape (see *Figure 5.1*). The majority of the hematite mineralisation is found in the area of Postmasburg and Sishen Mine. Iron ore and associated lithologies of the Transvaal and Olifantshoek Supergroups crop out intermittently along an

(1) http://www.saexplorer.co.za/south-africa/climate/hotazel_climate.asp. Accessed 8 October 2012.

arcuate belt for 60 km within this sub-region⁽¹⁾. These outcrops shape a regional anticlinal structure known as the Maremane anticline. The area is located at the northern end of the anticline. The Transvaal Supergroup lithologies were deposited as part of an extensive epeiric sea, located on the central part of the Kaapvaal Craton. These geological strata developed within two related basins. The westernmost (the Griqualand West basin) is preserved in the Northern Cape. The Transvaal Supergroup comprises an extensive, basal carbonate platform sequence (the Campbell Rand Subgroup) conformably overlain by iron-formations of the Asbestos Hills Subgroup. In the vicinity of the Sishen Mine, the upper parts of the Asbestos Hills Subgroup have been ferruginized to ore grade. The Asbestos Hills Subgroup is unconformably overlain by sedimentary rocks (conglomerates, shales, flagstone and quartzite), known as the Gamagara Subgroup⁽¹⁾.

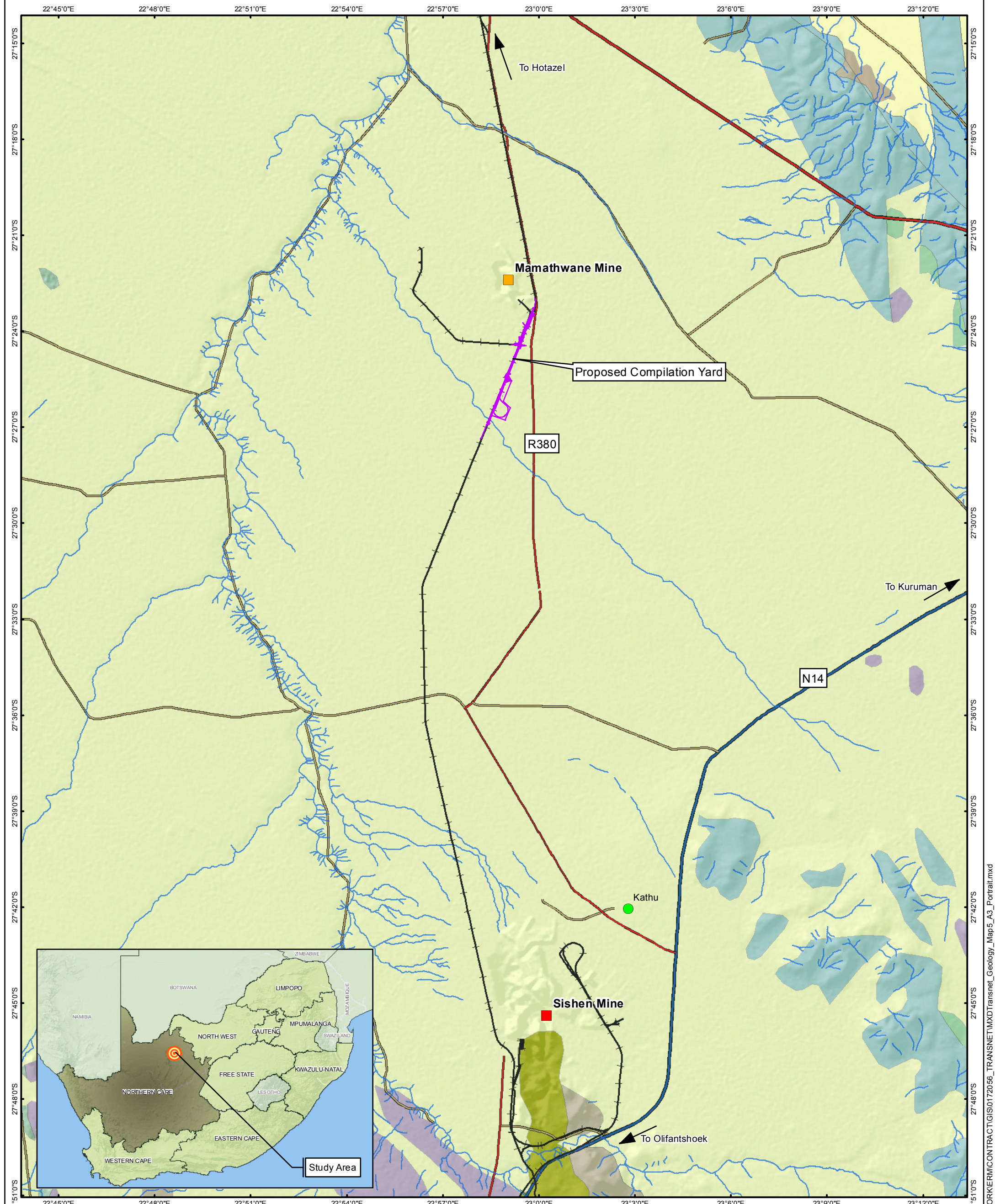
The study area is situated on the northern extremity of the Maremane anticline, where the lithologies strike north-south and plunge from the centre of the anticline in a northerly direction⁽¹⁾.

Campbell Rand Subgroup is separated from the overlying BIF of the Asbestos Hills Subgroup, by a siliceous, residual breccia ⁽²⁾, known locally as the Wolhaarkop Breccia. The BIF's of the Asbestos Hills Subgroup are fractured and brecciated, especially near the contact with the Wolhaarkop breccia⁽¹⁾.

The sedimentary rocks of the Gamagara Subgroup, overlie the laminated breccia ores. Partly ferruginized shales, interbedded with ore conglomerates and thick flagstones are also a characteristic of the Gamagara Subgroup. A buried glacial valley, filled with Dwyka tillite and mudstones has been identified in the study area, located between the Sishen mine and Kathu. The valley has a north-south orientation that changes to northwest between Dibeng and the Sishen mine. The valley does not fall within the planned open pit. The Kalahari Group located in the study area comprises boulder beds, clays, calcrete, dolocrete and windblown sands⁽¹⁾.

(1) <http://www.exxaro.com/pdf/icpr/a/geology/iron.htm>. Accessed 9 October 2012.

(2) Breccia is a rock composed of broken fragments of minerals, or rock cemented together by a fine-grained matrix.

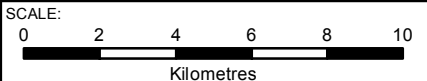


Legend

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

Geology

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



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TITLE:

Figure 5.1: Geology Map of the Transnet Mamathwane Compilation Yard

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CLIENT:

Transnet SOC Ltd

ERM

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Projection: Geographic, Datum: WGS 84
Source: Geology ENPAT (2001)
Inset Map: ESRI Data and Maps

SIZE: A3

5.1.4 *Hydrology - Surface Water and Ground Water*

The area has an aquifer classification of minor, i.e. a moderately yielding aquifer system of variable water quality. The dissolved solids (mg/L) are between 301-500mg, and the borehole distribution for the area is between 6-10.

Within the broader landscape, the Ga-Mogara River which is more than 10km to the west of the project site is a significant ecological feature. There is a river tributary system that traverses the southern portion of the project site. 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.

