water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

REPORT NO:
P RSA 000/A00/22318/1

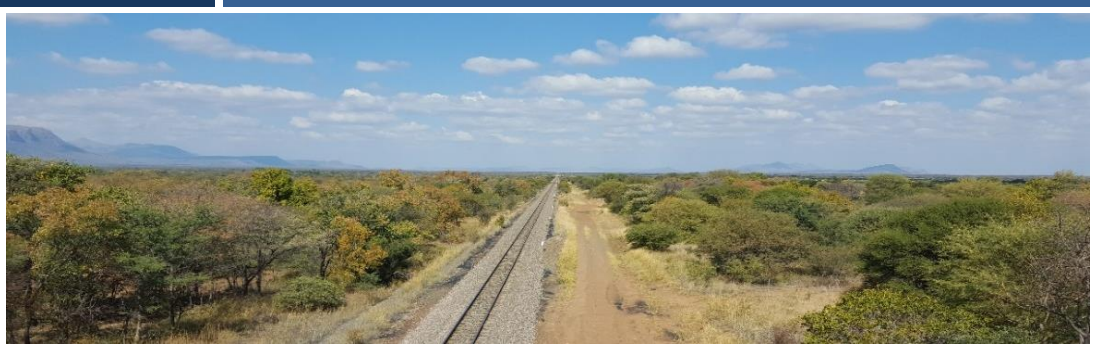
PROPOSED MOKOLO AND CROCODILE RIVER (WEST) WATER AUGMENTATION PROJECT (PHASE 2A) (MCWAP-2A):

BORROW PITS

SCOPING REPORT

DRAFT

March 2018



TITLE AND APPROVAL PAGE

Project Name:	***Proposed Mokolo and Crocodile River (West) Water Augmentation Project (Phase 2A) (MCWAP-2A): Borrow Pits***
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EXECUTIVE SUMMARY

PROJECT BACKGROUND AND MOTIVATION

Major developments are planned for the Waterberg coalfields that are located in the Lephalale area. As a direct result of the aforementioned developments, the demand for water in the Lephalale area is expected to significantly increase into the future. Due to the limited availability of water in the Lephalale area, the Department of Water and Sanitation conducted a feasibility study (completed in 2010) of the Mokolo Crocodile River (West) Water Augmentation Project to establish how the future water demands could be met.

The phases of the proposed project include the following:

- Mokolo Crocodile River (West) Water Augmentation Project Phase 1: Augment the supply from Mokolo Dam to supply in the growing water use requirement for the interim period until a transfer pipeline from the Crocodile River West can be implemented. The solution must over the long term optimally utilise the full yield from Mokolo Dam and will be operated as a system together with Mokolo Crocodile River (West) Water Augmentation Project Phase 2A. Phase 1 is operational since June 2015.
- **Mokolo Crocodile River (West) Water Augmentation Project Phase 2A**: Transfer water from the Crocodile River (West) to the Steenbokpan and Lephalale areas, including the implementation of the River Management System in the Crocodile River (West) and its tributaries. Phase 2A is the focus of this Environmental Impact Assessment.

The overall Mokolo Crocodile River (West) Water Augmentation Project Phase 2A consists of the following components:

- Water Transfer Infrastructure - transfer of water from Crocodile River (West) to Lephalale;
- **Borrow Pits** - sourcing of construction material; and
- River Management System - manage abstractions from, and the river flow in, the Crocodile River (West) between Hartbeespoort Dam and Vlieëpoort Weir, the Moretele River from Klipvoor Dam to the confluence with the Crocodile River (West), the stretch of Elands River from Vaalkop Dam to Crocodile confluence, and also the required flow past Vlieëpoort.

This Scoping Report specifically deals with the Borrow Pits component.

PROJECT LOCATION

The project is located within the western part of the Limpopo Province. The footprint of the borrow pits required for the MCWAP-2A project, are situated within Thabazimbi Local Municipality and Lephalale LM, which fall within the jurisdiction of the Waterberg District Municipality. The proposed borrow pits commence in the south-western point of the project area, from the Vlieëpoort Mountains at BP SS1 situated in the Crocodile River (West). From there, the borrow pits are

situated at approximately 5 km intervals in a predominantly northern direction along existing roads, farm boundaries and a railway line until ending near Steenbokpan at the last borrow pit, BP 51.

The 23 proposed borrow pits are situated along the MCWAP Phase 2 pipeline, as construction material will be sourced from the borrow areas and used for the construction of the pipeline infrastructure. The surrounding areas to the proposed borrow pits include Thabazimbi, which is situated approximately 10 km to the north-east of the first borrow pit, BP SS1. Lephalale is situated approximately 20 km to the east of the last borrow pit, BP 51.

PROJECT DESCRIPTION

The proposed borrow pits consist of the following:

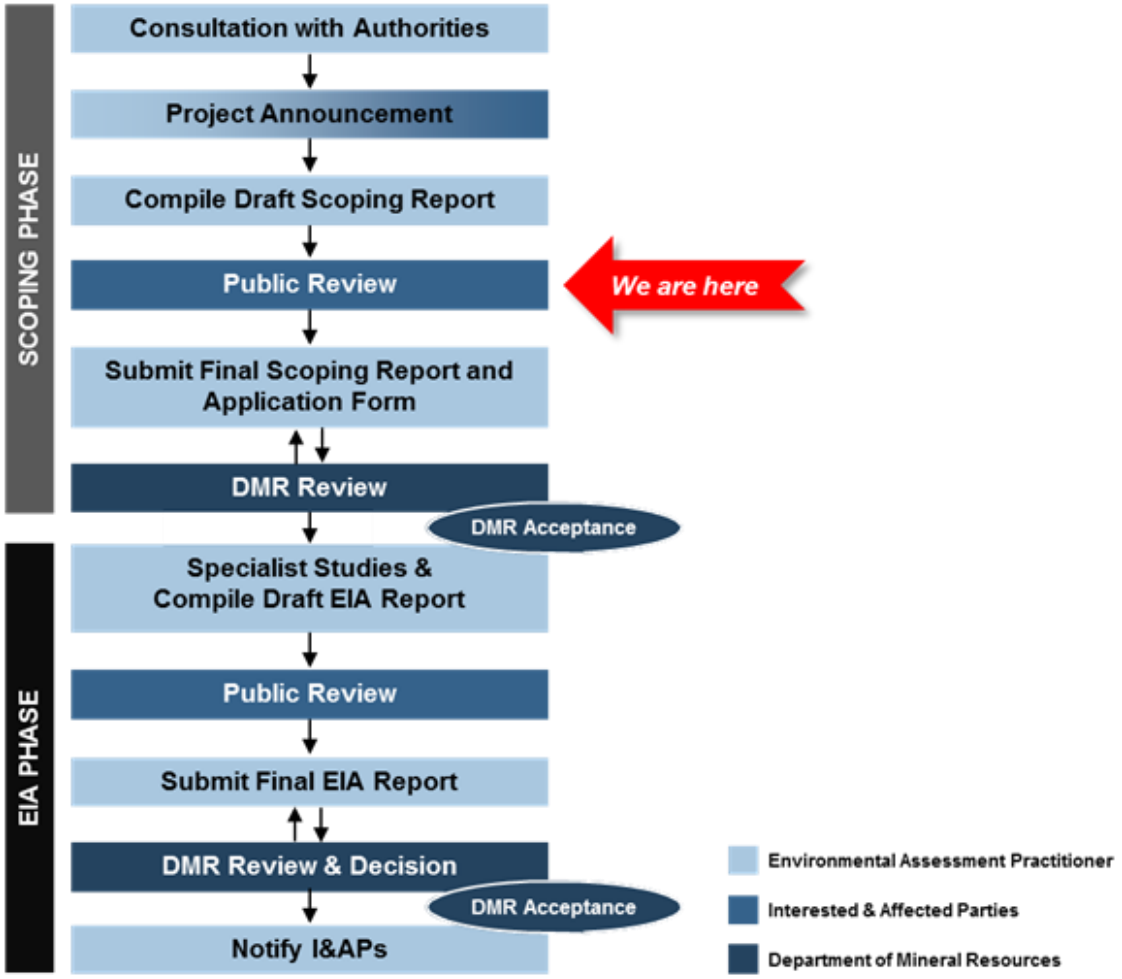
- Mining areas;
- Topsoil/overburden stockpiles;
- Access/haul roads;
- Mining equipment (screener, delivery vehicles, etc.); and
- Site offices/stores.

The proposed borrow pits are required for the sourcing of suitable material to be utilised during the construction phase of the MCWAP-2A project. 23 borrow pits will be required to source the necessary quantities of material and are located at approximately 5 km intervals along the central pipeline route, in order to limit haul distances and eliminate the need to source material from commercial sources, such as from the towns of Thabazimbi or Lephalale.

SCOPING AND EIA PROCESS

The process for seeking authorisation under the National Environmental Management Act (No. 107 of 1998) is undertaken in accordance with Government Notice No. R. 982 of 4 December 2014 (as amended), promulgated in terms of Chapter 5 of this Act. Based on the types of activities involved the requisite environmental assessment for the project is a Scoping and Environmental Impact Assessment process. An outline of the process is provided in the diagram to follow.

In terms of the National Environmental Management Act (No. 107 of 1998) the lead decision-making authority for the environmental assessment is the Department of Mineral Resources, as the project proponent (Department of Water and Sanitation) is a national department. Nemai Consulting was appointed by the Department of Water and Sanitation and TCTA (implementing agent) as the independent Environmental Assessment Practitioner to undertake the environmental assessment for the proposed Mokolo Crocodile River (West) Water Augmentation Project Phase 2A: Borrow Pits.



Outline of Scoping and Environmental Impact Assessment process

PROFILE OF THE RECEIVING ENVIRONMENT

The Scoping Report provides a general description of the status quo of the receiving environment in the project area. This serves to provide the context within which the Scoping exercise was conducted. It also allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed project. A brief overview is also provided of the manner in which the environmental features may be affected (positively or negatively) by the proposed project.

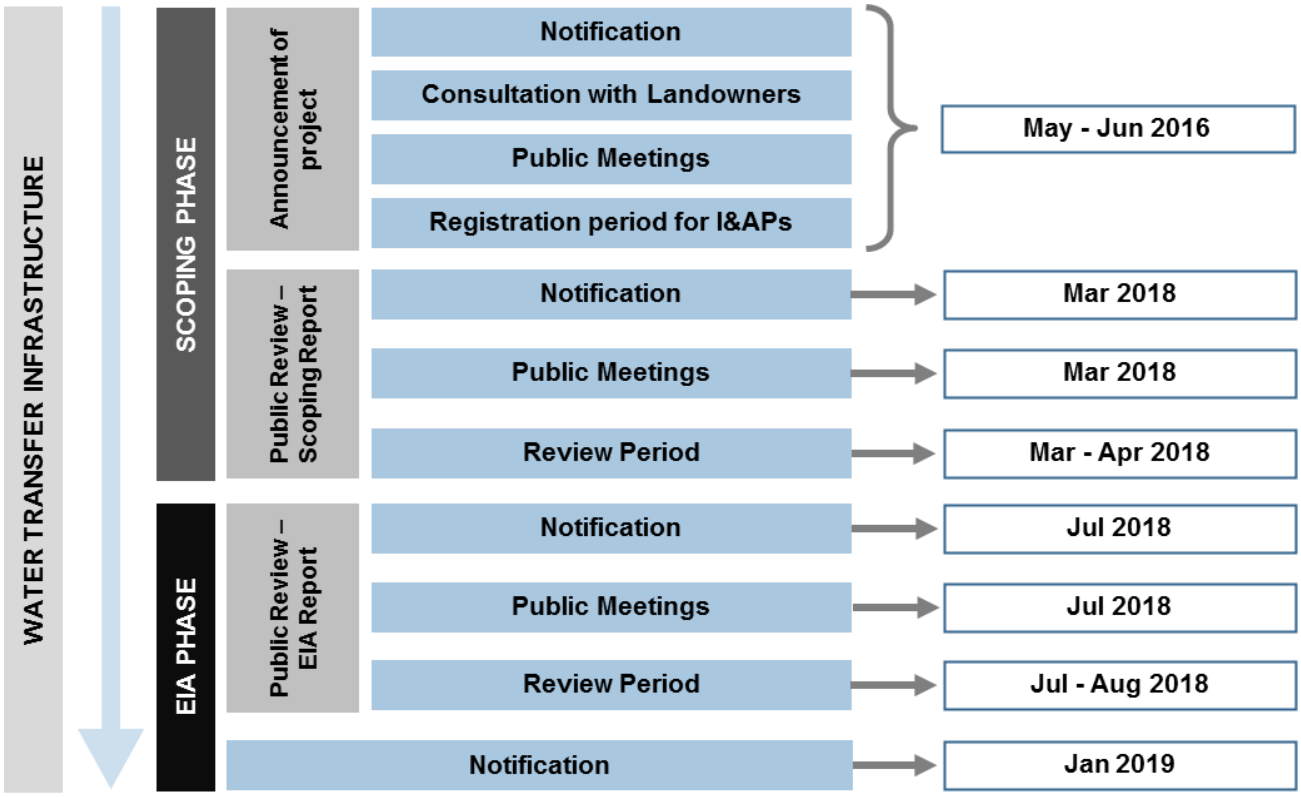
The receiving environment is assessed and discussed in terms of the following:

- Land Use and Land Cover
- Climate
- Geology
- Geohydrology
- Soils
- Topography
- Agriculture
- Air quality
- Noise
- Historical and Cultural Features
- Planning
- Existing Structures and Infrastructure

- Surface Water
- Terrestrial Ecology
- Socio-Economic Environment
- Transportation
- Aesthetic Qualities
- Tourism

PUBLIC PARTICIPATION

The diagram to follow outlines the public participation process for the Scoping (current) and Environmental Impact Assessment (pending) phases.



Outline of Public Participation Process

POTENTIALLY SIGNIFICANT ENVIRONMENTAL ISSUES

In accordance with the purpose of the Scoping exercise as part of the overall environmental assessment, the Scoping Report identifies potentially significant environmental issues for further consideration and prioritisation during the Environmental Impact Assessment phase. This allows for a more efficient and focused impact assessment going forward, where the analysis is largely limited to significant issues and reasonable alternatives.

Pertinent environmental issues, which will receive specific attention during the Environmental Impact Assessment phase through a detailed quantitative assessment and relevant specialist and technical studies (where deemed necessary), are discussed in the Scoping Report. A methodology to quantitatively assess the potential impacts is also provided, which will be employed during the Environmental Impact Assessment phase.

PLAN OF STUDY FOR EIA

The Scoping Report is concluded with a Plan of Study, which explains the approach to be adopted to conduct the Environmental Impact Assessment for the proposed project in accordance with the following pertinent tasks and considerations:

- Potentially significant environmental issues identified during the Scoping Phase to be investigated further;
- Feasible alternatives to be assessed during Environmental Impact Assessment Phase;
- Specialist studies to be undertaken, which include –
  - Aquatic Impact Assessment;
  - Terrestrial Ecological Impact Assessment;
  - Heritage Impact Assessment;
  - Agricultural Impact Assessment;
  - Social Impact Assessment;
  - Socio-Economic Impact Assessment;
  - Wildlife Impact Assessment; and
  - Consideration of specialist studies conducted for previous Environmental Impact Assessment;
- Public Participation process to be followed;
- Contents of the Environmental Impact Assessment Report;
- Consultation with authorities; and
- EIA timeframes.

CONCLUSION

Key outcomes of the Scoping phase are as follows:

- Stakeholders were effectively identified and were afforded adequate opportunity to participate in the scoping process;
- Potentially significant issues pertaining specifically to the pre-mining, mining and post-mining phases of the project were identified;
- Sensitive elements of the environment that may be affected by the project were identified;
- A Plan of Study was developed to explain the approach to executing the Environmental Impact Assessment phase, which also includes the Terms of Reference for the identified specialist studies; and
- The scoping exercise set the priorities for the ensuing Environmental Impact Assessment phase.

BESTUURSOPSOMMING

PROJEK AGTERGROND EN MOTIVERING

Groot ontwikkelings word beplan vir die Waterberg Steenkool velde in die Lephalale area. As 'n direkte gevolg van die voorgenoemde ontwikkelings sal die water aanvraag in die Lephalale area noemenswaardig toeneem in die toekoms. Weens die beperkte beskikbaarheid van water in die Lephalale area het die Departement van Water en Sanitasie die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Uitvoerbaarheid Studie van stapel gestuur om opsies vir die voorsiening in die water behoeftes te ondersoek.