5.1.5 *Flora and Fauna*

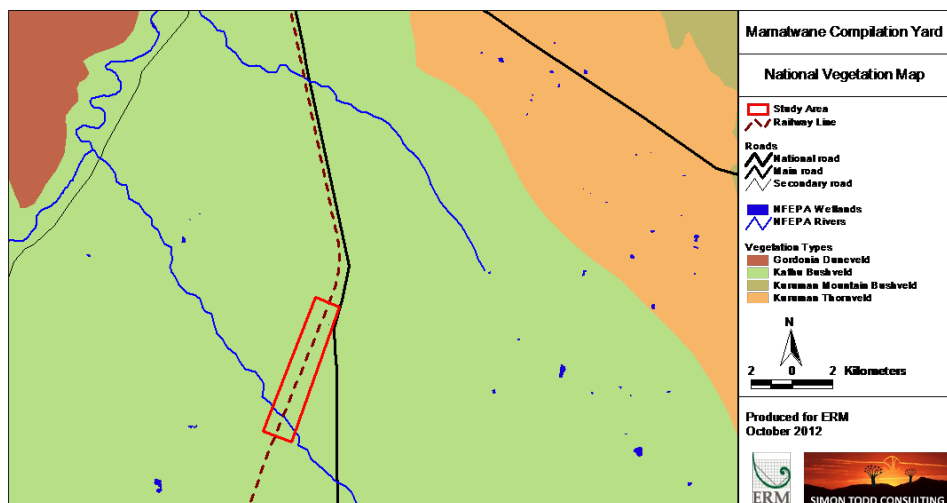
Vegetation

Broad-scale Vegetation Patterns:

According to the national vegetation map (Mucina & Rutherford 2006), the project site is entirely within the Kathu Bushveld vegetation type (Figure 5.2). 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. It is associated with Aeolian red sand and surface calcrete, deep sandy soils of the Hutton and Clovelly soil forms. The Kathu Bushveld vegetation type is still largely intact, with less than 2 percent transformed by mining activity, and classified as Least Threatened¹. 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 *Antheophora argentea* and Kalahari Buffalo Grass *Panicum kalaharensense*. 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.

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 5.2 Broad-scale Vegetation Types



Source: Simon Todd, 2012.

Fine-scale Vegetation Patterns:

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 understorey 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 hebeclada* 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 5.3, 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 5.3 Examples of Project Site Vegetation



Source: Simon Todd, 2012.

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 2723AC 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.

¹ The species is declining but the population has not yet reached a threshold of concern

Fauna

Mammals:

The project site is located within the distribution range of 48 terrestrial mammals, and 8 bat species, indicating mammalian diversity at the site is potentially high (see species lists in *Annex E*). Species associated with rocky habitats are not likely to occur at the site, which is restricted to flat Kalahari sands. There are five terrestrial mammal species of conservation concern that may occur in the study area, namely the Brown Hyena *Hyaena brunnea* (Near Threatened), Black-footed Cat *Felis nigripes* (Vulnerable), Leopard *Panthera pardus* (Near Threatened), Honey Badger *Mellivora capensis* (Endangered) and Ground Pangolin *Smutsia temminckii* (Vulnerable) (South African Red Data Book (SARDB)). Given that the area is currently used for livestock grazing, the abundance of larger predators such as Leopard and Brown Hyena is likely to be 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 widely distributed across the arid and semi-arid parts of South Africa, a single individual of which has a home range far exceeding the extent of the study area. The development of the project site would therefore not constitute significant habitat loss for these species,

Reptiles:

The project site lies in or near the distribution range of 33 reptile species, indicating that reptile diversity at the project site is likely to be relatively low. Based on distribution maps and habitat requirements, the reptile faunal species composition is likely to comprise two tortoises, 11 snakes, 13 lizards and skinks, one chameleon and 5 geckos (see species list in *Annex E*). Of the species mentioned above, species associated with rocky habitats are unlikely to occur at the project site, which is likely characterised by species associated with sandy substrates or wide habitat tolerance. There are no listed reptiles known for the study area and there are also no narrow endemics which occur in the study area, indicating that the reptiles at the project site are likely to be largely widespread species of low conservation concern.

Amphibians:

The project site lies within the distribution range of 11 amphibian species, of which only three or four are likely to occur at the project site (see species list in *Annex E*). There is no natural surface water present at the site and no areas where water is likely to collect for any prolonged length of time. Therefore, 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 occurring in the study area; however there is no breeding habitat for this species in or near the project site. 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 study area. However, the project site is not considered to be of above-average significance for these species.

5.1.6 *Critical Biodiversity Areas and Broad-scale Processes*

No fine-scale conservation planning has been conducted for the study area. Additionally, the project site does not fall within a National Protected Areas Expansion Strategy focus area, indicating that it has not been recognised as a potentially important area for future conservation efforts. The habitats present on the project site are widely available across an extensive area surrounding the project site and the potential for broad-scale fragmentation or loss of connectivity is low. In terms of the broad-scale processes, the flat, open nature of the project site suggests that few such ecological gradients and processes are likely to be operating across the project site.

Within the broader landscape, the Ga-Mogara River which is more than 10 km to the west of the project site is a significant ecological feature that may be important for dispersal and broad-scale ecological processes.

5.1.7 *Protected Nature Conservation Areas*

The nearest nature reserve is the Tswalu Kalahari Reserve located approximately 55 km west-north-west of the project site and is unlikely to be affected by the proposed project.

5.2 *SOCIOECONOMIC BASELINE*

5.2.1 *Introduction*

The purpose of this section is to describe the socio-economic environment within which the proposed project is located. The proposed development will have benefits on a national level in terms of providing rail infrastructure and on a local scale in terms of providing employment (i.e. both temporary and permanent). The potential socio-economic impacts resulting from the proposed project will primarily be experienced at the local level; therefore, the socio-economic baseline description is focused on the local level.

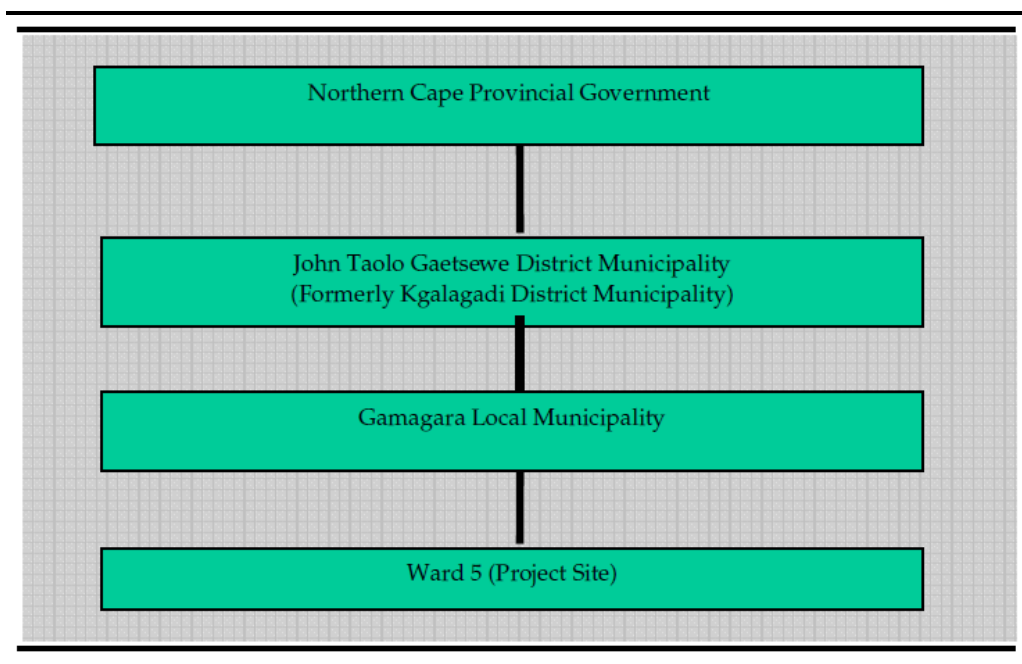
The description provided in this section is based on publically available and high level secondary information. A full and more current account of the project site will be provided as part of the socio-economic study for the EIA drawing on primary data collected for this project.

5.2.2 *Administrative Structure*

The project is located within the Gamagara Local Municipality which falls within the John Taolo Gaetsewe District Municipality, in the Northern Cape Province. 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 and local municipalities are each responsible for the provision of services and infrastructure within their municipal

boundaries. This is facilitated through the development and implementation of IDPs, SDF and Local Economic Development (LED) Plans.

Figure 5.4 *Administrative Structure*



5.2.3 *Provincial Level*

The Northern Cape Province is the largest province in South Africa, measuring 361,830km². The primary metropolitan areas within the Northern Cape include Kimberly and Upington. Smaller district towns include Douglas, De Aar, Prieska, Victoria West, Hopetown and Colesburg.

The Northern Cape is the least populous province in South Africa, containing approximately 1.8 percent of the national population ⁽¹⁾. The Province has a high poverty rate ⁽²⁾ despite the fact that the per capita Gross Domestic Product (GDP) in the Northern Cape is higher than the national average ⁽³⁾. The poverty rate for the Province is 48.5 percent, which is slightly lower than the national average ⁽⁴⁾. Poverty rates differ vastly between racial groups, with low poverty rates among the White and Asian populations, and high poverty rates among Coloured and African population groups ⁽⁵⁾. Over two thirds (70 percent) of the population live in urban areas, despite the vast extent of the Province.

(1) StatsSA, July 2011

(2) The poverty rate is defined as the number of people earning less than the minimum level of income deemed adequate in a country. The World Bank uses the figure of \$1.25 per day.

(3) PROVIDE: Project Background Paper 2005.

(4) StatsSA, July 2011

(5) PROVIDE Project Background Paper 2005.

The Northern Cape faces the challenge of high unemployment rates and low income levels. The unemployment rate in the Province is 26.7 percent, which is above the national average of 23.9 percent ⁽¹⁾.

5.3

JOHN TAOLO GAETSEWE DISTRICT MUNICIPALITY

John Taolo Gaetsewe District is one of five District Municipalities in the Northern Cape. It is located in the south eastern portion of the Northern Cape and is bordered by the Free State, Eastern Cape and Western Cape. The District is approximately 27,283 km² in size. The District comprise of three local municipalities namely, Joe Morolong, Ga-Segonyana and Gamagara.

The key economic sectors in the District are mining, social services, agriculture, tourism, manufacturing, and construction. Mining is the largest employer followed by the agricultural sector.

Table 5.1 provides a statistical summary of John Taolo Gaetsewe District Municipality.

Table 5.1 *John Taolo Gaetsewe District Municipality*

	Statistical Indicators in %	Additional Comments
DEMOGRAPHIC INDICATORS		
Population Size	224,799	
Population Growth Rate	9	The population has increased by 18,152 since the 2001 Population Census.
Rural/Urban Split	Mostly rural	The municipal area is rural, due to intensive agriculture undertaken
Racial Composition:		
African/Black	85	
Coloured	9	
White	5	
Indian/Asian	0.5	
Other	0.5	Foreign Nationals
The population is largely youthful at 69 percent (35 years old and below), and an economically active population 19 to 54 (61 percent) and five percent of population are elderly.		
SOCIO-ECONOMIC INDICATORS		
Education		
No Schooling	23 (2)	
Primary Schooling	35	
Secondary Schooling	25	
Grade 12	12	
Tertiary	5	
Employment rate	29	This category includes unspecified, children, elderly,
Unemployment rate	18	

(1) Unemployment rate for Q4 2011 according to StatsSA

(2) Based on the 2007 Community Survey

	Statistical Indicators in %	Additional Comments
Economically Inactive	53	sick and those who choose not to seek employment. During the 2007 Community Survey, over half of the population were classified as Economically Inactive.
ECONOMIC INDICATORS		
Annual growth rate	Between 4 and 6	The Municipality's economic growth target is 4 to 6 % which is in line with the Provincial economic growth strategy
Highest economic sector contributions:		
Sector	Percentage Contribution	
Mining	50.2	
General Government Services	13.1	
Wholesale, Retail, Catering, and Accommodation	8.4	
Finance and Business	7.4	
Transport and Communication	6.1	
Community Services	5.1	
Agriculture, Forestry, and Fishing	4.1	
Manufacturing	3.2	
Construction	1.2	
Electricity and Water	1.2	

Sources: StatSA: 2011 Population Census; 2007 Community Survey; and Kgalagadi Nodal Development Profile (no date)

5.3.1

The Municipal and Study Area

Gamagara Local Municipality comprises of an area of 2,619km², and is located in the north-eastern side of the Province and District, on the N14 National Road between Upington and Vryburg. The Municipality comprise of five towns, namely Kathu, Shesheng, Dibeng, Dingleton (former Sishen), and Olifantshoek. The Municipal administrative office is located in Kathu. A significant portion of the Municipal area is used for extensive farming (livestock) and mining (iron ore). The single largest factor that has guided the development of the Municipal area is the iron ore mine at Sishen which has led to the establishment of the modern town of Kathu which is the largest town, while Dingleton is the smallest of the five towns.

Table 5.2 provides a statistical summary of Gamagara Local Municipality.

Table 5.2 Gamagara Local Municipality

	Statistical Indicators in %	Additional Comments
DEMOGRAPHIC INDICATORS		
Population Size	41,617 ⁽¹⁾	The population has increased by 13,563 since the 2001 Population Census.
Population Growth Rate	48	
Rural/Urban Split	Mostly rural	The municipal area is rural, due to intensive agriculture and mining activities undertaken
Racial Composition:		
African/Black	55	Foreign Nationals
Coloured	29	
White	14	
Indian/Asian	0	
Other	2	
The population is largely youthful at 68 percent (35 years old and below), and an economically active population 19 to 54 (72 percent) and three percent of population are elderly.		
SOCIO-ECONOMIC INDICATORS		
Education		
No Schooling	22	The number of people who have tertiary education has increased by two percent when its compared to the 2007 Community Survey where the number stood at six percent
Primary Schooling	26	
Secondary Schooling	26	
Grade 12	18	
Tertiary	8	
Employment rate	49 ⁽²⁾	Majority of the employed people work within the mining, agricultural and tourism sectors. Agricultural sector jobs are mainly seasonal or temporary
Unemployment rate	17	
Economically Inactive	34	
ECONOMIC INDICATORS		
Annual growth rate	Between 4 and 6	The Municipality's economic growth target is 4 to 6 % which is in line with the Provincial economic growth strategy

Highest economic sector contributions:

Mining has the highest contribution to the local economy; this is due to the abundance of manganese ore and iron ore in the local municipal area. Mining has also contributed significantly to the establishment of the tourism sector in the Municipality, as most of its managers and other workers from outside the area are housed in the local B&Bs and hotels on a long term basis. Other important sectors in the economy include, trade, transport, finance, and agriculture. These sectors have been experiencing a renewed growth (with the sectors showing growth of between four and five percent).