Die fases vir die voorgestelde infrastruktuur behels die volgende:

- Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 1: Aanvulling vanaf Mokolodam om aan die groeiende water behoeftes te voldoen vir die interim periode totdat die oordragpyplyne vanaf die Krokodilrivier (Wes) geïmplementeer kan word. Die oplossing moet die volle lewering vanaf Mokolodam oor die langtermyn optimaal benut en sal as 'n stelsel bedryf word tesame met die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A. Fase 1 word al bedryf vanaf Junie 2015.
- **Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A**: Oordrag van water vanaf Krokodilrivier (Wes) tot by die Steenbokpan en Lephalale gebiede, insluitend die implementering van die rivierbedryfstelsel in die Krokodilrivier (Wes) en sy sytakke. Fase 2A is die fokus van die Omgewingsimpakbepaling.

Die algehele Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A bestaan uit die volgende komponente:

- Water oordrag infrastruktuur (hoofonderwerp van hierdie Omgewingsimpakbepaling) - oordrag van water van die Krokodilrivier (Wes) na Lephalale;
- **Leengroewe** – verkryging van konstruksiemateriaal; en
- Rivierbedryfstelsel – bestuur ontrekkings vanaf, asook die riviervloei in, die Krokodilrivier (Wes) tussen Hartbeespoortdam en die stuwal by Vlieëpoort, die Moretelerivier vanaf Klipvoordam tot by die samevloei met die Krokodilrivier (Wes), die Elandsrivier vanaf Vaalkopdam tot by die samevloei met die Krokodilrivier (Wes), asook die vereiste vloei verby Vlieëpoort.

Die Omvangsbepalingsverslag handel spesifiek oor die voorgestelde Leengroewe.

PROJEK LIGGING

Die projekgebied is geleë in die westelike gedeelte van die Limpopo-provinsie. Die voorgestelde leengroewe oorkruis die Thabazimbi en Lephalale Plaaslike Munisipaliteite, wat beide in die jurisdiksie van die Waterbergdistriksmunisipaliteit val. Die voorgestelde leengroewe begin in die suid-westelike gedeelte van die projek area, in die Vlieëpoortberge by BP SS1 in die Krokodilrivier (Wes). Van daar af volg die leengroewe in 'n noordelike rigting, teen ongeveer 5km tussenposes

langsaan bestaande paaie, plaasgrense en 'n spoorlyn en eindig naby Steenbokpan by die laaste leengroef, BP 51.

Die 23 voorgestelde leengroewe is langsaan die MKWAP Fase 2 pyplyn geleë, aangesien konstruksiemateriaal gebruik sal word vir die konstruksie van die pyplyn infrastruktuur. Thabazimbi is ongeveer 10 km noord-oos van die eerste voorgestelde leengroef, BP SS1. Lephalale is ongeveer 30 km oos van die laaste voorgestelde leengroef, BP 51.

PROJEKBESKRYWING

Die voorgestelde leengroewe behels die volgende:

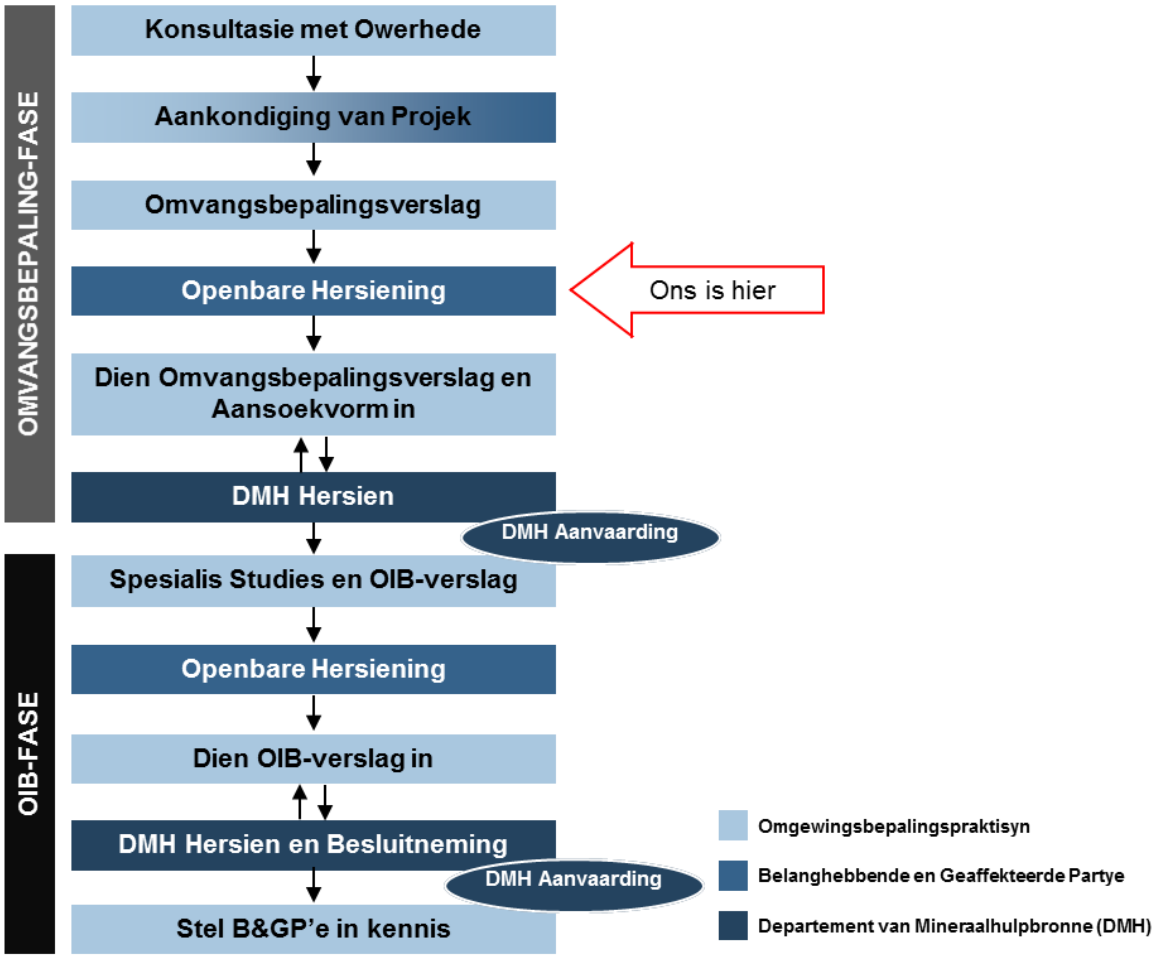
- Mynbou area;
- Bogrond/deklaag hope;
- Paaie vir toegang en vervoer van materiaal;
- Mynbou-toerusting; en
- Terreinkantore/werkswinkels.

Die voorgestelde leengroewe word benodig as die bron van geskikte materiaal wat tydens die konstruksiefase van die MCWAP-2A-projek gebruik sal word. 23 leengroewe sal benodig word om die nodige hoeveelheid materiaal te kry, en is ongeveer 5 km langsaan die sentrale pyplynroete geleë om die afstand te beperk en die behoefte aan materiaal uit kommersiële bronne te elimineer, soos van die dorpe Thabazimbi of Lephalale.

OMVANGSBEPALING EN OMGEWINGSIMPAKBEPALING-PROSES

Die aansoekproses vir magtiging van die Wet op Nasionale Omgewingsbestuur (Wet Nr. 107 van 1998) word onderneem ingevolge die Omgewingsimpakbepalingsregulasies (Staatskennisgewing Nr. R. 982 van 4 Desember 2014, soos gewysig). Op grond van die gelyste aktiwiteite wat deur die leengrowe genoodsaak word, sal 'n Omvangsbepaling en Omgewingsimpakbepaling-proses uitgevoer word. Verwys na die diagram vir 'n oorsig van die proses.

Ingevolge die Wet op Nasionale Omgewingsbestuur (Wet Nr. 107 van 1998) is die besluitnemende owerheid die Departement van Mineraalhulpbronne, aangesien die projekvoorsteller (Departement van Water en Sanitasie) 'n Nasionale Departement is. Nemai Consulting is aangestel deur DWS en TCTA (Implementeringsagent) as die onafhanklike Omgewingsimpakbepalingspraktisyn om die Omgewingsimpakbepaling-proses uit te voer vir die Mokolo en Krokodilrivier (Wes) Wateraanvullingsprojek Fase 2A: Leengroewe projek.



Oorsig van Omvangsbepaling en Omgewingsimpakbepaling-proses

OORSIG VAN GEAFFEKTEERDE OMGEWING

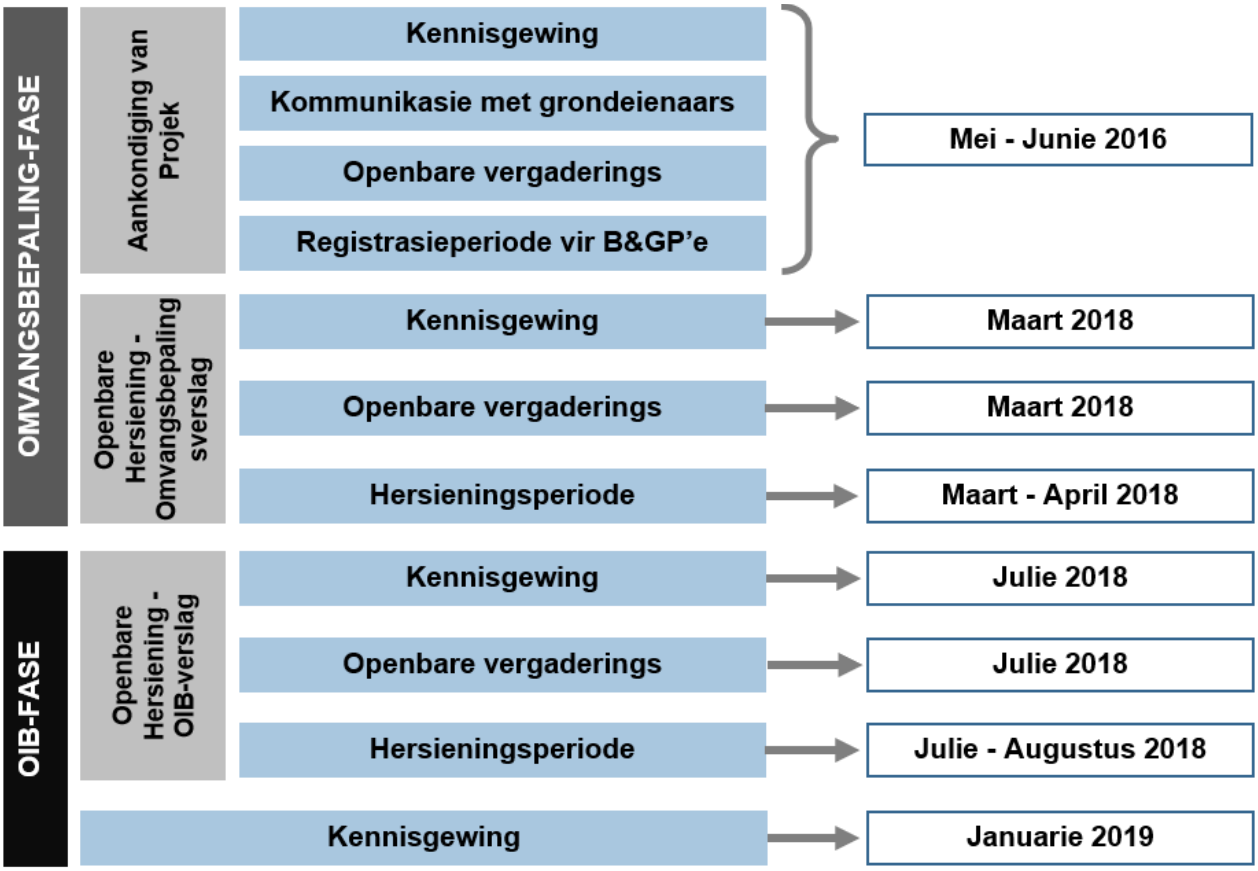
Die Omvangsbepalingsverslag gee 'n algemene beskrywing van die stand van die omgewing in die projek area, wat vir die inagneming van sensitiewe omgewingskenmerke en moontlike geaffekteerde partye van die voorgestelde projek voorsiening maak.

Die moontlike gevolge van die projek op die volgende kenmerke word bespreek op 'n kwalitatiewe vlak:

- Grondgebruik;
- Klimaat;
- Geologie;
- Geohidrologie;
- Grond;
- Topografie;
- Oppervlak water;
- Terrestriële Ekologie;
- Sosio-Ekonomiese Omgewing;
- Landbou;
- Lug Kwaliteit;
- Geraas;
- Historiese en Kulturele Kenmerke;
- Beplanning;
- Bestaande strukture en infrastruktuur;
- Vervoer;
- Visuele Kwaliteit; en
- Toerisme.

OPENBARE DEELNAME

Die gepaargaande diagram voorsien 'n oorsig van die openbare deelname proses vir die Omvangsbepaling en Omgewingsimpakbepaling fases.



Openbare Deelname Proses

MOONTLIKE BEDUIDENDE OMGEWINGSIMPAKTE

Volgens die doel van die Omvangsbepaling word die moontlike betekenisvolle omgewingsimpakte geïdentifiseer vir verdere ondersoek tydens die Omgewingsimpakbepaling-fase. Dit bevorder 'n meer effektiewe impak-assessering wat fokus op beduidende kwessies en uitvoerbare alternatiewe.

Daar sal aandag geskenk sal word aan die pertinente omgewingskwessies tydens die Omgewingsimpakbepaling-fase deur middel van 'n gedetailleerde kwantitatiewe assessering en relevante spesialis en tegniese studies (waar nodig geag).

PLAN VAN STUDIE VIR OMGEWINGSIMPAKBEPALING

Die Omvangsbepalingsverslag sluit in 'n Plan van Studie wat die benadering tot die Omgewingsimpakbepaling verduidelik in terme van die volgende:

- Moontlike betekenisvolle omgewingsimpakte geïdentifiseer tydens die Omvangsbepaling wat verder ondersoek gaan word;
- Uitvoerbare alternatiewe wat geassesseer sal word tydens die Omgewingsimpakbepaling-fase;
- Spesialis-studies wat uitgevoer gaan word -
  - Terrestriële Ekologiese Impakassessering;
  - Akwatiese Impakassessering;
  - Erfenis Impakassessering;
  - Landbou Impakassessering;
  - Sosiale Impakassessering;
  - Sosio-ekonomiese Impakassessering;
  - Wild Impakassessering;
  - Inagneming van spesialis-studies wat uitgevoer was as deel van die vorige Omgewingsimpakbepaling;
- Die Openbare Deelname proses wat gevolg gaan word;
- Inhoud van die Omgewingsimpakbepalingsverslag;
- Konsultasie met owerhede; en
- Tydsraamwerk van die Omgewingsimpakbepaling.

GEVOLGTREKKING

Sleuteluitkomste van die Omvangsbepalings-fase sluit in die volgende:

- Belanghebbende en Geaffekteerde Partye was geïdentifiseer en die geleentheid gegun om deel te neem aan die Omvangsbepaling;
- Moontlike betekenisvolle kwessies rakende die projek-lewensiklus was geïdentifiseer;
- Sensitiewe omgewingskenmerke wat moontlike deur die projek geaffekteer kan word was geïdentifiseer;
- 'n Plan van Studie was saamgestel wat die benadering tot die Omgewingsimpakbepaling-fase voorsien, insluitend die terme van verwysing vir die geïdentifiseerde spesialis-studies; en
- Die Omvangsbepaling stel die prioriteite vir die daaropvolgende Omgewingsimpakbepaling-fase.