Sources: StatSA: 2011 Population Census; 2007 Community Survey; and 2009-2013 Gamagara Local Municipality Integrated Development Plan.

(1) 2011 Population Census, StatsSA

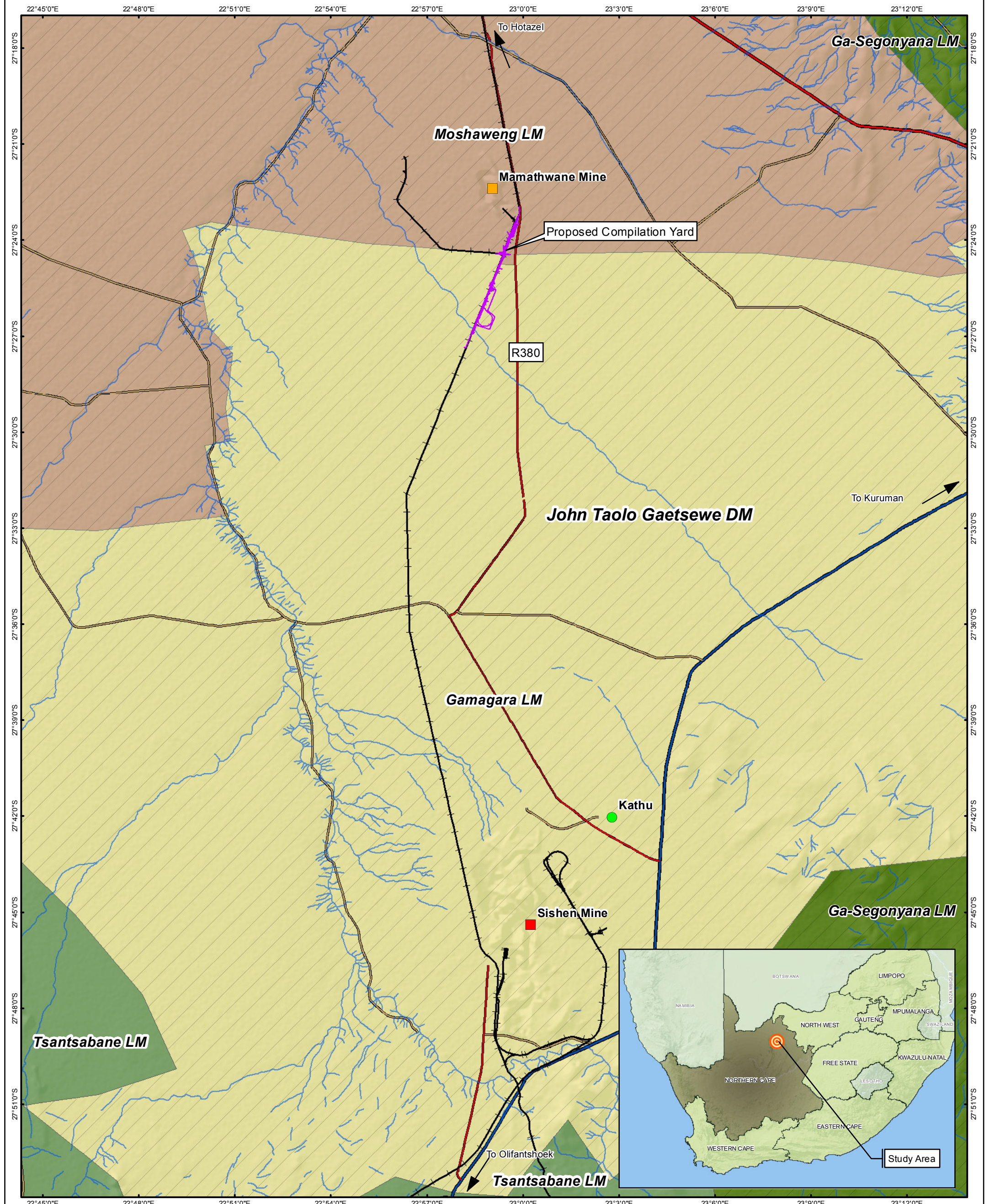
(2) 2007 Community Survey, StatsSA

5.3.2

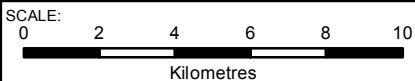
Description of the Project Site

There are three farm portions which will be directly affected by the project, namely Portion 3 of Remainder of the farm Moab No. 700, Portion of Remainder of Portion 1 of the farm Shirley No 367, and Portion of Remainder of Portion 2 of the farm Walton No 390. All three farms are privately owned. The farms are used for agricultural purposes, specifically cattle, sheep and game farming. On farm Walton No 390, the landowner mines sand which he sells as a flea and tick remedy for livestock and pets. He also produces a multivitamin supplement for humans from this sand. These products form an important source of secondary income for the household.

The infrastructure found on site includes fences, houses, boreholes, water storage dams, and working areas.



Legend	
	Mamathwane Mine
	Sishen Mine
	Towns
	Proposed Compilation Yard
	Existing Railway
	River
	National Freeway Route
	Arterial Route
	Main Road
	Secondary Road
Local Municipalities	
	Gamagara
	Moshaweng
	Tsantsabane
	Ga-Segonyana
District Municipalities	
	John Taolo Gaetsewe (Formerly Kgalagadi Municipality)



DATE: Oct 2012
 DRAWN: AT
 CLIENT: **Transnet SOC Ltd**

TITLE:
Figure 5.5: Municipal Map of the Transnet Mamathwane Compilation Yard

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APPROVED: SHC	SCALE: 1 : 200 000
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ERM Southern Africa 175 Lunnon Road Hillcrest, Pretoria Tel: +27 12 362 0008 Fax: +27 12 362 8368	
Projection: Geographic, Datum: WGS 84 Source: ENPAT (2001) Inset Map: ESRI Data and Maps	SIZE: A3

5.4.1

Palaeontology

The project site is located on rocks of the Kalahari Group and the fossils of interest which may be present in the geological strata present in the vicinity of the site are described below. 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).

Fossils within the Kalahari Group

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 expected occasionally expected within Kalahari Group sediments and calcretes, notably those associated with ancient, Plio-Pleistocene alluvial gravels.

5.4.2

Archaeology

Archaeological resources in the Northern Cape include prehistorical and historical sites particularly adjacent to rivers, hilltops and pans. These include

rock art, stone age sites as well as historical sites related to the Kimberley and South African War.

Although the project site is located adjacent to the existing manganese ore railway line and although the area may be largely disturbed, the possibility of finding a high density of stone tools is good based on archaeological work done in the vicinity of the site.

6.1 INTRODUCTION

A key part of the Scoping Phase is a preliminary identification and consideration of the ways in which the project may impact (positively and negatively) with environmental and socio-economic resources or receptors. The issues that are identified as potentially significant during the Scoping Phase provide focus for more detailed specialist studies for the EIA. Each of the potential issues will be briefly described in this section while the significance of any resulting impacts will be discussed and assessed in more detail in the EIR.

6.2 DESCRIPTION OF POTENTIAL IMPACTS

The potential impacts on environmental and socio-economic resources and receptors arising from the project include direct and indirect impacts. Impacts will also be linked to the different stages of the project which are identified as construction, operation and decommissioning.

Table 6.1 provides an overview of likely aspects arising from each of the key project activities and considers their likely interaction with socio-economic and environmental resources and receptors.

Table 6.1 Interaction between Project Activities and Receiving Environment

Key: Shaded box indicates potential interaction between the project and resource or receptor. The difference in shades indicates the predicted degree of interaction with darker shading indicating a greater degree of interaction.

Project Activities	Environmental Resources/Receptors							Socio-economic Resources/Receptors							
	Fauna	Flora	Geology and Soils	Surface Water	Groundwater	Air Quality	Noise and Vibration	Economy and Livelihoods	Traffic and Transport	Infrastructure Services	Land Use and Agricultural Potential	Landscape and Visual Amenity	Heritage/Archaeology/Palaeontology	Social and Cultural Structure	Health
Pre-construction and Construction															
Clearance of Vegetation (of the railway lines, maintenance roads, fence line and laydown areas)															

Project Activities	Environmental Resources/Receptors							Socio-economic Resources/Receptors							
	Fauna	Flora	Geology and Soils	Surface Water	Groundwater	Air Quality	Noise and Vibration	Economy and Livelihoods	Traffic and Transport	Infrastructure Services	Land Use and Agricultural Potential	Landscape and Visual Amenity	Heritage/Archaeology/Palaeontology	Social and Cultural Structure	Health
Construction of Roads															
Construction Camp															
Site Levelling and Grading															
Construction of Level Crossings															
Component Delivery															
Construction of Buildings (including operations building, shunter cabins, relay rooms, and locomotive maintenance shed)															
Construction of New Railway Lines															
Construction of New Overhead Electrical Cables															
Construction of Refuelling Facility															
Construction of Road over Rail Bridge															
Wastes and Emissions Handling and Disposal															
Operation															
Use of Railway Lines															
Use of Roads															
Use of Buildings															
Site Maintenance and Security															
Use of Refueling Facility															
Wastes and Emissions Handling and Disposal															
Decommissioning															
Removal of Railway Lines															
Removal of Overhead Railway Cables															

Project Activities	Environmental Resources/Receptors							Socio-economic Resources/Receptors							
	Fauna	Flora	Geology and Soils	Surface Water	Groundwater	Air Quality	Noise and Vibration	Economy and Livelihoods	Traffic and Transport	Infrastructure Services	Land Use and Agricultural Potential	Landscape and Visual Amenity	Heritage/ Archaeology/ Palaeontology	Social and Cultural Structure	Health
Removal of Foundations															
Removal of Roads															
Removal of Buildings															
Removal of Refueling Facility															
Wastes and Emissions Handling and Disposal															
Site Restoration & Rehabilitation															

Note: This interactions matrix will be continually developed throughout the EIA process.

6.3 *POTENTIAL IMPACTS*

The following section describes potential impacts which will be assessed in the EIA Phase, based on the initial site visit, discussions with the project team and available information about the environmental effects of similar developments. It is likely that many of these impacts can be adequately addressed through the implementation of appropriate mitigation and management measures, however, some require further specialist investigation as part of the EIA Phase.

6.3.1 *Noise and Vibration*

During the construction phase, vehicles including delivery trucks and excavation equipment may produce an increase in noise disturbance. Impacts are likely to be minimal considering the rural and isolated location of the project site which has few receptors. Delivery vehicles may create some noise and vibration along access roads.

Increased noise levels are anticipated during the operational phase of the development from the use of the railway infrastructure by trains. The project is located adjacent to the existing railway line and therefore noise generated

by the movement of trains is not anticipated to be out of place given the status quo.

Potential noise impacts will be addressed in the EIR and appropriate mitigation measures if considered necessary will be included in the Draft Environmental Management Programme (EMP).

6.3.2 *Air Quality and Dust*

Limited dust generation may occur during construction due to vegetation clearance, transportation of materials, and the construction of the compilation yard and associated infrastructure. Taking into consideration the distance of potential sensitive receptors to the site, impacts from increased dust are not likely to be significant.

No dust generation is expected to occur during the operational phase of the compilation yard, except for minimal dust created by maintenance vehicles along gravel roads, which is expected to be infrequent. However, the storage and handling of ore which will take place at the Common User Facility may generate dust and therefore require an Air Emissions Licence.

A specialist air quality assessment will be undertaken in the EIA Phase of the project. Appropriate measures to manage impacts associated with dust generation will be developed and proposed as part of the Draft EMP.

6.3.3 *Loss of Agricultural Land*

A portion of the project site is currently zoned for agriculture (livestock grazing). The construction activities and the establishment of the compilation yard will result in a reduction in the area of land that is available for livestock grazing, as the compilation yard will be fenced off.

The potential impact of loss of grazing land will be assessed in the EIR and appropriate mitigation measures will be included in the Draft EMP, where necessary.

6.3.4 *Loss of, or Damage to Palaeontology, Archaeological or Cultural Heritage Resources*

Section 38 of the National Heritage Resources Act states that any person who intends to undertake a development categorised as-

'(a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
(c) any development or other activity which will change the character of a site -
(i) exceeding 5,000 m² in extent;'

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the project.

During construction excavations required for the installation of railway lines and buildings and road construction etc. and land clearing could disturb or destroy features of cultural heritage interest, if they exist on the site. These potential impacts will be assessed through a palaeontology and heritage specialist study in the EIA Phase along with the required submissions to the South African Heritage Resource Agency (SAHRA).

6.3.5 *Visual and Aesthetic Landscape Impacts*

The main landscape feature in the area is the existing Mamathwane mine, while on the site there are a number of existing man-made features including power lines, Eskom's Mamathwane substation, the existing railway line and roads. The project infrastructure will result in an alteration of the landscape character of the site itself however, given the disturbed nature of the surrounding landscape and the height of existing infrastructure, it is not anticipated that this would result in high visual intrusion.

The EIA Phase will consider the potential effects that the project will have on the landscape character and effects upon potential viewers.

6.3.6 *Impact on Flora, Fauna and Habitats*

Potential ecological impacts resulting from the development would stem from a variety of different activities and factors associated with the construction and operational phases of the project including:

Construction Phase

- Vegetation clearing for lines, roads, buildings etc., could impact listed plant species as well as high-biodiversity plant communities. Vegetation clearing will also lead to habitat loss for fauna and potentially the loss of sensitive faunal species, habitats and ecosystems.
- Increased erosion risk would be likely to result due to the loss of plant cover and soil disturbance created during the construction phase. This may impact downstream riparian and wetland habitats if a high volume of silt enters the drainage systems.
- Presence and operation of construction machinery on the site. This could create a physical impact as well as generate noise, pollution and other forms of disturbance at the site.
- Increased human presence could lead to poaching, illegal plant harvesting and other forms of disturbance such as fire.
- Loss of connectivity and habitat fragmentation may result due to the presence of the railway infrastructure, roads, fencing and other support infrastructure of the project.

Operational Phase

- Although the existing railway is already operational, the operation of the compilation yard will create a more persistent presence and generate noise

which may deter fauna amounting to a loss of connectivity and habitat fragmentation.

- Maintenance activities such as vegetation clearing may impact indigenous plant species as well as encourage alien plant invasion.

The above risk factors are likely to be manifested as the following impacts:

Impacts on Vegetation and Protected Tree Species

Some loss of vegetation is an inevitable consequence of the development. In addition, the density of the protected tree species Camel Thorn *Acacia erioloba* and Grey Camel Thorn *Acacia haematoxylon* at the project site is high and some loss of individuals of these species is likely to be unavoidable.

Alien Plant Invasion Risk

The disturbance created during construction will leave the site vulnerable to alien plant invasion. The existing railway line forms a potential corridor for the dispersal of alien species and many alien species are common along the existing line and would represent a ready source for the spread of invasive species on the project site.