AMENDMENTS PAGE

Date	Nature of Amendment	Amendment No.	Signature
March 2018	Draft for Review by Authorities and the Public	0	

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LIST OF FIGURES

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LIST OF ACRONYMS & ABBREVIATIONS

BID	Background Information Document
BP	Borrow Pit
BPR	Break Pressure Reservoir
DEA	Department of Environmental Affairs
DME	Department of Mineral and Energy
DMR	Department of Mineral Resources
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EWR	Ecological Water Requirements
FGD	Flue-Gas Desulphurisation
GIS	Geographical Information System
GN	Government Notice
IAPs	Interested and Affected Parties
IDP	Integrated Development Plan
IPP	Independent Power Producer

IRP	Integrated Resource Plan
LDEDET	Limpopo Department of Economic Development, Environment and Tourism
MAR	Mean Annual Runoff
MCWAP	Mokolo Crocodile (West) Water Augmentation Project
MCWAP-2A	Mokolo Crocodile (West) Water Augmentation Project Phase 2A
NEMA	National Environmental Management Act (No. 107 of 1998)
OHS	Occupational Health and Safety
PGDS	Provincial Growth and Development Strategy
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SIPs	Strategic Integrated Projects
TAU SA	Transvaal Agricultural Union South Africa
TCTA	Trans-Caledon Tunnel Authority
ToR	Terms of Reference
WMA	Water Management Area
WRC	Water Research Commission
WWTW	Wastewater Treatment Works

UNITS OF MEASUREMENT

°C	Degrees Celsius
ha	Hectare
km	Kilometre
km^2	Square kilometre
kV	Kilovolt
l	Litres
l/s	Litres per second
m	Metre
m^3	Cubic metre
m^3/a	Cubic metre per annum
mm	Millimetre
Mm^3	Million m^3
Mm^3/a	Million m^3/a
MVA	Megavolt-ampere
%	Percentage

1 PURPOSE OF THIS DOCUMENT

Water demand will increase in the Lephalale area due to various planned and anticipated developments associated with the Waterberg coalfields. The Department of Water and Sanitation (DWS) thus commissioned the Proposed Mokolo and Crocodile River (West) Water Augmentation Project (MCWAP) Feasibility Study to investigate the options for meeting the aforementioned water requirements.

Nemai Consulting was appointed by DWS and the Trans-Caledon Tunnel Authority (TCTA) (Implementing Agent) to conduct the Environmental Impact Assessment (EIA) for MCWAP Phase 2A (MCWAP-2A) in terms of Government Notice (GN) No. R. 982 of 04 December 2014 (as amended). This document serves as the **Draft Scoping Report** for the proposed **Borrow Pits**, required for the sourcing of material to be used for the construction of the **MCWAP-2A** project. The proposed borrow pits consist of the following:

- Mining areas;
- Topsoil/overburden stockpiles;
- Access/haul roads;
- Mining equipment (screener, delivery vehicles, etc.); and
- Site offices/stores.

The purpose of Scoping, which constitutes the first phase of the overall EIA Process, includes the following (amongst others):

- Identify the legal framework in terms of the proposed project;
- Identify and engage with Interested and Affected Parties (IAPs) and allow for adequate participation in the process;
- Assess the receiving environment in terms of current state and potential positive or negative impacts;
- Consider alternatives for achieving the project's objectives;
- Identify significant issues to be investigated further during the execution of the EIA phase;
- Determine the scope of the ensuing EIA phase, in terms of specialist studies, public participation, assessment of impacts and appraisal of alternatives; and
- Allow for informed decision-making with regard to the EIA Process.

2 DOCUMENT ROADMAP

As a minimum, the Scoping Report aims to satisfy the requirements stipulated in Appendix 2 of GN No. R 982 of the 2014 EIA Regulations, as amended. **Table 1** presents the document's composition in terms of the aforementioned regulatory requirements.

Table 1: Scoping Report Roadmap

Chapter	Title	Correlation with GN No. R 982, Appendix 2	Overview
1	Purpose of this Document	–	–
2	Document Roadmap	–	–
3	Project Background and Motivation	2(1)(f)	A motivation for the need and desirability for the proposed development.
4	Project Location	2(1)(b) & 2(1)(c)	A description of the location of the activity.
5	Legislation and Guidelines Considered	2(1)(e)	A description of the policy and legislative context within which the development is proposed.
6	Scoping and EIA Process	2(1)(a)	Details of Environmental Assessment Practitioner (EAP) who prepared the report and the expertise of the EAP.
7	Assumptions & Limitations	–	–
8	Need & Desirability	2(1)(f)	A motivation for the need and desirability for the proposed development.
9	Project Description	2(1)(c) & 2(1)(d)	A description of the scope of the proposed activity.
10	Alternatives	2(1)(g)(i)	Details of all the alternatives considered.
		2(1)(g)(vii)	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected.
11	Profile of the Receiving Environment	2(1)(g)(iv)	Environmental attributes associated with the alternatives.
		2(1)(g)(vii)	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected.
12	Public Participation	2(1)(g)(ii)	Details of the public participation process.
		2(1)(g)(iii)	A summary of the issues raised by IAPs.
13	Potentially Significant Environmental Issues	2(1)(g)(v)	Impacts and risks identified for each alternative.
		2(1)(g)(vii)	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected.
		2(1)(g)(vi)	The methodology used in identifying and ranking the potential environmental impacts and risks associated with the alternatives.
14	Plan of Study for EIA	2(1)(h)	A plan of study for undertaking the environmental impact assessment process.

Chapter	Title	Correlation with GN No. R 982, Appendix 2	Overview
15	Conclusion	-	-
16	References	-	-
Appendix M		2(1)(i) and 2(1)(j)	An undertaking under oath or affirmation by the EAP.
N/A		2(1)(k)	Where applicable, any specific information required by the competent authority.
N/A		2(1)(l)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.

Note that the following sections of Appendix 2 of GN No. R 982, will be investigated further and reported on in the Environmental Impact Report (EIR), following the execution of the relevant specialist studies and targeted public participation:

- SECTION 2(1)(G)(V) - *The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts-*
  (a) can be reversed;
  (b) may cause irreplaceable loss of resources; and
  (c) can be avoided, managed or mitigated.

  The impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts -
  (a) can be reversed;
  (b) may cause irreplaceable loss of resources; and
  (c) can be avoided, managed or mitigated.
- SECTION 2(1)(G)(VII) - *Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.*
- SECTION 2(1)(G)(VIII) - *The possible mitigation measures that could be applied and level of residual risk.*
- SECTION 2(1)(G)(IX) - *The outcome of the site selection matrix.*
- SECTION 2(1)(G)(XI) - *A concluding statement indicating the preferred alternatives, including preferred location of the activity.*

3 PROJECT BACKGROUND AND MOTIVATION

3.1 National Development Context

The South African Government adopted a National Infrastructure Plan in 2012 that intends to transform our economic landscape while simultaneously creating significant numbers of new jobs, and to strengthen the delivery of basic services. The plan also supports the integration of African economies. The National Infrastructure Plan consists of 18 Strategic Integrated Projects (SIPs) spread across the country.

SIP 1 aims to unlock SA's northern mineral belt in one of the poorest provinces (Limpopo) through key infrastructure provision in the Waterberg and Steelpoort districts, initiating new energy and industrial development, shifting coal from road to rail in Mpumalanga and increasing rail capacity to Richards Bay whilst supporting regional integration. 15% of the country's total power generation is situated in Waterberg. The assurance of water supply to the current power stations is not acceptable and places the country's power supply at risk. The components associated with SIP 1 thus include the proposed MCWAP-2. The former Minister of Water Affairs approved the implementation of MCWAP-1 (MCWAP Phase 1), MCWAP-2A (MCWAP Phase 2A) and MCWAP-3 (MCWAP Phase 3) as government waterworks in terms of Section 109 of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) on 14 May 2010, subject to the environmental authorisation of the project by the Department of Environmental Affairs (DEA). The MCWAP-3 (River Management System) was since merged with MCWAP-2A.

3.2 Meeting the Increased Water Demands

Due to the limited availability of water in the Lephalale area, the DWS conducted a feasibility study (completed in 2010) of the MCWAP to establish how the future water demands could be met. The phases of the proposed project include (shown in **Figure 1**):

- **MCWAP Phase 1 (MCWAP-1):** Augment the supply from Mokolo Dam to supply in the growing water use requirement for the interim period until a transfer pipeline from the Crocodile River West can be implemented. The solution must over the long term optimally utilise the full yield from Mokolo Dam and will be operated as a system together with MCWAP-2A when the latter is completed.

  Phase 1 is operational since June 2015, however the pipeline section between Lephalale to Steenbokpan was not constructed as part of MCWAP-1 as originally envisaged, and will now form part of the construction contract/s for MCWAP-2A. However, the environmental authorisation for this section was received as part of the EIA for MCWAP-1; and

- **MCWAP-2A:** Transfer water from the Crocodile River (West) to the Steenbokpan and Lephalale areas, including the implementation of the River Management System in the Crocodile River (West) and its tributaries. Phase 2A is the focus of this EIA.

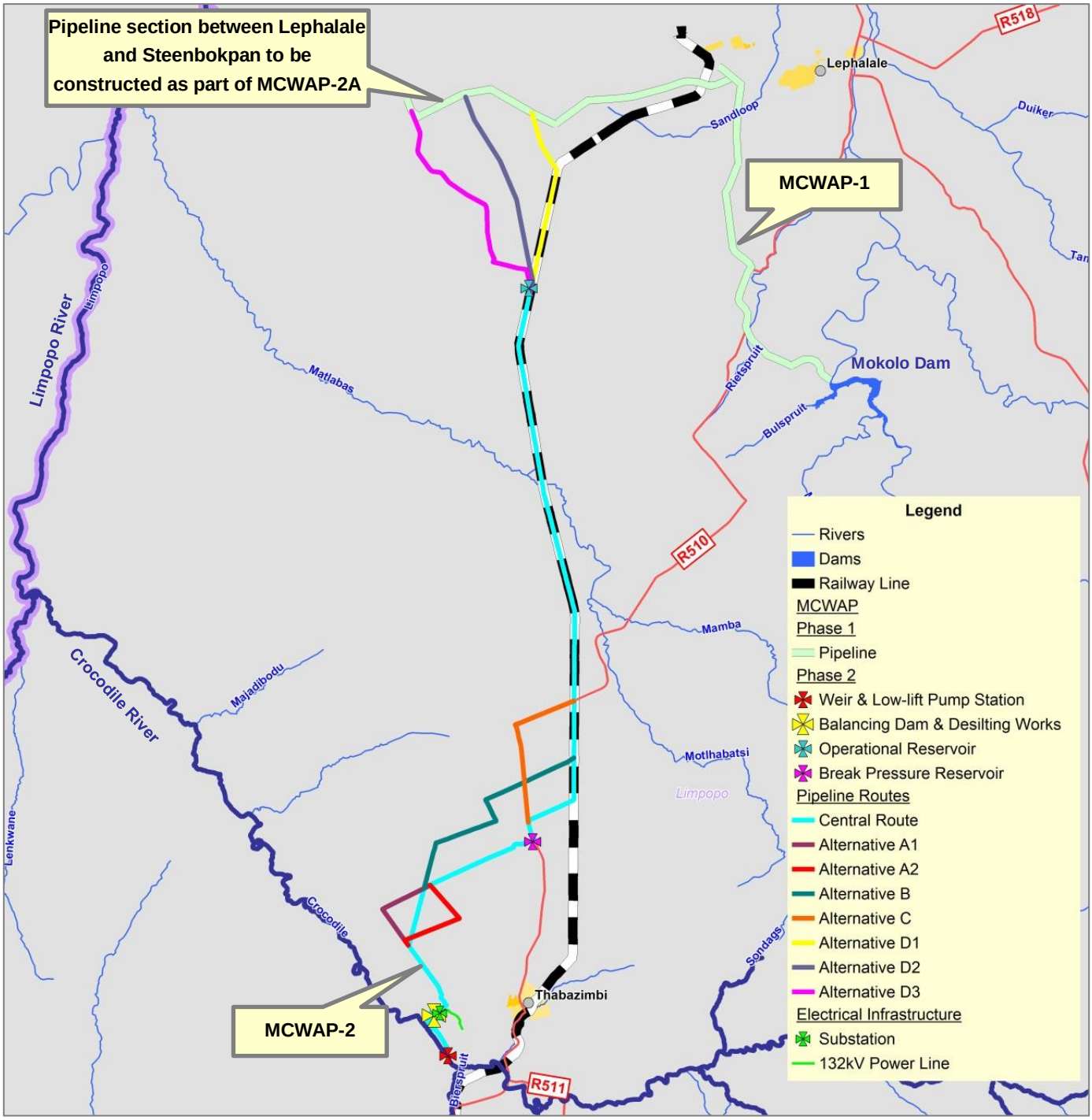


Figure 1: MCWAP Phases 1 and 2

In essence, water from the Mokolo Dam will primarily be provided to existing consumers such as Matimba Power Station, Municipal users in the vicinity of Lephalale (Ellisras), as well as the new Medupi Power Station (partly), while the Crocodile River (West) Transfer Scheme will provide water to the new consumers such as Eskom. It was originally intended that construction of the two MCWAP phases should start concurrently, but with the smaller Phase 1 Scheme being able to deliver water much sooner than Phase 2. However, due to significant changes occurring in the national energy planning environment and their related water demand figures compared to the

demand scenarios considered during the 2010 Feasibility Study, the implementation of MCWAP-2A was placed on hold. This decision was informed by two main aspects:

- Firstly by the Department of Energy's (DoE) Integrated Resource Plan (IRP 2010) published in March 2011 and updated in November 2013, which redefined the country's future electric power supply energy mix. The latest IRP was updated in November 2016 and final approval is still awaited at the time of this report; and
- Secondly by Sasol's decision to cancel their plans for developing a coal to liquid fuel facility in the project area called Project Mafutha.

In order to address the impact of the reduced water demand from the revised energy planning process, DWS initiated a Post Feasibility Bridging Study to review and update the Feasibility Study findings for MCWAP-2A. The important development principles that have been formulated in the Feasibility Study reports remain relevant. These documents still inform the basic configuration, design, construction and operation of the MCWAP project. The bridging study aimed to redefine the capacity required for MCWAP-2A.

The MCWAP will also aim to satisfy most of the water requirements of the new anticipated developments from the increasing source of return flows from the Gauteng area. Operating rules for both the Mokolo and the Crocodile River (West) systems need to be developed by DWS in a separate process and must take cognisance of this and ensure that existing lawful use is respected and protected. Similarly, it is a legal requirement that provision is made for meeting the requirements of the Reserve, as catered for in the National Water Act (Act No. 36 of 1998).

3.3 MCWAP-2A Scope

The overall MCWAP-2A consists of the following components:

- Water Transfer Infrastructure - transfer of water from the Crocodile River to Lephalale;
- **Borrow Pits** - sourcing of construction material (refer to **Sections 9.2 – 9.5**); and
- River Management System - manage abstractions from, and the river flow in, the Crocodile River (West) between Hartbeespoort Dam and Vlieëpoort Weir, the Moretele River from Klipvoor Dam to the confluence with the Crocodile River (West), the stretch of Elands River from Vaalkop Dam to Crocodile confluence, and also the required flow past Vlieëpoort.

This Scoping Report deals specifically with the borrow pits, which are required for the sourcing of suitable material to be utilised during the construction phase of the MCWAP-2A. 23 borrow pits will be required to source the necessary quantities of material and they are located at approximately 5 km intervals along the central pipeline route in order to limit haul distances (see **Figure 2**). The close proximity of the borrow areas to the pipeline is also to eliminate the need to source material from commercial sources, such as from the towns of Thabazimbi or Lephalale.

Note that if the EIA for the Water Transfer Infrastructure identifies pipeline option D2 or D3 to be preferred then new borrow pits will need to be identified for the preferred alignment.

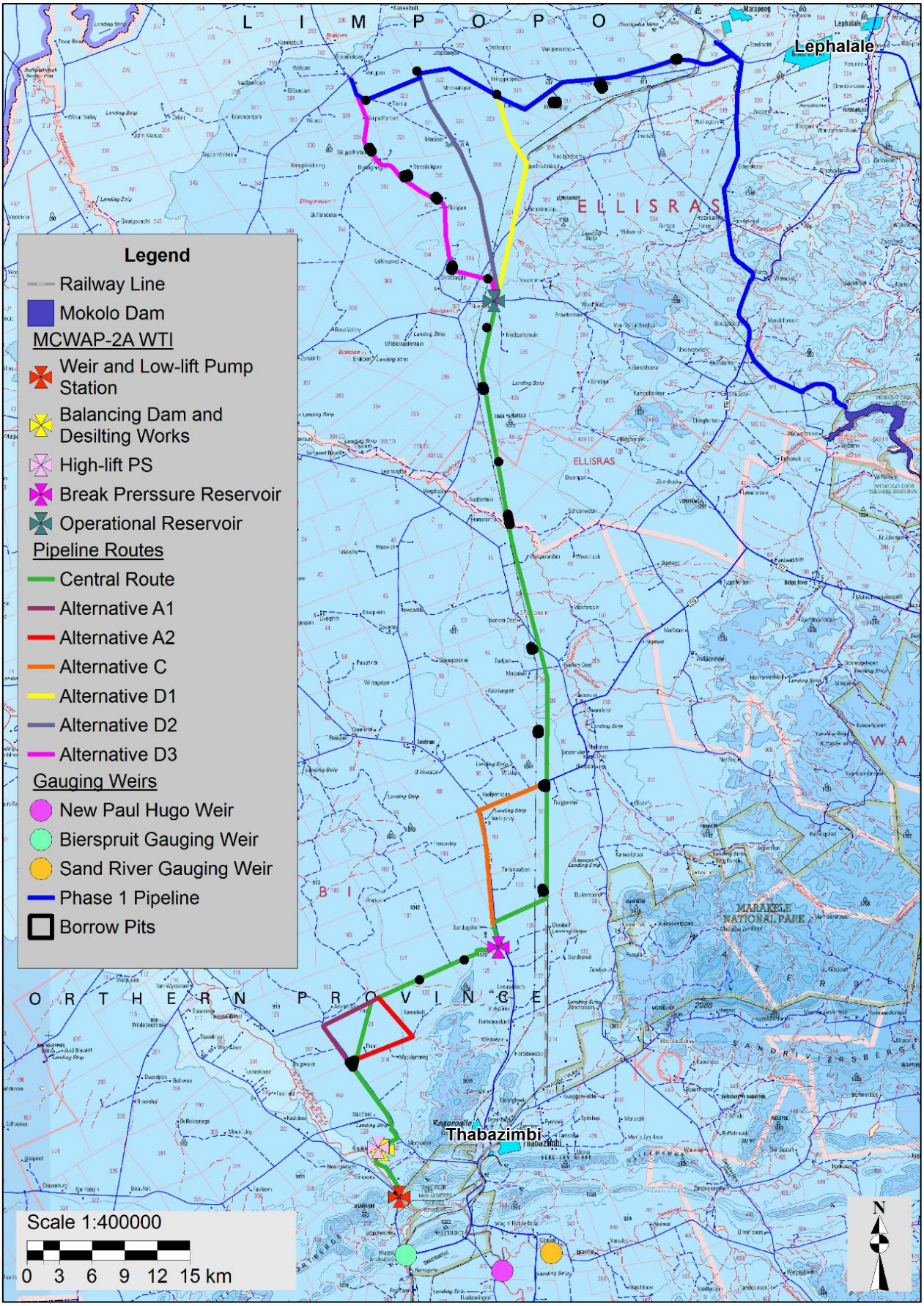


Figure 2: Borrow pits required for MCWAP Phase 1 and 2

3.4 DWS Project Life-cycle

The generic DWS project life cycle consists of nine stages, as shown in **Figure 3**.

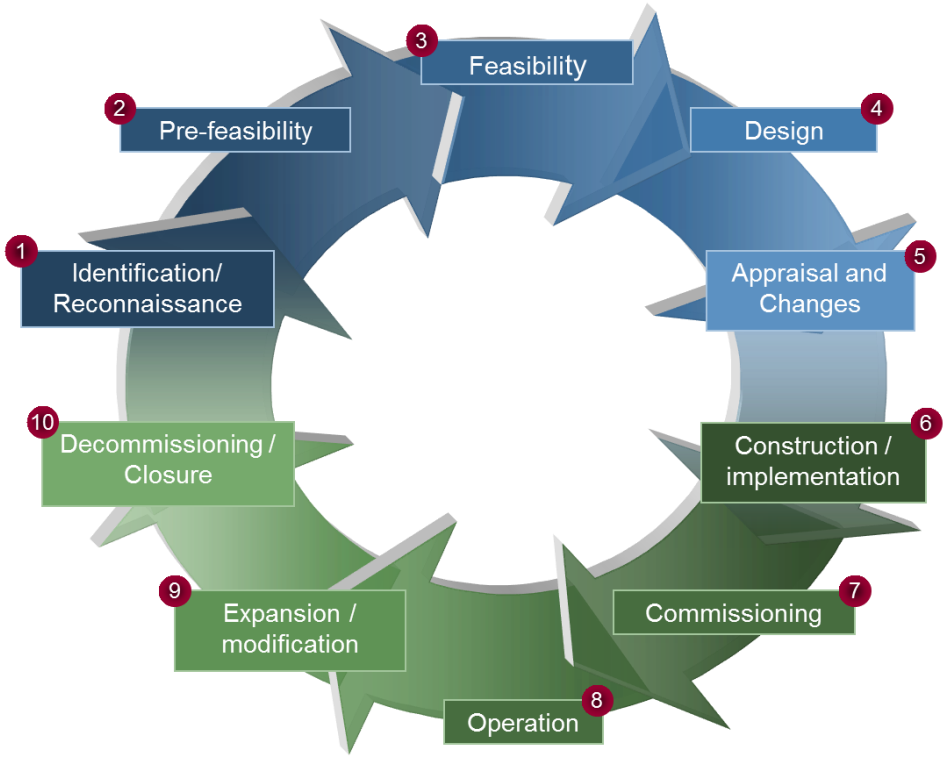


Figure 3: Generic DWS Project Life Cycle for Water Resource Management

As mentioned, DWS initiated a feasibility study in 2008 entitled “Mokolo and Crocodile River (West) Water Augmentation Project (MCWAP) Feasibility Study”. The feasibility study was commissioned to augment the water supply to the Lephalale area. The reports were completed in September 2010. Thereafter, DWS initiated a Post Feasibility Bridging Study to review and update the Feasibility Study findings for MCWAP-2A.

The following technical reports are of particular relevance to the information contained within the Scoping Report:

- P RSA A000/00/8109 - Feasibility Stage: Main Report: MCWAP Feasibility Study Technical Module Summary;
- P RSA A000/00/8409 - Feasibility Stage: Supporting Report 8A: Geotechnical Investigation Phase 1;
- P RSA A000/00/8709 - Feasibility Stage: Supporting Report 8B: Geotechnical Investigation Phase 2; and
- Geotechnical Investigations (Mokolo Crocodile Consultants, 2012).

The EIA, which takes place during the feasibility stage of the project life-cycle, makes a final recommendation on the preferred options which is submitted with motivation to management for approval and funding.

4 PROJECT LOCATION

4.1 Geographical Context

The project is located within the western part of the Limpopo Province. The footprint of the borrow pits required for the MCWAP-2A project, are situated within Thabazimbi Local Municipality (LM) and Lephalale LM, which fall within the jurisdiction of the Waterberg District Municipality (DM) (**Figure 4**). A locality map is provided in **Figure 5** and a 1:50 000 topographical map is shown in **Figure 6**. All locality maps for the proposed borrow pits are contained in **Appendix A**.

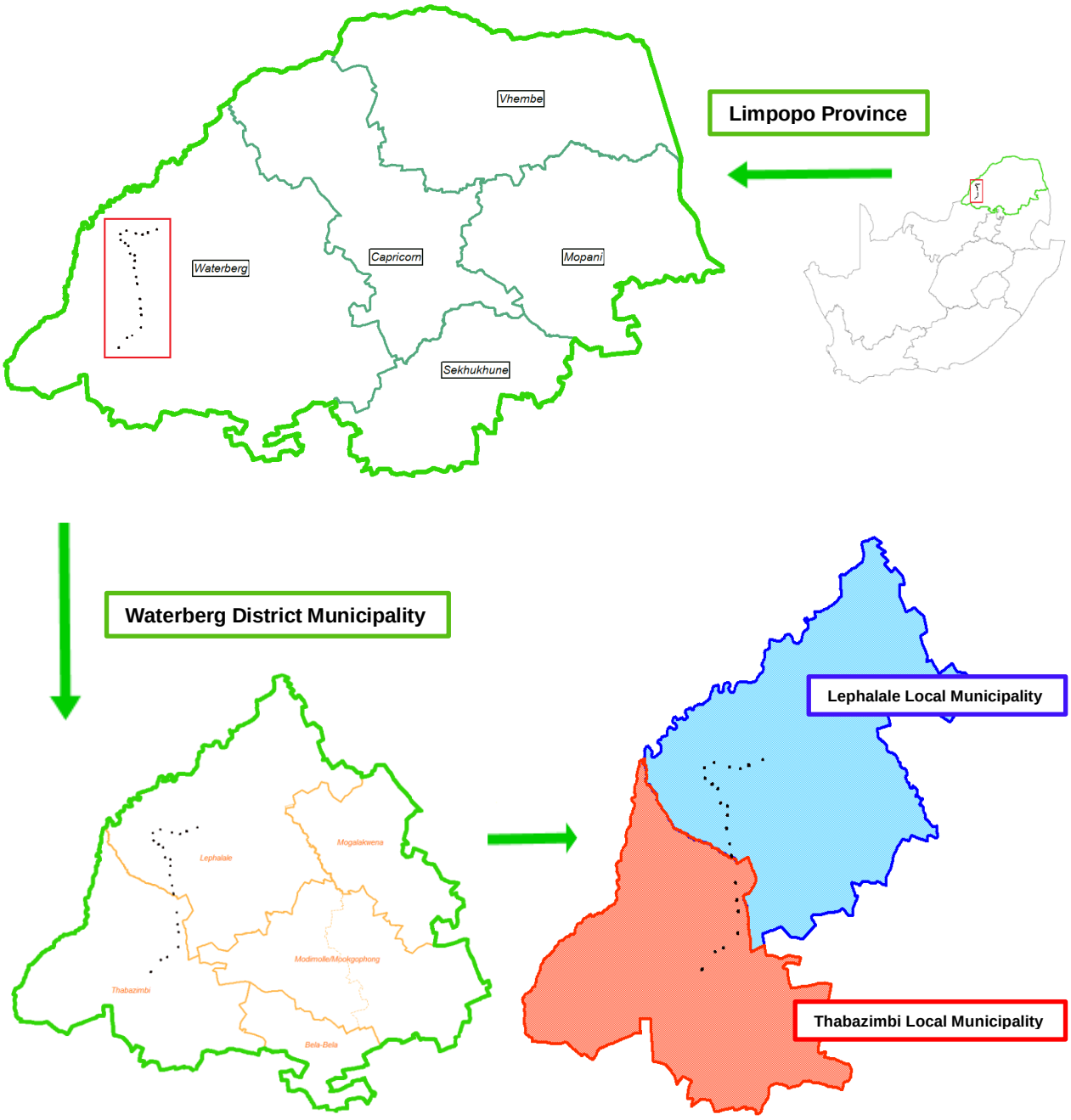


Figure 4: District and local municipal maps of the MCWAP-2A borrow pits

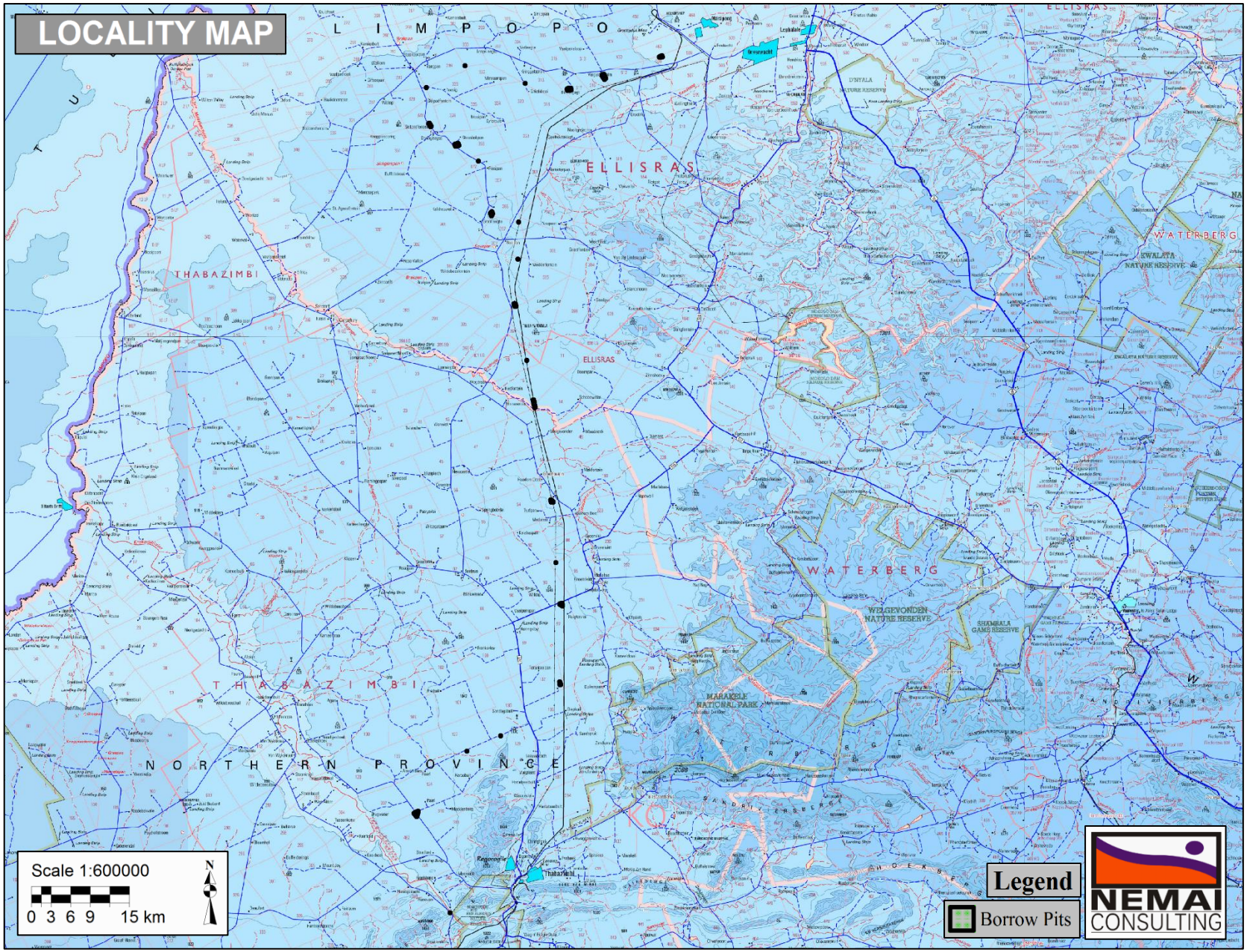


Figure 5: Locality Map

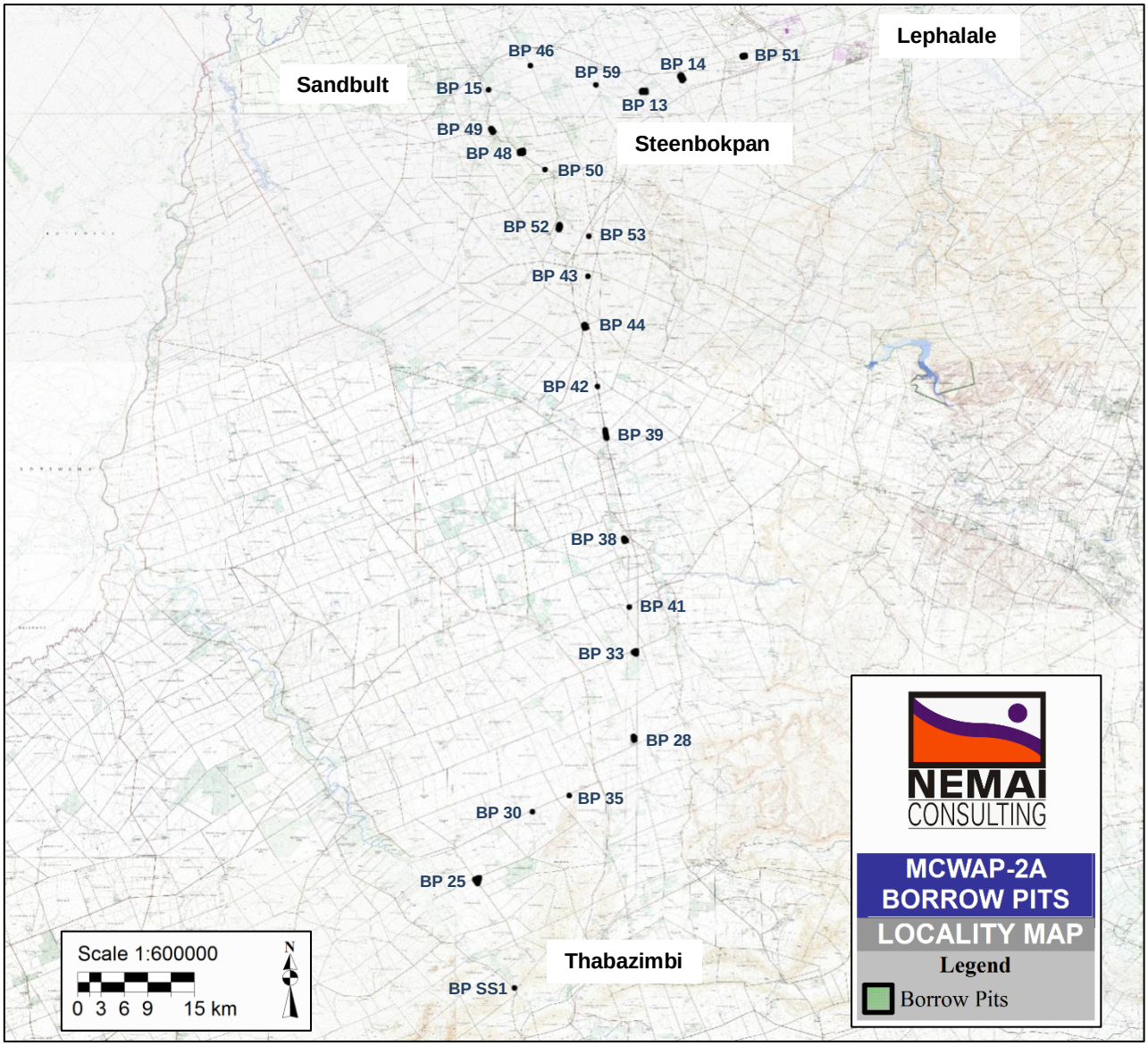


Figure 6: 1:50 000 Topographical Map

The proposed borrow pits commence in the south-western point of the project area, from the Vlieëpoort Mountains at BP SS1 situated in the Crocodile River (West). From there, the borrow pits are situated at approximately 5 km intervals and move in a predominantly northern direction along existing roads, farm boundaries and a railway line and ends near Steenbokpan at the last borrow pit, BP 51. The 23 proposed borrow pits are situated along the MCWAP Phase 2 pipeline, as construction material will be sourced from the borrow areas and used for the construction of the pipeline infrastructure. Detailed maps are contained in **Appendix A**.