Increased Erosion Risk

Increased erosion risk would result from soil disturbance and the loss of plant cover within cleared and disturbed areas. The site is however largely flat and it is anticipated that erosion risk would be associated with wind erosion as well as water erosion, although instances of the latter may be less frequent. Cleared and disturbed areas with loose exposed sand would be most vulnerable.

Direct Faunal Impacts

Increased levels of noise, pollution, disturbance and human presence is likely to impact fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and may be killed. Some mammals and reptiles such as tortoises would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present. There are also a number of mammals of conservation concern which may occur in the area and some habitat loss for these species is likely to occur. It is not anticipated that the significance given the scale of the development relative to the distribution extent of these species.

Loss of Landscape Connectivity and Disruption of Broad-scale Ecological Processes

The presence of the compilation yard could potentially contribute to the disruption of broad-scale ecological processes such as dispersal, migration or the ability of fauna to respond to fluctuations in climate or other conditions.

Fencing would likely restrict animal movement and disrupt the connectivity of the landscape for fauna, which would no longer be able to pass through the site.

A botanical and ecological specialist study will be undertaken during the EIA Phase to assess the impact on terrestrial flora and fauna and the identification of appropriate mitigation and management measures to be included in the Draft EMP, where required.

6.3.7 *Impact on Traffic during Construction*

There will be an increase in traffic during construction as trucks and vehicles will be required to transport infrastructure, equipment and construction materials onto site and earth-moving vehicles will be involved in construction activities. This would decrease during the operational phase as trucks and vehicles will only be required for maintenance activities.

Further information regarding traffic levels and an assessment of significance will be provided in the EIR.

6.3.8 *Impacts Due to Waste Generation*

Waste from the construction and operational activities may arise from a range of sources including the following:

- Excavated material during construction (e.g. rock and soil);
- Waste from fuels and greases including storage of waste and treatment of oily water runoff using a separator;
- Waste from infrastructure components (e.g. scrap metal);
- Waste from workers on site including storage; and
- Waste from equipment, packaging, materials and vehicles.

A waste management licence application has been submitted to the DEA to ensure storage and treatment of waste during the operational phase is properly licenced and managed. Specific requirements for waste management and disposal will be identified in the Draft EMP.

6.3.9 *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 along or in dry drainage lines. The removal of vegetation and the development of access roads and hard standing surfaces may impact surface water flow and run off within the site and surrounds, during both the construction and operational phases. The input of additional water, mainly during construction, may exacerbate these impacts.

The potential impacts discussed above and any further impacts identified during the EIA Phase will be assessed in the EIR. These will be accompanied by the identification of appropriate mitigation and management measures, such as specific measures to manage surface water run-off, which will be included in the Draft EMP.

6.3.10 *Surface Water and Groundwater Contamination*

The potential for surface water contamination is an important consideration in relation to the construction of the compilation yard. Soil erosion leading to increased sediment load in surface water runoff could impact on drainage channels in the area. The presence and susceptibility of drainage features to potential sediment loading will be explored in the EIA Phase. The potential for groundwater contamination is associated with uncontrolled spills of fuels and lubricants during the construction and operational phases. The extent and impact of potential groundwater or surface water contamination is largely dependent on the nature of the subsurface soil conditions, their transmissivity and susceptibility to erosion. Apart from the permeability of the soil substrate, groundwater contamination could also occur through joints, fractures and contact zones associated with the geology.

Basic precautions to prevent groundwater and surface water impact during construction will be identified in the Draft EMP developed during the EIA Phase of the project.

6.3.11 *Socio-Economic Impacts*

Employment and procurement of local goods and services have been the issues of most interest to local stakeholders to date, and this is likely to continue. If managed well, it is the impact area with the greatest potential to have a significant positive effect on the area of influence.

The positive employment and procurement impacts would in turn result in positive impacts for the local economy over the duration of the project, i.e. from the construction phase through to decommissioning. Employment numbers will be reported on more fully during the EIA Phase and the associated socio-economic implications, positive and negative will be described and assessed. Related to the creation of employment, social impacts as a result of unmet expectations for employment and procurement may also occur. In addition, the influx of staff associated with the project may give rise to impacts on the social and cultural structure of the local communities.

Indirect social impacts may be associated with the proposed project and with other impacts identified in this section for example, increased noise, dust, vibration, construction and operational hazards, loss of agricultural land, road traffic hazards and sense of place.

The above-mentioned direct and indirect impacts will be described and assessed in the EIA Phase.

6.3.12 *Human Health and Safety*

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

The risk of injury will be mainly 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 will be specified in the Draft EMP which, in turn, will be incorporated into subcontractor health and safety plans.

6.4 *SCREENING OF IMPACTS*

The preceding *Section 6.3* describes a number of potential impacts associated with the project. One of the purposes of Scoping is to offer a preliminary, qualitative assessment of potential environmental and social impacts associated with the project, thereby ensuring that those impacts that are potentially significant are assessed in the EIA Phase.

The following impacts have been identified and described above:

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

The impacts which require further investigation through specialist studies are the following:

- Loss to archaeological, palaeontology and cultural heritage;

- Noise and vibration;
- Air quality;
- Natural vegetation and ecology; and
- Socio-economic.

The potential impacts identified will be assessed with input from the specialist studies mentioned above to determine the significance of the impact (i.e. the significance rating of the impact) and identify appropriate mitigation measures. The significance rating of an impact after mitigation is taken into account is the residual impact or the actual predicted impact associated with the proposed project.

Visual impacts, traffic disruption, loss of agricultural potential, waste generation, potential effects on hydrology, soils and geology and health and safety impacts will be addressed in the impact assessment and controlled through the implementation of standard environmental management measures that will be included in the Draft EMP.

The impact assessment methodology is discussed in more detail in *Section 7*.

6.5

CUMULATIVE IMPACTS

A cumulative impact is one which arises as a result of an impact from the project interacting with an impact from another activity to create an additional impact. For example, a residential property positioned between a railway project and an airport would result in the residential receptors experiencing the combined effect of the two noise sources. Although there are not many developments in the area, due to the presence of the Mamathwane mine it is important to follow a precautionary approach in accordance with NEMA to ensure that cumulative impacts are addressed or avoided. The following positive and negative significant cumulative impacts could result due to the project interacting with other facilities in close proximity:

- Visual intrusion;
- Air quality;
- Noise and vibration;
- Changes in (loss of) agricultural land;
- Change in sense of place and character of the area;
- An increase in employment opportunities;
- An increase in the significance of ecological impacts; and
- An increase in the significance of geological and hydrological impacts.

The cumulative impacts of the project will be qualitatively assessed in the EIR.

7.1 INTRODUCTION

The Scoping Phase represents an initial step of the EIA process. A key outcome of scoping includes the creation of Plan of Study for a full EIA. The EIA will then be carried out prior to approval and Environmental Authorisation of the project. This section describes the Plan of Study for EIA as contemplated in regulation 28(1)(n) of R543 and sets out how the EIA will be conducted.

According to Government Notice R543 and Amendment R1159, Section 28(1)(n), a plan of study, must include the following:

- a. *'a description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialised processes, and the manner in which such tasks will be undertaken;*
- b. *an indication of the stages at which the competent authority will be consulted;*
- c. *a description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity; and*
- d. *particulars of the public participation process that will be conducted during the environmental impact assessment process'...*

This chapter serves as the Plan of Study and sets out the following:

- Overview of activities to complete the EIA process;
- Specialists studies;
- Interaction with authorities;
- Stakeholder engagement activities;
- Proposed methodology for assessing impacts; and
- Provisional schedule for the EIA process.