As seen above, the surrounding areas to the proposed borrow pits include Thabazimbi, which is situated approximately 10 km to the north-east of the first borrow pit, BP SS1. Lephalale is situated approximately 20 km to the east of the last borrow pit, BP 51.

4.2 Affected Properties

The proposed borrow pits are situated mostly on privately-owned properties/farms, that are primarily used for agricultural practices and game-farming. Details of the properties that are directly affected by and adjacent to the proposed development are contained in **Appendix B**. Directly affected properties and their cadastral information are provided in **Section 9.2.**

5 LEGISLATION AND GUIDELINES CONSIDERED

5.1 Legislation

5.1.1 Environmental Statutory Framework

The legislation that has possible bearing on the proposed project from an environmental perspective is captured in **Table 2** below. **Note:** *this list does not attempt to provide an exhaustive explanation, but rather represents an identification of the most appropriate sections from pertinent pieces of legislation*.

Table 2: Environmental Statutory Framework

Legislation	Description and Relevance	
Constitution of the Republic of South Africa, (No. 108 of 1996)	• Chapter 2 – Bill of Rights. • Section 24 – Environmental Rights.	
National Environmental Management Act (NEMA) (No. 107 of 1998)	• Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment). • Section 28 – Duty of care and remediation of environmental damage. • Environmental management principles. • Authorities – Department of Mineral Resources (DMR) due to proposed mining activities.	
GN No. R 982 of 4 December 2014, as amended	• Purpose - regulate the procedure and criteria as contemplated in Chapter 5 of NEMA relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to EIA, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.	
GN No. R. 983 of 4 December 2014, as amended (Listing Notice 1)	• Purpose - identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA. • The investigation, assessment and communication of potential impact of activities must follow a Basic Assessment Process, as prescribed in regulations 19 and 20 of GN No. R 982 of 4 December 2014. However, according to Regulation 15(3) of GN No. R 982, S&EIR must be applied to an application if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any of the activities. • Activities under Listing Notice 1 that are relevant to this project follow.	
	GN No. R.983 – Activity no. 12: *The development of-* *(xii) infrastructure or structures with a physical footprint of 100 square metres or more;* *where such development occurs-* *(a) within a watercourse;* *(b) in front of a development setback; or* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; -* *excluding-* *(aa) the development of infrastructure or structures*	• *Borrow areas that require access roads (physical footprint of more than 100 square meters) that traverse watercourses, and fall within a watercourse (BP SS1)*

Legislation	Description and Relevance	
	within existing ports or harbours that will not increase the development footprint of the port or harbour; *(bb) where such development activities are related to the development of a port or* *harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;* *(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;* *(dd) where such development occurs within an urban area; or* *(ee) where such development occurs within existing roads or road reserves.*	
	GN No. R.983 – Activity no. 14: *The development 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 cubic metres or more but not exceeding 500 cubic metres.*	*"Dangerous goods" that are likely to be associated with the greater project, are fuel stores, as well as any dangerous goods to be used during the mining phase. Threshold of 80 m^3 expected to be exceeded.* *Diesel, Petrol and Oil to be stored on site at all borrow areas along pipeline. Capacities to be confirmed*
	GN No. R.983 – Activity no. 19: *The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from-* *(i) a watercourse;* *(ii) the seashore; or* *(iii) 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 -* *but excluding where such infilling, depositing , dredging, excavation, removal or moving-* *(a) will occur behind a development setback;* *(b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or* *(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.*	*Access roads/haul roads to the borrow areas that traverse watercourses. BP SS1 falls within a watercourse.*
	GN No. R.983 – Activity no. 22: *The decommissioning of any activity requiring –* *(i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); or* *(ii) a prospecting right, mining right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure;* *but excluding the decommissioning of an activity relating to the secondary processing* *of a –* *(a) mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource; or* *(b) petroleum resource, including the refining of gas, beneficiation, oil or petroleum products; –* *in which case activity 31 in this Notice applies.*	*Once borrow pits are not required after the construction phase for MCWAP-2A project infrastructure, the borrow areas will have to be rehabilitated and closed during the post-mining phase, thus a closure plan is required for the rehabilitation of the borrow areas.*
	GN No. R.983 – Activity no. 24: *The development of-* *(i) a road for which an environmental authorisation was obtained for the route determination in terms of*	*Access and haul roads to the various borrow areas will be required as not all fall within existing farm roads and are remote.*

Legislation	Description and Relevance	
	activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or *(ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;* *but excluding-* *(a) roads which are identified and included in activity 27 in Listing Notice 2 of 2014; or* *(b) roads where the entire road falls within an urban area.*	
	GN No. R.983 – Activity no. 27: *The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.*	*Clearance of large areas associated with the borrow pit footprint, which includes the following large project components:* • *Mining area;* • *Access/haul roads;* • *Site office/store; and* • *Topsoil stockpiles.* *Status of vegetation to be confirmed as part of the Terrestrial Ecological Study.*
	GN No. R.983 – Activity no. 30: *Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).*	*Possible occurrence of sensitive biodiversity features at affected areas. To be confirmed as part of the Terrestrial Ecological Study.*
	GN No. R.983 – Activity no. 56: *The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre-* *(i) where the existing reserve is wider than 13,5 meters; or* *(ii) where no reserve exists, where the existing road is wider than 8 metres;* *excluding where widening or lengthening occur inside urban areas.*	*Possible widening of existing roads, in order to allow haul trucks access to the various borrow areas and pipeline servitude. Dimensions to be confirmed.*
GN No. R. 984 of 4 December 2014, as amended (Listing Notice 2)	• Purpose - identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA. • The investigation, assessment and communication of potential impact of activities must follow a Scoping and EIA Process, as prescribed in regulations 21 - 24 of GN No. R 982 of 4 December 2014. • Activities under Listing Notice 2 that are relevant to this project follow.	
	GN No. R.984 – Activity no. 4: *The development of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.*	*"Dangerous goods" that are likely to be associated with the greater project, are fuel stores, as well as any dangerous goods to be used during the mining phase.* *Fuel and other dangerous goods will be stored at all site establishments.*
	GN No. R.984 – Activity no. 15: *The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.*	*Cumulative area to be cleared for all borrow pits (except linear components) exceeds 20 hectares.* *Status of vegetation to be confirmed as part of the Terrestrial Ecological Study.*
	GN No. R.984 – Activity no. 17: *Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including—* *(a) associated infrastructure, structures and earthworks, directly related to the extraction of a*	*DWS is exempted from a mining right, thus this is not triggered.*

Legislation	Description and Relevance	
	mineral resource; or *(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.*	
GN No. R. 985 of 4 December 2014, as amended (Listing Notice 3)	• Purpose - list activities and identify competent authorities under sections 24(2), 24(5) and 24D of NEMA, where environmental authorisation is required prior to commencement of that activity in specific identified geographical areas only. • The investigation, assessment and communication of potential impact of activities must follow a Basic Assessment Process, as prescribed in regulations 19 and 20 of GN No. R 982 of 4 December 2014. However, according to Regulation 15(3) of GN No. R 982, S&EIR must be applied to an application if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any of the activities. • Activities under Listing Notice 3 that are relevant to this project follow.	
	GN No. R.985 – Activity no. 4(a)(ii): *<u>The development of a road wider than 4 metres</u> with a reserve less than 13,5 metres.*	*Access/haul roads to the various sites (pre-mining and mining phase) are expected to exceed thresholds. Dimensions to be confirmed.* *Activity to be confirmed following Terrestrial Ecological Study.*
	GN No. R.985 – Activity no. 10(e)(i): *The development of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.*	*"Dangerous goods" that are likely to be associated with the greater project, are fuel stores, as well as any dangerous goods to be used during the mining phase. Threshold of 30 m^3 expected to be exceeded. Fuel and other dangerous goods will be stored at all site establishments.* *Activity to be confirmed following Terrestrial Ecological Study.*
	GN No. R.985 – Activity no. 12(a)(i – ii): *The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.*	*Clearance of large areas associated with the borrow pit footprint.* *Activity to be confirmed following Terrestrial Ecological Study.*
	GN No. R.985 – Activity no. 14(a)(ii): *The development of-* *(i) canals exceeding 10 square metres in size ;* *(ii) channels exceeding 10 square metres in size;* *(iii) bridges exceeding 10 square metres in size;* *(iv) dams, where the dam, including infrastructure and water surface area exceeds 10 square metres in size;* *(v) weirs, where the weir, including infrastructure and water surface area exceeds 10 square metres in size;* *(vi) bulk storm water outlet structures exceeding 10 square metres in size;* *(vii) marinas exceeding 10 square metres in size;* *(viii) jetties exceeding 10 square metres in size;* *(ix) slipways exceeding 10 square metres in size;* *(x) buildings exceeding 10 square metres in size;* *(xi) boardwalks exceeding 10 square metres in size; or* *(xii) <u>infrastructure or structures with a physical footprint of 10 square metres or more</u>;* *where such development occurs -* *(a) <u>within a watercourse;</u>* *(b) in front of a development setback; or* *(c) if no development setback has been adopted,*	*The BP SS1 borrow area falls within the Crocodile River (West), and will be approximately 1.3 ha in size, exceeding the threshold.*

Legislation	Description and Relevance	
	within 32 metres of a watercourse, measured from the edge of a watercourse; *excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.*	
	GN No. R.985 – Activity no. 18(a)(ii): *The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.*	*Access/haul roads to the various sites (pre-mining and mining phases) are expected to exceed thresholds. Dimensions to be confirmed.* *Activity to be confirmed following Terrestrial Ecological Study.*
National Water Act (Act No. 36 of 1998)	• Chapter 3 – Protection of water resources. • Section 19 – Prevention and remedying effects of pollution. • Section 20 – Control of emergency incidents. • Chapter 4 – Water use. • Authority – DWS.	
National Environmental Management Air Quality Act (Act No. 39 of 2004)	• Air quality management • Section 32 – Dust control. • Section 34 – Noise control. • Authority – DEA.	
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	• Management and conservation of the country's biodiversity. • Protection of species and ecosystems. • Authority – DEA.	
National Environmental Management: Protected Areas Act (Act No. 57 of 2003)	• Protection and conservation of ecologically viable areas representative of South Africa's biological diversity and natural landscapes.	
National Environmental Management: Waste Act (Act No. 59 of 2008)	• Chapter 5 – licensing requirements for listed waste activities - GN No. R. 921 of 29 November 2013. • Authority – Minister (DEA) or MEC (provincial authority).	
National Forests Act (No. 84 of 1998)	• Section 15 – Authorisation required for impacts to protected trees. • Authority – Department of Agriculture, Forestry and Fisheries (DAFF).	
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	• Approval of borrow pits. • Authority – DMR.	
Occupational Health & Safety Act (Act No. 85 of 1993)	• Provisions for Occupational Health & Safety. • Authority – Department of Labour.	
National Heritage Resources Act (Act No. 25 of 1999)	• Section 34 – protection of structure older than 60 years. • Section 35 – protection of heritage resources. • Section 36 – protection of graves and burial grounds. • Section 38 – Heritage Impact Assessment for linear development exceeding 300m in length; development exceeding 5 000m^2 in extent, etc. • Authority – Limpopo Provincial Heritage Resources Authority (LIHRA).	
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	• Control measures for erosion. • Control measures for alien and invasive plant species. • Authority – Department of Agriculture.	
National Road Traffic Act (Act No. 93 of 1996)	• Authority – Limpopo Department of Public Works, Roads and Infrastructure.	

The relationship between the project and certain key pieces of environmental legislation is discussed in the subsections to follow.

5.1.2 National Environmental Management Act

According to Section 2(3) of the National Environmental Management Act (NEMA) (Act No. 107 of 1998), "*development must be socially, environmentally and economically sustainable*", which means the integration of these three factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

The proposed borrow pits require authorisation in terms of NEMA and the EIA is being undertaken in accordance the EIA Regulations of 2014 (as amended) that consist of the following:

- EIA procedure - GN No. R 982;
- Listing Notice 1 - GN No. R 983;
- Listing Notice 2 - GN No. R 984; and
- Listing Notice 3 - GN No. R 985.

The project triggers activities under Listing Notices 1, 2 and 3, and thus needs to be subjected to a Scoping and EIA Process. The listed activities are explained in the context of the project in **Table 2**.

Note that the dimensions and quantities of the project infrastructure and components should be regarded as approximates due to the dynamic nature of the planning and design process. As a conservative approach, all activities that could possibly be triggered by the project were included in the Application Form (draft included in **Appendix C**) that will be submitted to the DMR with the Draft Scoping Report, and a refinement of these activities will take place as the EIA Process unfolds.

5.1.3 National Environmental Management: Waste Act

Amongst others, the purpose of the National Environmental Management: Waste Act (NEM:WA) (Act No. 59 of 2008) includes the following:

1. To reform the law regulating waste management in the country by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development;
2. To provide for institutional arrangements and planning matters;
3. To provide for specific waste management measures;
4. To provide for the licensing and control of waste management activities;
5. To provide for the remediation of contaminated land; and
6. To provide for compliance and enforcement.

No authorisation will be required in terms of NEM:WA, as the project will not include any listed waste management activities in terms of GN No. R. 921 of 29 November 2013.

The following is noted with regards to waste management for MCWAP-2A Borrow Pits:

❖ Mining phase –

- Excess material will be used to as part of the filling and rehabilitation of borrow pits;
- Temporary waste storage facilities will remain below the thresholds contained in the listed activities under Schedule 1 of NEM:WA;
- The storage of general or hazardous waste in a waste storage facility on site will comply with the norms and standards in GN No. R. 926 of 29 November 2013; and
- The Environmental Management Programme (EMPr) will make suitable provisions for waste management, including the storage, handling and disposal of general and hazardous waste;

5.1.4 Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)

The purpose of the Mineral and Petroleum Resources Development Act (MPRDA) (Act No. 28 of 2002) is to make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources and to provide for matters related thereto. This act defines mining as "any operation or activity for the purposes of winning any mineral on, in or under the earth, water or any residue deposit, whether by underground or open working or otherwise and includes any operation or activity incidental thereto".

In terms of the MPRDA, as amended, a mining permit applies when the mineral in question can be mined in 2 years and the area does not exceed 5 hectares. For larger areas a mining right will need to be applied for.

23 borrow pits have been identified to source construction material for the project infrastructure. Sources of material suitable for use as bedding or soft backfill to the pipe were sought at a nominal spacing of 5 km along the pipeline. Under Section 106(1) of the MPRDA, and in accordance with GN No. R. 762 of 25 June 2004, DWS is exempt from the provisions of Sections 16, 20, 22 and 27 "*in respect of any activity to remove any mineral for road construction, building of dams or other purpose which may be identified in such notice*". Section 106(2) of the MPRDA was amended as follows: "*Despite subsection (1), the organ of state so exempted must submit relevant environmental reports required in terms of Chapter 5 of the National Environmental Management Act, 1998, to obtain an environmental authorisation*."

Thus DWS still needs to submit a Scoping, EIA and EMPr for the proposed borrow areas, for approval by the DMR.