7.2 OVERVIEW OF EIA TASKS

Following on from the Scoping Phase, the remainder of the EIA process will include the specialist studies and an Integration and Impact Assessment Phase; in parallel with these activities the EIA team will continue to interact with the Authorities and implement the stakeholder engagement process.

7.2.1 Specialist Study Phase

It is anticipated that all the specialist studies will be completed by February 2013. However, this timeframe is subject to the approval of this Scoping Report and Plan of Study for EIA by DEA. See Section 7.2.2 below for further details.

7.2.2 *Integration and Impact Assessment Phase*

The aim of this phase is to synthesise the findings of the specialist studies and any other relevant available information into a Draft EIR (including a Draft EMP). Information will be presented in a clear and understandable report which is easy to comment on and will aid decision-making.

The Draft EIR and EMP will be published for a 40-day I&AP comment period. Registered I&AP's will be notified of the release of the report as will members of the public. Copies of the full report will be made available at key locations and on the project website.

Comments will be collated and the EIA project team will provide a response. Comments and responses will be documented in a Comments and Responses Report which will be appended to the Final EIR and submitted to DEA for decision-making.

Registered I&APs will be notified of the outcome of the EIA process once a decision (positive or negative) has been issued by DEA. The statutory appeal period will then follow.

The Integration and Impact Assessment Phase is anticipated to commence in March 2013. The commencement of this phase is, however, subject to the approval of the Final Scoping Report, including the Plan of Study for the EIA.

7.2.3 *Interaction with Authorities*

The DEA will be consulted once the Scoping Report is submitted for approval, to ensure that all the requirements for Scoping have been met.

Once the Integration and Impact Assessment Phase of the EIA is underway, the next key interaction with the DEA will be the submission of the Final EIR and EMP for decision. However, at the request of the DEA, the consultants would be willing to present the findings of the impact assessment and conduct a site visit, prior to decision-making.

The Northern Cape Department of Environment and Nature Conservation (DENC), the provincial commenting authority, will be engaged for their comments on the Draft EIR. In addition, a number of other commenting authorities will be approached for comment, including but not limited to the following:

- Ngwao Boswa Kapa Bokoni, the provincial heritage authority in the Northern Cape;
- SAHRA, the national heritage authority; and
- Department of Agriculture, Forestry and Fisheries given the potential impact on protected tree species.

7.2.4 *Stakeholder Engagement Activities*

Stakeholder engagement is an essential part of the EIA process. As such, a number of opportunities will exist for public involvement during the Integration and Impact Assessment Phase of the EIA. This will include the following:

- The Draft EIR will be released for a 40-day public and authority review period.
- A notification letter will be sent to all registered I&APs on the project database. This letter will invite I&APs to comment on the Draft EIR. Members of the public will also be notified via a newspaper advert.
- I&APs will be notified of the Environmental Authorisation and the statutory appeal period through correspondence and via a newspaper advert.

7.3 *SPECIALIST STUDIES*

As discussed in *Section 6*, a number of potentially significant issues were identified during scoping. The following specialist studies will, therefore, be commissioned to further investigate these issues and any data gaps:

- Archaeological, cultural heritage and palaeontology study;
- Air quality study;
- Noise and vibration study;
- Vegetation and terrestrial ecology study; and
- Socio-economic study.

During the specialist study phase, the appointed specialists will:

- Gather relevant data to provide a description of the affected environment;
- Assist the project team in assessing impacts (both negative impacts and benefits) according to a predefined assessment methodology (see *section 7.4*); and
- Suggest ways in which negative impacts could be mitigated and benefits enhanced.

Specialists who will be responsible for the specialist studies are identified in *Table 7.1*.

Table 7.1 Specialists

Specialist Study	Name and Organisation	Qualifications
Archaeological, Heritage and Palaeontology	Elize Becker	BSc Hons, Archaeology and Anthropology, University of Pretoria
	David Morris (peer review)	Head of Archaeology at the McGregor Museum in Kimberley and PhD candidate at the University of the Western Cape
	John Almond	PhD Earth Sciences (Palaeontology), University of Cambridge
Air Quality	Mark Zunckel	PhD Meteorology, University of Witwatersrand
Noise and Vibration	Demos Dracoulides (DDA Environmental Engineers)	MSc Engineering, (Energy Studies), University of Cape Town
Botany and Terrestrial Ecology	Simon Todd	MSc, Cum Laude Conservation Biology University of Cape Town
Socio-Economic	Janet Mkhabela	MA, Policy & Development Studies, University of KwaZulu-Natal

The terms of reference for each of the specialist studies are included in *Table 7.2* below. The results of the specialist studies will be integrated into the EIR during the Integration and Impact Assessment Phase.

Table 7.2 *Terms of Reference for Specialist Studies*

Specialist Study	Aim of the Study	Terms of Reference for specialist study
Archaeology, Cultural Heritage and Palaeontology	Determine the palaeontological, archaeological and cultural heritage impacts associated with the project.	<ul style="list-style-type: none"> • Collect secondary data on the occurrence and distribution of heritage, archaeological and palaeontology sites in the study area. • Survey the Area of Influence and identify and describe sites of interest. • Explain how the different elements of the project may affect any archaeological, heritage and palaeontology sites within the study area. • Evaluate the potential impacts (direct, indirect and cumulative) on sites of interest. • Describe mitigation/management measures that may be implemented to avoid or reduce any negative impacts on these sites and enhance benefits of the development. • Provide recommendations for any ongoing monitoring that may be necessary. • Liaison, submission and follow-up on all relevant permits, project applications and associated documents to the SAHRA and Ngwao Boswa Kapa Bokoni (Heritage Northern Cape), as required.
Air Quality	Determine the impacts associated with the project on air quality.	<ul style="list-style-type: none"> • Provide a description of the receiving environment with regard to ambient air quality, including meteorology, baseline air pollutant concentrations and sensitive receptors. • Describe the legal framework with respect to air quality. • Identify all project specific air pollutants from the Common User Facility by activity and source, including transport, stockpiles, materials handling and wind entrainment and develop an emission inventory. • Assess the impacts of the project (direct, indirect and cumulative) on ambient air quality by estimating the ambient concentrations of key pollutants described in the emission inventory. The assessment will consider the impacts associated operations using dispersion modelling. • The assessment of the significance of the impacts will be done by comparison of predicted ambient concentrations with South African Ambient Air Quality Standards.
Noise and Vibration	Determine the impacts result from noise and vibration associated with the project.	<ul style="list-style-type: none"> • Provide a description of the receiving environment with regard to ambient noise levels and vibration. • Describe the legal framework with respect to noise and vibration. • Identify project specific sources of noise and vibration. • Assess the impacts (direct, indirect and cumulative) of the project on the receiving environment in terms of noise and vibration. The assessment will consider impacts using noise modelling. • The assessment of the significance of the impacts will be done by comparison of predicted noise and vibration levels with the relevant South African regulations.

Specialist Study	Aim of the Study	Terms of Reference for specialist study
Vegetation and Terrestrial Ecology	Determine the impacts on vegetation and terrestrial ecology associated with the project.	<ul style="list-style-type: none"> • Undertake a desk and field-based investigation of the flora and fauna of the project site, integrating on site information with available data from atlases, research reports and other published sources. • Map the ecological sensitivity of the project site. • Assess the impacts (direct, indirect and cumulative) on flora and fauna that are associated with the project and describe relevant mitigation measures to reduce, avoid or minimise negative impacts to flora, fauna and habitats. • Provide recommendations for any ongoing monitoring that may be necessary.
Socio-economic	Assess the socio-economic impact associated with the project.	<ul style="list-style-type: none"> • Identify all relevant legislation, permits and standards that would apply to the project. • Provide a baseline description of the socio-economic environment that may be affected by the project activities. • The baseline description will be derived from secondary data and primary data collection. • Identify and assess socio-economic impacts (direct, indirect and cumulative) that may result from the construction and operation phases of the project. • Recommend mitigation measures that address the local context and needs.

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 the project must be considered in the context of the area and the affected communities.

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.

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.

7.4.1 *Assessing Impacts*

Table 7.3 *Defining Impact Characteristics*

Characteristic	Definition	Designation
Type	A descriptor indicating the relationship of the impact to the project (in terms of cause and effect).	Direct Indirect Induced
Extent	The "reach" of the impact (e.g., confined to a small area around the project footprint, projected for several kilometres, etc).	Local Regional International
Duration	The time period over which a resource / receptor is affected.	Temporary Short-term Long-term Permanent
Scale	The size of the impact (e.g., the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.)	(No fixed designations; intended to be a numerical value)
Frequency	Measure of the constancy or periodicity of the impact.	(No fixed designations; intended to be a numerical value)

A definition of each impact characteristic is provided to contextualise the requirements. The designations for each of the characteristics are defined below.

Table 7.4 *Designations for Characteristics*

Designations	Definition
Type	
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).
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).
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).
Extent	
Local	Defined on a resource/receptor-specific basis
Regional	
International	
Duration	
Temporary	Defined on a resource/receptor-specific basis
Short-term	
Long-term	
Permanent	

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 7.5 *Definitions of likelihood*

Likelihood	Definition
Unlikely	The event is unlikely but may occur at some time during normal operating conditions.
Possible	The event is likely to occur at some time during normal operating conditions.
Likely	The event will occur during normal operating conditions (i.e. it is essentially inevitable).

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.

Assessing Significance

Once the impact characteristics are understood, they are used (in a manner specific to the resource/receptor in question) 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 7.6 **Context for Defining Significance**

<ul style="list-style-type: none"> • An impact of <i>negligible</i> 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.
<ul style="list-style-type: none"> • An impact of <i>minor</i> 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 7.7 *Impact Significance Rating Matrix*

		Sensitivity/Vulnerability/Importance of Resource/Receptor		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

7.4.2 *Mitigation Potential and Residual Impacts*

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 7.8 *Mitigation Hierarchy*

Avoid at Source; Reduce at Source: 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).
Abate on Site: add something to the design to abate the impact (e.g., pollution control equipment, traffic controls, perimeter screening and landscaping).
Abate at Receptor: 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).
Repair or Remedy: 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.
Compensate in Kind; Compensate Through Other Means: 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).

7.5 PROJECT TIMING

Table 7.9 outlines the current estimated timeline of the EIA process going forward.

Table 7.9 *Planned Schedule for Future Activities*

Task	Date
Stakeholder Comment on Draft Scoping Report and Plan of Study for EIA	November 2012 – January 2013
Finalise Scoping Report and Plan of Study for EIA and submit to DEA	February - March 2013
Acceptance of Scoping Report received from DEA	April 2013
Specialist studies	March - April 2013
Prepare Draft EIR and EMP	April - May 2013
Stakeholder Comment on Draft EIR and EMP	May - June 2013
Finalise and submit EIR and EMP to DEA	July 2013

Upon completion of the 40 day comment period for I&APs (14 November 2012 to 04 January 2013) the Final Scoping Report will be submitted to DEA for approval. On acceptance of the Final Scoping Report by DEA, the EIA will proceed with the Integration and Impact Assessment Phase.

I&APs will be notified of the availability of the Draft EIR for comment.

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.

Alexander, G. & Marais, J. 2007. A Guide to the Reptiles of Southern Africa. Struik Nature, Cape Town.

Branch W.R. 1998. Field guide to snakes and other reptiles of Southern Africa. Struik, Cape Town.

Department of Economic Development, 2007.

Department of Human and Social Development, 2008.

Driver, A, Maze, K, Rouget, M, Lombard, A.T., Nel, J, Turpie, J.K., Cowling, R.M., Desmet, P, Goodman, P, Harris, J, Jonas, Z, Reyers, B, Sink, K & Strauss, T. 2005. National Spatial Biodiversity Assessment 2004: Priorities for Biodiversity Conservation in South Africa. *Strelitzia* 17. South African National Biodiversity Institute, Pretoria.

Du Preez, L. & Carruthers, V. 2009. A Complete Guide to the Frogs of Southern Africa. Struik Nature., Cape Town.

Environmental Resources Management. 2009. Final Environmental Impact Report EIA for the Proposed Upgrade of the Transnet Railway Line between Hotazel and the Port of Ngqura.

Gamagara Local Municipality. 2010. Gamagara Municipality Reviewed Spatial Development Framework.

Gamagara Local Municipality. 2011. Gamagara Local Municipality Fourth Reviewed Integrated Development Plan 2011/2012 – 2013/2014.

Health Systems Trust, www.hst.org.za

<http://www.exxaro.com/pdf/icpr/a/geology/iron.htm>. Accessed 9 October 2012.

http://www.saexplorer.co.za/south-africa/climate/hotazel_climate.asp. Accessed 8 October 2012.

http://www.saexplorer.co.za/south-africa/climate/hotazel_climate.asp. Accessed 8 October 2012.

IUCN 2012. IUCN Red List of Threatened Species. Version 2010.2.
<www.iucnredlist.org>. Downloaded on 19 January 2012.

Kgalagadi District Municipality, Integrated Development Plan, 2007/2008 to 2010/2011.

Marais, J. 2004. Complete Guide to the Snakes of Southern Africa. Struik Nature, Cape Town.

Mucina L. & Rutherford M.C. (eds) 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Nel, J., Maree, G., Roux, D., Moolman, J., Kleynhans, N., Silberbauer, M. & Driver, A. (2004) South African National Spatial Biodiversity Assessment 2004: Technical Report. Volume 2: River Component (ENV-S-I-2004-063) Council for Scientific and Industrial Research, Stellenbosch.

Nel, J.L., Murray, K.M., Maherry, A.M., Petersen, C.P., Roux, D.J., Driver, A., Hill, L., Van Deventer, H., Funke, N., Swartz, E.R., Smith-Adao, L.B., Mbona, N., Downsborough, L. and Nienaber, S. (2011). Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801.

Rouget, M., Reyers, B., Jonas, Z., Desmet, P., Driver, A., Maze, K., Egoh, B., Cowling, R.M., Mucina, L. & Rutherford, M.C. (2005) South African National Spatial Biodiversity Assessment 2004: Technical Report. Volume 1: Terrestrial Component South African National Biodiversity Institute, Pretoria.

Skinner, J.D. & Chimimba, C.T. 2005. The mammals of the Southern African Subregion. Cambridge University Press, Cambridge.

South African Institute of Race Relations, 2008.

<http://www.sairr.org.za/press-office/archive/three-provinces-drive-economic-growth-in-sa-24th-april-2008.html>

Statistics South Africa, Census 2001 Metadata

Transnet Sustainability Report, 2012.

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