Based on a Memorandum of Understanding in 2007 between the then Department of Water Affairs and Forestry (DWAF) and Department of Mineral and Energy (DME), it was agreed between these parties that for the construction and maintenance of Government Waterworks undertaken by DWS's own Construction Unit, this Department shall be deemed to comply with the requirements of financial provision. Provided that the estimated costs for the management,

rehabilitation and closure of such quarries and borrowed areas or works are provided for within the approved budget for such Government Waterworks.

Approval will be sought from DMR for the borrow areas in terms of the activities triggered under the Listing Notices of the 2014 EIA Regulations (as amended).

5.1.5 National Water Act (Act No. 36 of 1998)

The proposed borrow pits entail the following activities that constitute water uses in terms of Section 21 of the NWA:

- Section 21(c) - Impeding or diverting the flow of water in a watercourse (instream works for abstraction works, gauging weirs, access roads' crossings, pipeline crossings, etc.); and
- Section 21(i) - Altering the bed, banks, course or characteristics of a watercourse (instream works for abstraction works, gauging weirs, access roads' crossings, pipeline crossings, etc.).

An Integrated Water Use Licence Application will be submitted separately to the DWS Limpopo Regional Office for the entire scope of MCWAP-2A . The following requirements of the NWA will be catered for:

- Provision for the Reserve requirements of the Crocodile River (West); and
- Ensure that existing lawful use is respected and protected.

5.2 Guidelines

The following guidelines were considered during the preparation of the Draft Scoping Report:

- Integrated Environmental Management Information Series, in particular Series 2 – Scoping (DEAT, 2002);
- Guideline on Alternatives, EIA Guideline and Information Document Series (DEA&DP, 2010a);
- Guideline on Need and Desirability, EIA Guideline and Information Document Series (DEA&DP, 2010b);
- Integrated Environmental Management Guideline Series 5: Companion to the EIA Regulations 2010 (DEA, 2010a);
- Integrated Environmental Management Guideline Series 7: Public Participation in the EIA Process (DEA, 2010b); and
- Guidelines for Involving Specialists in the EIA Processes Series (Brownlie, 2005).

5.3 National and Regional Plans

The following regional plans were considered during the execution of the Scoping phase (amongst others):

- Municipal Spatial Development Frameworks (SDFs) (where available);
- Municipal Integrated Development Plans (IDPs);
- Relevant national, provincial, district and local policies, strategies, plans and programmes;
- Environmental Management Framework (EMF) for the Waterberg District Municipality (2010);
- Limpopo Provincial Conservation Plan version 2, September 2013;
- Limpopo Provincial Growth and Development Strategy (PGDS);
- Department of Energy's Integrated Resource Plan (IRP) 2010-30;
- Lephalale LM Water Services Development Plan (WSDP); and
- Crocodile River (West) Water Supply System Reconciliation Strategy.

5.4 Protocols

The Limpopo River Basin, of which the Crocodile River (West) is a tributary, is shared by a number of countries, namely, South Africa, Botswana, Zimbabwe and Mozambique. The international obligations in terms of water resource management thus need to be satisfied. This includes the Protocol on Shared Watercourse Systems in the Southern African Development community (SADC) and the SADC Regional Water Policy.

6 SCOPING AND EIA PROCESS

6.1 Previous Environmental Assessments

The MCWAP Environmental Module was originally initiated at the end of 2008 under the EIA Regulations of 2006. The status of each of the original MCWAP applications is shown in **Table 3**.

Table 3: Status of original MCWAP applications

MCWAP Component	Environmental Assessment Process	DEA Ref. No.	Status
Phase 1	Scoping and EIA	12/12/20/1465	Environmental Authorisation issued on 03 December 2010
Phase 2	Scoping and EIA	12/12/20/1466	EIA application withdrawn following Scoping phase due to uncertainty with regards to water demands
De-bottlenecking	Basic Assessment	12/12/20/1467	Environmental Authorisation issued on 24 February 2010

MCWAP-2A was resuscitated for the following reasons:

- Government identified and approved 18 SIPs across the RSA to support economic development and address service delivery in the poorest provinces. SIP 1 entails the unlocking of the Northern Mineral Belt with Waterberg as the catalyst. Investment in rail, water and transmission infrastructure and energy generation will catalyse unlocking rich mineral resources in Limpopo resulting in thousands of direct jobs across the areas covered. The MCWAP includes the water infrastructure needed for SIP 1. Due to the priority accorded by Government to such SIP projects, it was prudent to give priority to the future water needs of the Lephalale area in support of the national development imperatives;

- MCWAP-1 augments the supply from Mokolo Dam and is already operational since June 2015. It serves as an interim measure to supply in the growing water requirements of Lephalale, Eskom and Exxaro. This solution will over the long term optimally utilise the full yield from Mokolo Dam. The sustainable yield of Mokolo Dam is not sufficient to meet the increased needs of the users including the pollution abatement measures which is an environmental and funding condition;

- A suitably sized transfer pipeline from the Crocodile River (West) can be implemented timeously to meet the increased requirements to support the RSA's economy. MCWAP-1 will be operated as a system together with proposed MCWAP-2A when the latter is completed. MCWAP-2A will also serve to provide the necessary assurance of water supply to the strategic end users from independent sources; and

- The water requirements have been finalised to the degree that is adequate to make informed economic decisions with respect to the transfer capacity of MCWAP-2A.

6.2 Environmental Assessment Practitioner

Nemai Consulting was appointed by DWS as the independent EAP to undertake the environmental assessment for the proposed borrow pits required for the MCWAP-2A project.
In accordance with Appendix 2, Section 2(1)(a) of GN No. R 982 of 4 December 2014 (as amended), this section provides an overview of Nemai Consulting and the company's experience with EIAs, as well as the details and experience of the EAPs that form part of the Scoping and EIA team.

Nemai Consulting is an independent, specialist environmental, social development and Occupational Health and Safety (OHS) consultancy, which was founded in December 1999. The company is directed by a team of experienced and capable environmental engineers, scientists, ecologists, sociologists, economists and analysts. The company has offices in Randburg (Gauteng), Durban (KZN) and Cape Town (Western Cape).

The core members of Nemai Consulting that are involved with the Scoping and EIA Process for the project are captured in **Table 4** below, and their respective Curricula Vitae are contained in to **Appendix D**.

Table 4: Scoping and EIA Core Team Members

Name	Qualifications	Experience	Duties
Ms D. Naidoo	B.Sc Eng (Chem)	19 years	• Project Manager • Quality Control • EIA Process
Mr D. Henning	M.Sc (River Ecology)	15 years	• Project Leader • EIA Process • Scoping & EIA Reports
Mr C. v. d. Hoven	B.Sc (Hons) (Environmental Studies)	2 years	• EIA Process • Public Participation
Mr S. Pienaar	B.Sc (Hons) (Environmental Studies)	10 years	• Public Participation
Mr C. Chidley	• B.Sc Eng (Civil); • BA (Economics, Philosophy) • MBA	20 years	• Quality Review • Technical Input • EMPr

6.3 DMR Pre-application Consultation

A Pre-application Consultation Meeting was convened with DMR on 07 December 2017 (refer to **Appendix E** for correspondence).

The purpose of the meeting included the following:

- To introduce the overall MCWAP-2A and required borrow pits to DMR;
- To seek clarification regarding certain matters that pertain to the EIA process;
- To determine DMR's requirements; and
- To confirm the process and timeframes.

Key outcomes of above pre-application consultation with DMR include the following:

- It was agreed that the Application Form and draft Scoping Report be submitted to DMR, who will be the competent authority for the proposed project; and
- DMR stated that the National Department of Water and Sanitation will be exempted from an application for a mining right, however, environmental authorisation is required in terms of NEMA, and thus a Scoping and EIA Process is required.

6.4 Environmental Assessment Triggers

An Application for Environmental Authorisation in terms of NEMA will be made for the proposed development of MCWAP-2A Borrow Pits. Based on the outcomes of the pre-application consultation meeting with DMR, the Application Form and draft Scoping Report will be submitted to DMR (see **Section 6.3**). A copy of the Application Form is contained in **Appendix C**.

The process for seeking authorisation under NEMA is undertaken in accordance with GN No. R. 982 of 4 December 2014 (as amended), promulgated in terms of Chapter 5 of NEMA. Based on the types of activities involved the requisite environmental assessment for the project is a Scoping and EIA Process. Refer to **Section 5** for the project's legal framework and specifically the

activities triggered by the project in terms of Listing Notices 1, 2 and 3 of the EIA Regulations of 2014 (as amended).

6.5 Environmental Assessment Authorities

In terms of NEMA the lead decision-making authority for the environmental assessment is DMR, as the project proponent (DWS) is a national department. The new EIA Regulations of 2014 (as amended) include a number of provisions in terms of the transition of the environmental regulation of mining from the MPRDA to NEMA and the introduction of the One Environmental System. Amongst others, this is facilitated by the inclusion of mining activities under the 2014 Listing Notices. Approval is thus being sought from the Department of Mineral Resources (DMR) for the borrow areas in terms of the activities triggered under the Listing Notices of 4 December 2014 (as amended).

Various other authorities with jurisdiction over elements of the receiving environment or project activities (refer to **Section 5.1**) will also be consulted during the course of the entire EIA. Refer to the database of IAPs contained in **Appendix H** for a list of the government departments that were notified during the EIA Process to date.

6.6 Scoping Process

6.6.1 Formal Process

An outline of the Scoping and EIA Process for the proposed MCWAP-2A Borrow Pits is provided in **Figure 7**.

The purpose of Scoping phase, which constitutes the first phase of the formal EIA process, is as follows:

- Identify the legal framework in terms of the proposed project;
- Identify and engage with IAPs and allow for adequate participation in the process;
- Consider alternatives for achieving the project's objectives;
- Identify significant issues to be investigated further during the execution of the EIA phase;
- Clarify the roles and responsibilities of various stakeholders in the process;
- Determine the scope of the ensuing EIA phase, in terms of specialist studies, public participation, assessment of impacts and appraisal of alternatives; and
- Allow for informed decision-making by DMR and other authorities with regard to the EIA Process.

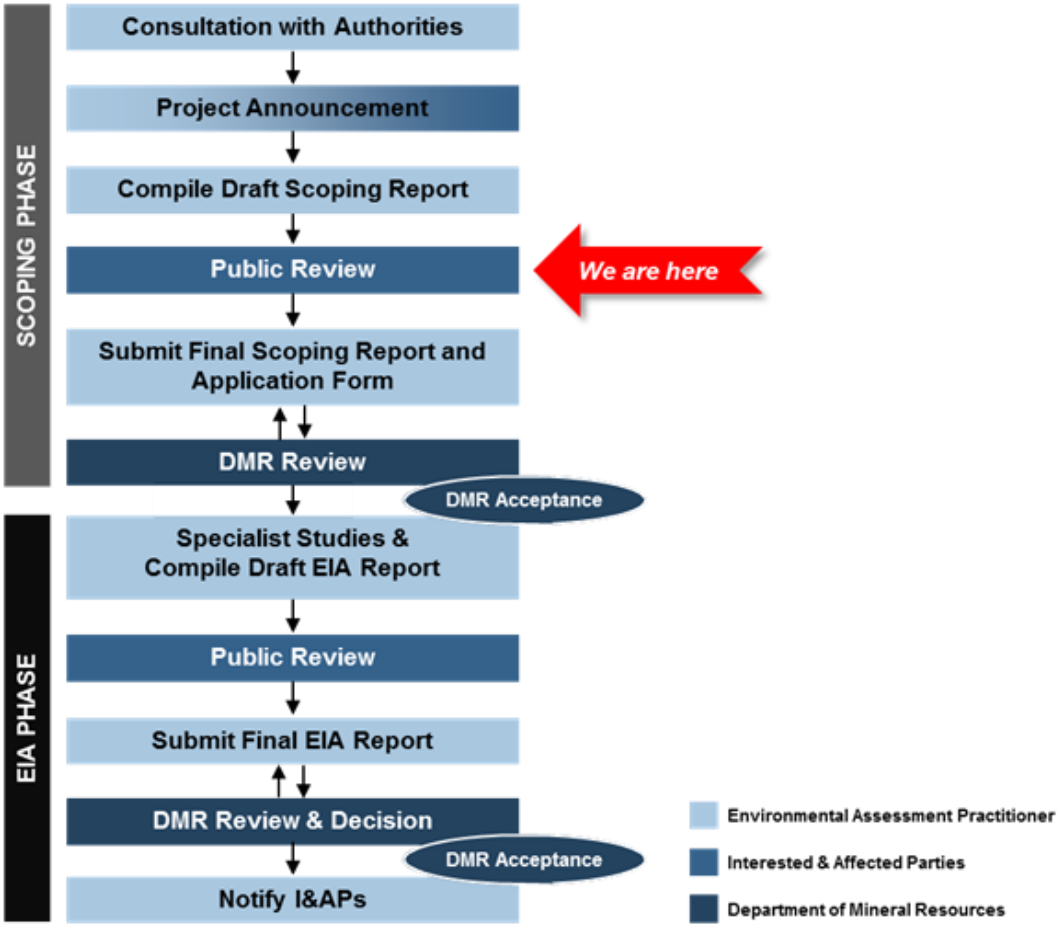


Figure 7: EIA Process

6.6.2 Landowner Consent

According to Regulation 39(1) of GN No. R 982 of the 2014 EIA Regulations (as amended), if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land. This requirement however does not apply *inter alia* for linear developments (e.g. pipelines, power lines, roads) or if it is a SIP as contemplated in the Infrastructure Development Act, 2014. MCWAP-2A, including the required borrow pits, fall under SIP 1 and thus landowner consent will not be required.

6.6.3 Landowner Notification

The details of the various properties affected by the proposed borrow areas are provided in **Appendix B**. All affected landowners / persons in control of the land is provided in **Appendix F**. All proof of written notification to the landowners / persons in control of the land, will be included in the Final Scoping Report in **Appendix K**.

6.6.4 Application Form

A copy of the Application Form, which was submitted to DMR together with the Draft Scoping Report, is provided in **Appendix C**.

The Application Form makes provision for all the activities associated with the project and the following associated works:

1. Borrow Areas;
2. Site office/store;
3. Topsoil stockpiles;
4. Storage of hazardous and general waste materials;
5. Operational plant (e.g. screeners, haul trucks etc.); and
6. Access/haul roads.

The activities triggered in terms of Listing Notices 1, 2 and 3 were confirmed based on the following:

- Project description, quantities and location;
- Information contained in the Technical Feasibility Study reports, previous Scoping Report (DWA, 2011) and Environmental and Social Screening Report (DWAF, 2008);
- Input received from DWS and the technical team; and
- Feedback received from DMR and the other environmental authorities.

6.6.5 Screening of Alternatives

Geotechnical investigations (Mokolo Crocodile Consultants, 2012) lead to the identification of the 23 locations of the required borrow pits, based on the availability and volumes of the required material for construction, and thus there are no alternatives. The “no go” option will also be evaluated to understand the implications of the project not proceeding. The proposed borrow pits are taken forward in the impact prediction, where the potential positive and adverse environmental impacts are examined further.

6.6.6 Impact Prediction

The potential environmental impacts associated with the proposed borrow pits were identified during the Scoping phase through an appraisal of the following:

- Proposed locations and footprint of the project infrastructure and components, which included site investigations as well as a desktop evaluation with a Geographical Information System (GIS) and aerial photography;
- Activities associated with the project life-cycle (i.e. pre-mining, mining, and post mining);
- Profile of the receiving environment and the potential sensitive environmental features and attributes;
- Input received during public participation from authorities and IAPs; and
- Legal and policy context.

The Scoping exercise aimed to identify and qualitatively predict potentially significant environmental issues for further consideration and prioritisation during the EIA stage (see **Section 13**). Note that “significance” relates to whether the effect (i.e. change to the environmental feature / attribute) is of sufficient importance that it ought to be considered and

have an influence on decision-making. During the EIA stage a detailed quantitative impact assessment will be conducted via contributions from the project team and requisite specialist studies, and through the application of the impact assessment methodology contained in **Section 13.4**. Suitable mitigation measures will be identified to manage (i.e. prevent, reduce, rehabilitate and/or compensate) the environmental impacts, and will be included in the EMPr.

6.7 Other Applications in Project Area

The following proposed developments, which are earmarked for the same properties that are affected by MCWAP-2A infrastructure, are known at this stage:

- Proposed upgrade of the rail network as part of the Waterberg Coal Project (multiple properties); and
- Proposed quarry on Portion 1 of the Farm Ruigtevley 97 KQ.

Further information with regards to the above or any additional developments that may influence the project footprint will be included in the EIA Report, as relevant.

7 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations accompany the Scoping exercise:

- In accordance with the purpose of Scoping, the report does not include detailed specialist investigations on the receiving environment, which will only form part of the EIA phase. The environment in the project area was primarily assessed in the Scoping phase through site visits and appraisals, desktop screening, incorporating existing information from previous studies, and input received from authorities and IAPs. A refinement of all maps will also be undertaken in the EIA phase, if necessary; and
- As the design of the project components is still in feasibility stage, and due to the dynamic nature of the planning environment, the dimensions and layout of the infrastructure may change during the detailed design phase. Any amendments to the scheme will need to comply with the prevailing environmental legal requirements.

8 NEED AND DESIRABILITY

This section serves to expand on the motivation / need and desirability for the proposed development that is provided in **Section 3.2**. The format contained in the Guideline on Need and Desirability (DEA&DP, 2010b) was used in **Table 5** below. The table provides a description of the need and desirability of the proposed MCWAP-2A project, which also includes the required borrow pits.

Table 5: Need and Desirability of the Project

No.	Question	Response
NEED ('timing')		
1.	Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved Spatial Development Framework (SDF) agreed to by the relevant environmental authority? (i.e. is the proposed development in line with the projects and programmes identified as priorities within the IDP).	The IDP for the Lephalale LM (2016) acknowledges the need for MCWAP and specifically states the following: "*It is imperative to note that the outcome of the MCWAP project need to be implemented to address expected water shortages before any development in node area 1 will be viable, as currently the area does not have sufficient water resources to sustain any new development*". MCWAP-2A is also included as one of the strategic projects in terms of Key Performance Area 2: Basic Services and Infrastructure investment. It is noted that Thabazimbi LM's water supply is from Magalies Water. According to the spatial vision presented in the IDP for the Thabazimbi LM (2017), the proposed footprint of MCWAP-2A falls primarily within the activity and government corridor, which extends northwards from the town of Thabazimbi (similar to Zone 11 of the Waterberg DM EMF).
2.	Should development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occur here at this point in time?	• The timing of the project is driven by the water demands associated with the development of the Waterberg Coalfields, where the water users include power generation, coal mining to support power generation, other industrial / mining activities and urban use by the Lephalale LM. • Several possible weir sites along the Crocodile River (West) were evaluated for suitability with respect to topography, access, founding conditions and river morphology. This led to the selection of two possible sites, namely the Vlieëpoort Upper Site and the Boschkop Lower Site. The choice of the final abstraction point was largely determined by the extent of river losses and additional costs associated with river management actions, as well as the need for and benefit of implementing a phased approach to deliver water to the end users. • To minimise impacts, the proposed pipeline route attempts to remain alongside existing linear-type infrastructure, such as roads (main roads and dirt roads), the railway line (i.e. section of approximately 56km), transmission lines, industrial corridors and farm boundaries where the environment is regarded as less sensitive.

No.	Question	Response
3.	Does the community/area need the activity and the associated land use concerned (is it a societal priority)? This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate)	• MCWAP-2A features prominently on SIP 1, which aims to unlock SA's northern mineral belt in one of the poorest provinces (Limpopo). • The assurance of water supply to the current power stations near Lephalale is not acceptable and places the country's power supply at risk. • The concerns raised by IAPs with regards to the proposed project primarily fall into the following categories: ○ Concerns related to the footprint of the physical infrastructure and associated impacts to land use as well as existing structures and infrastructure; ○ Concerns related to water availability in the Crocodile River (West); and ○ Concerns related to the cumulative impacts associated with the various developments that are linked to the Waterberg Coalfields.
4.	Are the necessary services with appropriate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	Bulk power is required for the operation of the high-lift and low-lift pump stations associated with the MCWAP-2A Water Transfer Infrastructure and borrow pits. Eskom has confirmed that the proposed MCWAP-2A substation can be accommodated into the network without any capacity constraints. The proposed substation will be supplied from the new planned Thabatshipi – Thabazimbi Combined 132kV Power Line. A separate application will be submitted by Eskom to seek approval for the bulk power required for MCWAP-2A. The services required for the development are explained in **Section 9.4**.
5.	Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services)?	The project aims to supply bulk water to a number of strategic end users. The Lephalale LM, as one of the intended water users, will need to ensure that it is able to optimally utilise this water as part of infrastructure planning. See the response in item no. 1 above in terms of the reference to MCWAP-2A contained in the IDP for the Lephalale LM.
6.	Is this project part of a national programme to address an issue of national concern or importance?	Yes. Refer to response provided above for item no. 3 in terms of the project's SIP status.
7.	Is the development the best practicable environmental option (BPEO) for this land/site?	The borrow pit site selection for the project infrastructure is discussed in item no. 2 above.
8.	Would the approval of this application compromise the integrity of the existing approved municipal IDP and SDF as agreed to by the relevant authorities?	It is not anticipated that the proposed project will contradict or be in conflict with the municipal IDPs and SDFs (refer to response provided above to item no. 1).

No.	Question	Response
9.	Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?	In terms of the EMF for the Waterberg DM, the project falls within the following Environmental Management Zones (refer to **Section 11.16.3**): • Zone 4: Game and cattle farming (including hunting) areas with commercial focus; • Zone 5: Mining and industrial development focus areas; • Zone 6: Restricted mining focus areas in aesthetic and/or ecological resource areas; and • Zone 11: Major infrastructure corridors. It is noted that Zone 11 facilitates the routing of bulk infrastructure, such as the pipeline associated with MCWAP-2A. The EIA will further assess whether MCWAP-2A is incompatible with the desired state established for the remaining zones. The compatibility of the project with the Limpopo Provincial Conservation Plan (2013) and other environmental management and planning tools will be considered in detail during the EIA phase, following the undertaking of the relevant specialist studies. Refer to **Section 11.9.3** for a discussion of the project in relation to Critical Biodiversity Areas.
10.	Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context).	As part of the technical analysis a number of locational factors were considered in selecting the abstraction site and pipeline route, as discussed in item no. 2 above. The specialist studies, as part of the EIA phase, will further investigate the location based on sensitive environmental features and receptors.
11.	How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?	See compilation of significant environmental issues associated with the proposed project contained in **Section 13**.
12.	How will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc.)?	
13	Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?	The affected land is rural in nature and primarily used for agricultural and game farming purposes. Opportunity costs, which are associated with the net benefits forgone for the development alternative, will be considered in the Socio-economic Study during EIA phase.
14	Will the proposed land use result in unacceptable cumulative impacts?	Cumulative impacts, as considered in **Section 13.3**, will be evaluated in the EIA phase.

9 PROJECT DESCRIPTION

9.1 General

The proposed borrow pit locations were identified as part of geotechnical investigations conducted for MCWAP-2A. As mentioned, the borrow pits are located at approximately 5 km intervals along the central pipeline route in order to limit haul distances and to prevent the need to obtain material from commercial sources.

Note: The sizing and location of the project-related infrastructure takes place within a dynamic planning environment, with various role-players, affected landowners, authorities and other stakeholders. Subsequent project modifications that emanate from discussions with the IAPs, findings from specialist studies and technical considerations will be conveyed during the public participation of the EIA phase and will be incorporated into the Draft EIA report, which will be lodged in the public domain.

9.2 Borrow Pits

The borrow pits and associated activities required for MCWAP-2A are described in the subsections to follow. **Table 6** below provides a description of the 23 proposed borrow pits in terms of the size, volume and depth required at each site.

Table 6: Description of proposed borrow pits

Name	Borrow Pit Area (ha)	Management Area (ha)**	Volume (m^3)	Average Depth (m)
BP SS1	0.3	1.3	8 000	2.7
BP25	14.8	17.3	370 000	2.5
BP30	7.2	8.9	170 000	2.4
BP35	4.3	5.7	65 000	1.5
BP28	4.6	6.1	105 000	2.3
BP33	7.6	9.4	223 500	2.9
BP41	5.3	6.8	180 000	3.4
BP38	7.0	8.7	100 000	1.4
BP39	4.5	6.0	105 000	2.3
BP42	3.3	4.6	150 000	4.5
BP44	5.1	6.6	140 000	2.7
BP43	4.3	5.7	110 000	2.6
BP53	2.3	3.5	60 000	2.6
BP52	7.2	8.9	100 000	1.4
BP50	4.4	5.8	100 000	2.3
BP48	10.7	12.8	100 000	0.9
BP49	5.2	6.7	100 000	1.9
BP15	3.3	4.6	100 000	3.0
BP46	2.5	3.8	100 000	4.0

Name	Borrow Pit Area (ha)	Management Area (ha)**	Volume (m^3)	Average Depth (m)
BP59	3.0	4.3	100 000	3.3
BP13	7.7	9.5	100 000	1.3
BP14	12.6	14.9	100 000	0.8
BP51	3.8	5.2	100 000	2.6

** *Management area = the allowance of 10% of Borrow Pit area for topsoil stockpile and 1ha for working space.*

9.2.1 Location of proposed borrow pits

The proposed borrow pits which will be used to source material for the construction of the project components included in the MCWAP-2A project, are provided in the figures and tables to follow.

The locality maps include the proposed locations of all 23 borrow pits, their associated access/haul roads, as well as the co-ordinates of the corners and the properties directly and adjacently affected.

The accompanying tables contain the size of each proposed borrow pit, the volumes of material required from the proposed borrow pit, and the cadastral details (i.e. farm name, farm portion, 21 digit SG Code) of the affected properties. As the borrow pits are situated at approximately 5 km intervals along the pipeline, the tables below the figures, also provide the distance of the pipeline in relation to the position of the borrow pit. It also indicates whether a new access/haul road is required, or whether access will be gained from existing farm/dirt roads, or due to the close proximity of the borrow pit to the pipeline, the use of the pipeline servitude for access.

Note the following:

1. As discussed, the dimensions and layout of the infrastructure may change as the technical study advances through the detailed design stage if Environmental Authorisation is obtained. All dimensions should thus be regarded as approximates;
2. All property descriptions are based on 2017 cadastral information; and
3. All distances and coordinates provided should be regarded as approximates, as they are based on desktop estimates derived from GIS software.

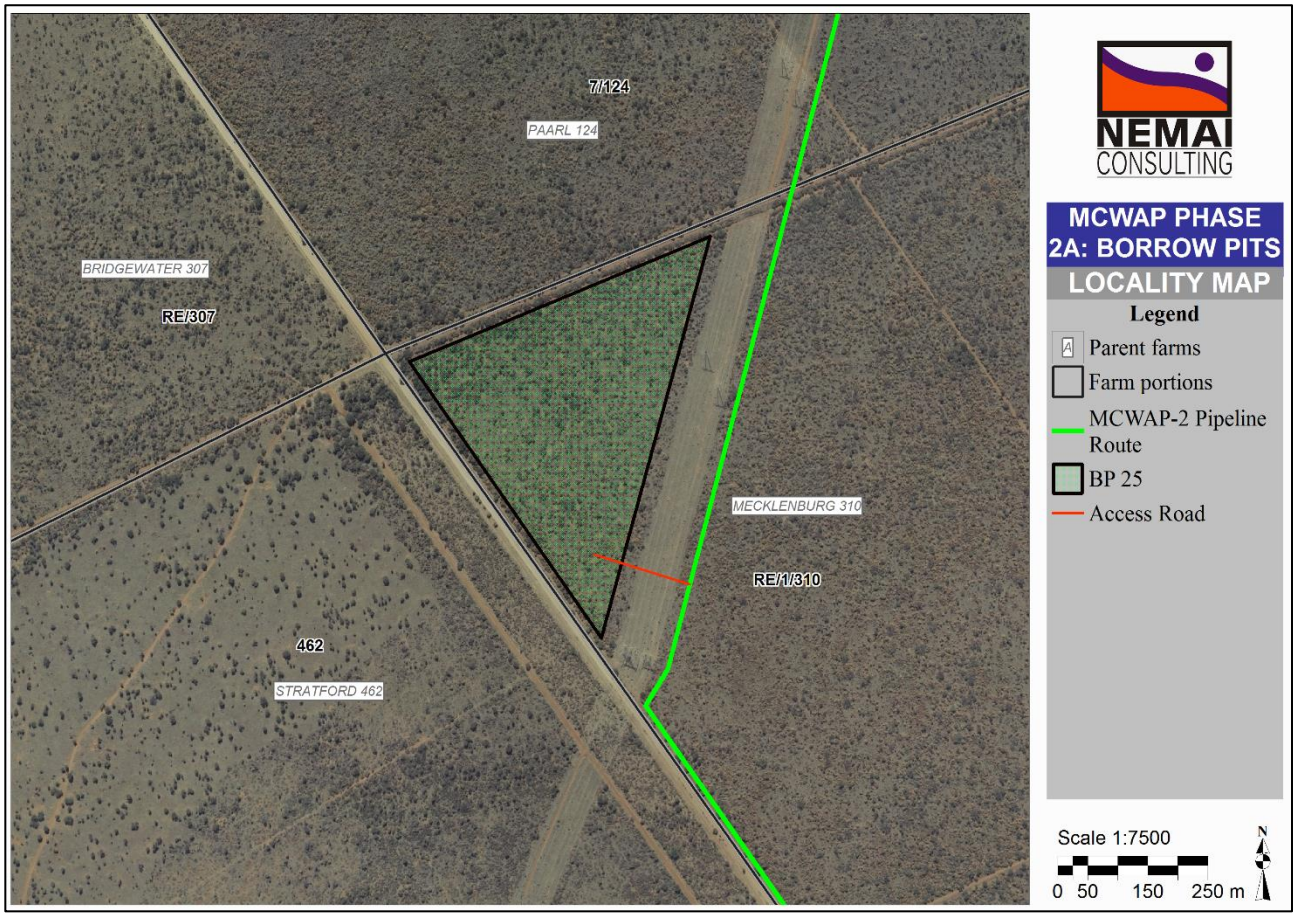
Borrow Pit SS1

Borrow pit Details				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m³)**	**Pipeline Section**	**Chainage (m)**	**Required ?**	**Length (km)**
BP SS1	0.3	1.3	8000	Low-lift Rising Main	200	Yes	1.0

Property Description		
Farm Name	HANNOVER 341 KQ	MOOIVALEI 342
Farm Portion	RE/341	RE/342
21 Digit SGI Code	T0KQ00000000031000001	T0KQ00000000034200000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
24°37'58.4341"S	27°18'56.2169"E
24°37'57.1443"S	27°18'55.6168"E
24°37'54.1066"S	27°18'52.214"E
24°37'56.1769"S	27°18'53.2871"E
24°37'57.112"S	27°18'54.2825"E

Borrow Pit 25

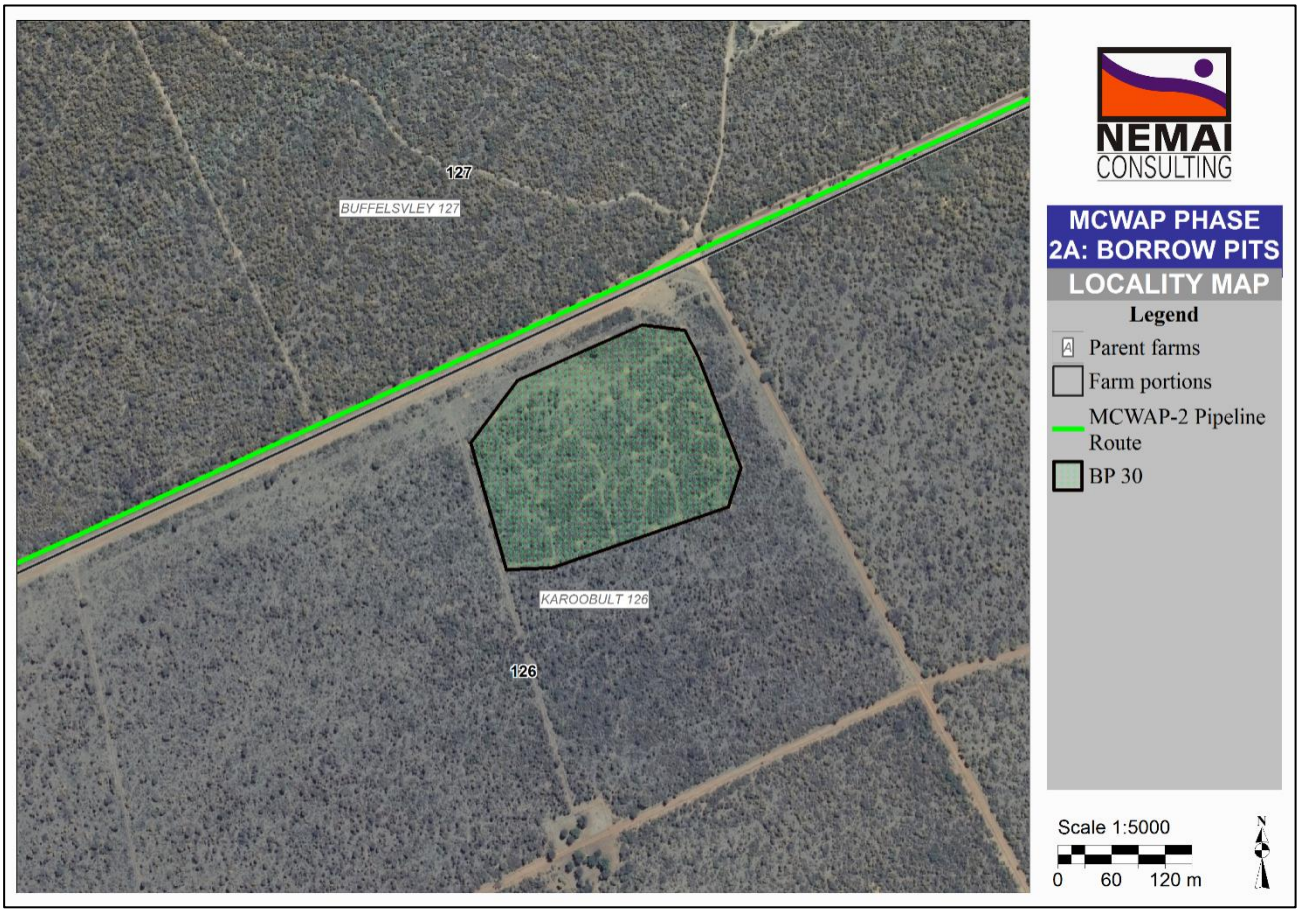


Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m³)**	**Pipeline Section**	**Chainage (m)**	**Required ?**	**Length (km)**
BP25	14.8	17.3	370 000	High-lift Rising Main	9 900	Yes	Access will be from pipeline servitude or existing farm road

Property Description	
Farm Name	MECKLENBURG 310 KQ
Portion	RE/1/310
SGI Code	T0KQ00000000031000001

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
24°31'34.7975"S	27°16'27.5508"E
24°31'13.9014"S	27°16'34.04"E
24°31'21.1893"S	27°16'16.5237"E

Borrow Pit 30

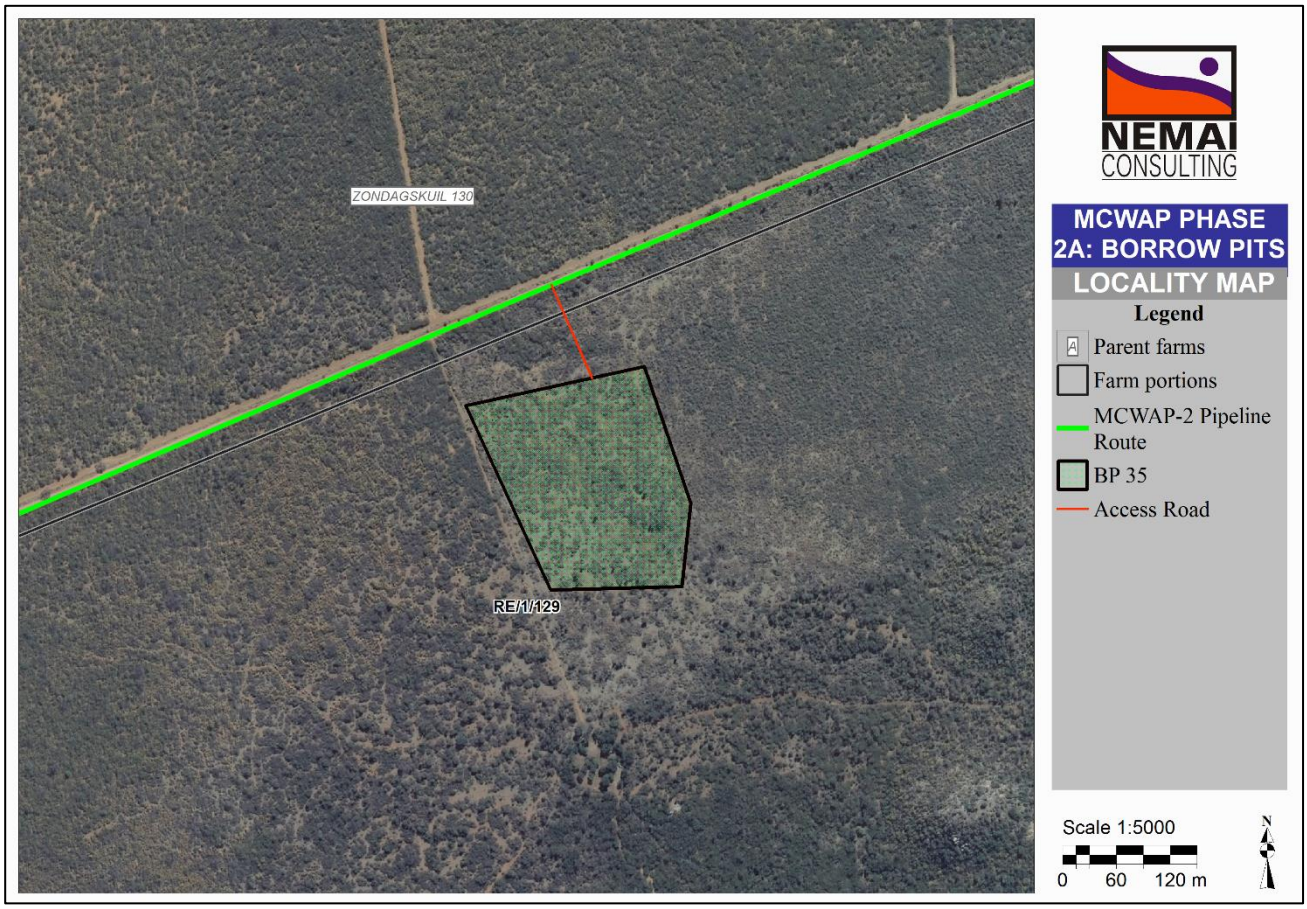


Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required ?**	**Length (km)**
BP30	7.2	8.9	170 000	High-lift Rising Main	20 800	No	Access will be from pipeline servitude

Property Description	
Farm Name	KAROOBULT 126 KQ
SGI Code	T0KQ00000000012600000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
24°27'19.7185"S	27°20'5.3856"E
24°27'19.654"S	27°20'7.289"E
24°27'17.5042"S	27°20'14.1978"E
24°27'16.0122"S	27°20'14.6254"E
24°27'11.059"S	27°20'12.4259"E
24°27'10.8698"S	27°20'10.8092"E
24°27'12.8821"S	27°20'5.8461"E
24°27'15.1351"S	27°20'3.9662"E

Borrow Pit 35

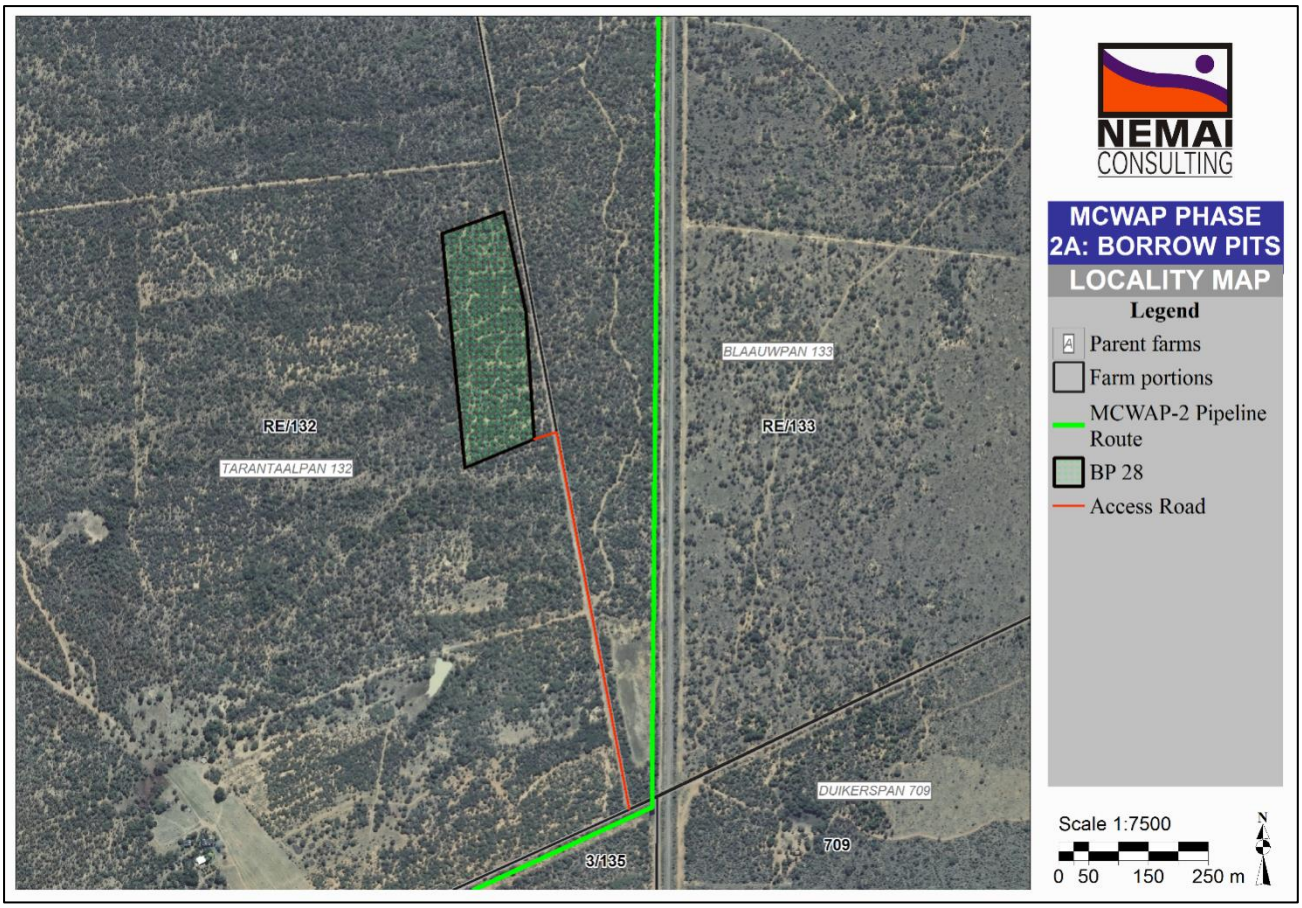


Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required ?**	**Length (km)**
BP35	4.3	5.7	65 000	High-lift Rising Main	25 200	Yes	0.10

Property Description	
Farm Name	LEEUWBOSCH 129 KQ
Portion	RE/1/129
SGI Code	T0KQ00000000012900001

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
24°26'21.9312"S	27°22'32.6288"E
24°26'21.7506"S	27°22'37.7603"E
24°26'18.801"S	27°22'38.2209"E
24°26'13.9252"S	27°22'36.2801"E
24°26'15.2796"S	27°22'29.3393"E

Borrow Pit 28



Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required ?**	**Length (km)**
BP28	4.6	6.1	105 000	Gravity Main from BPR to OR	8 600	Yes	Access will be from an existing farm road

Property Description	
Farm Name	TARANTAALPAN 132 KQ
Portion	RE/132
SGI Code	T0KQ00000000013200000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
24°22'54.442"S	27°26'44.1742"E
24°22'52.7652"S	27°26'48.3076"E
24°22'45.9716"S	27°26'47.7909"E
24°22'40.554"S	27°26'46.3348"E
24°22'41.8009"S	27°26'42.859"E

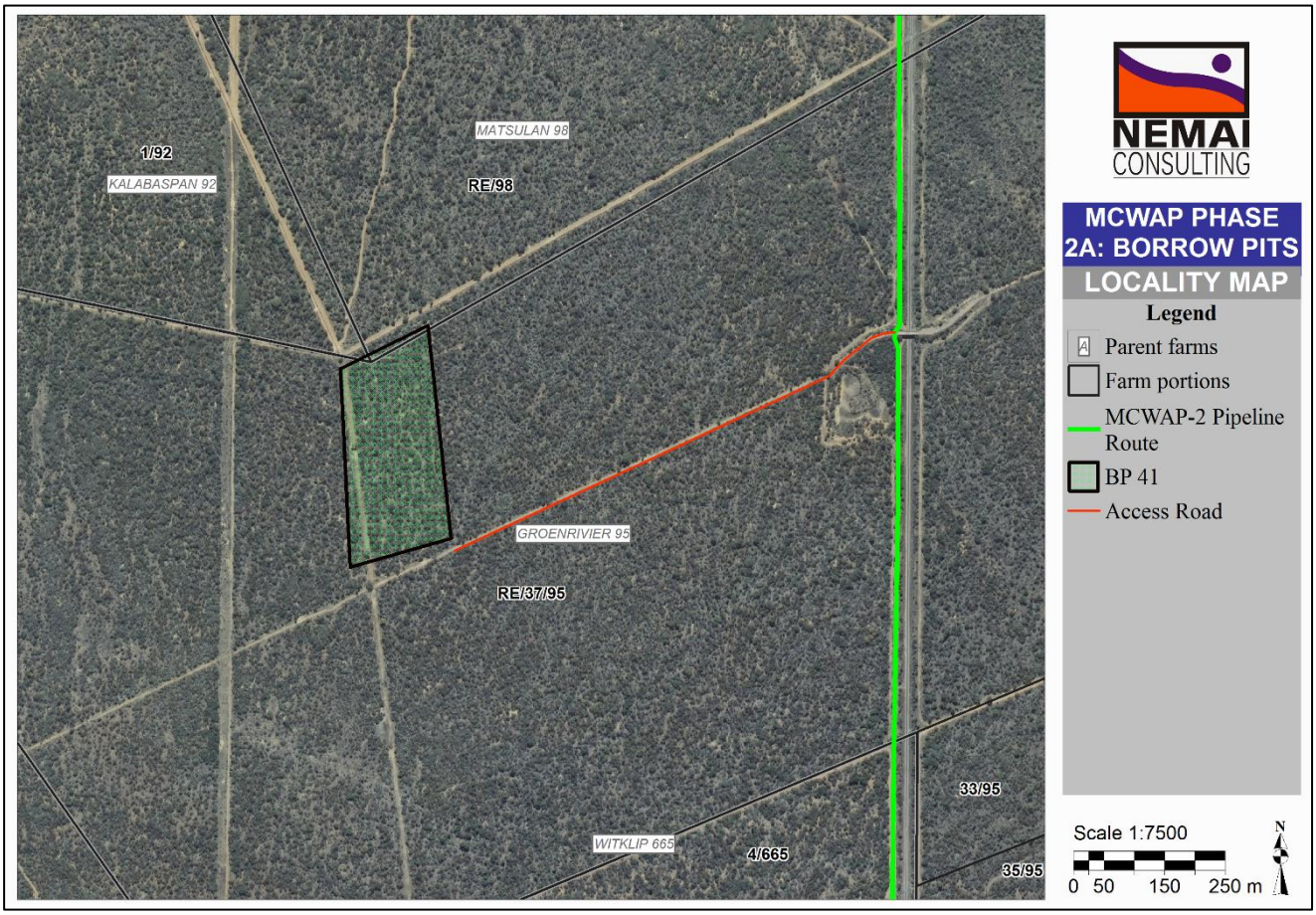
Borrow Pit 33

Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP33	7.6	9.4	223 500	Gravity Main from BPR to OR	17 900	Yes	0.13

Property Description	
Farm Name	RUIGTEVLEY 97 KQ
Portion	5/97
SGI Code	T0KQ00000000009700005

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
24°17'42.1626"S	27°26'54.9996"E
24°17'30.8758"S	27°26'53.8263"E
24°17'33.6707"S	27°26'49.813"E
24°17'34.7026"S	27°26'43.6875"E
24°17'34.7456"S	27°26'43.7345"E
24°17'34.7456"S	27°26'43.7579"E
24°17'36.487"S	27°26'45.0018"E
24°17'39.7763"S	27°26'45.1192"E

Borrow Pit 41



Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m³)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP41	5.3	6.8	180 000	Gravity Main from BPR to OR	23 100	Yes	Access will be from an existing farm road

Property Description		
Farm Name	GROENRIVIER 95 KQ	MATSULAN 98 KQ
Portion	RE/37/95	RE/98
SGI Code	T0KQ00000000009500037	T0KQ00000000009800000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
24°15'1.7993"S	27°26'27.1333"E
24°15'0.3546"S	27°26'33.1112"E
24°14'49.0376"S	27°26'31.6331"E
24°14'51.381"S	27°26'26.7016"E

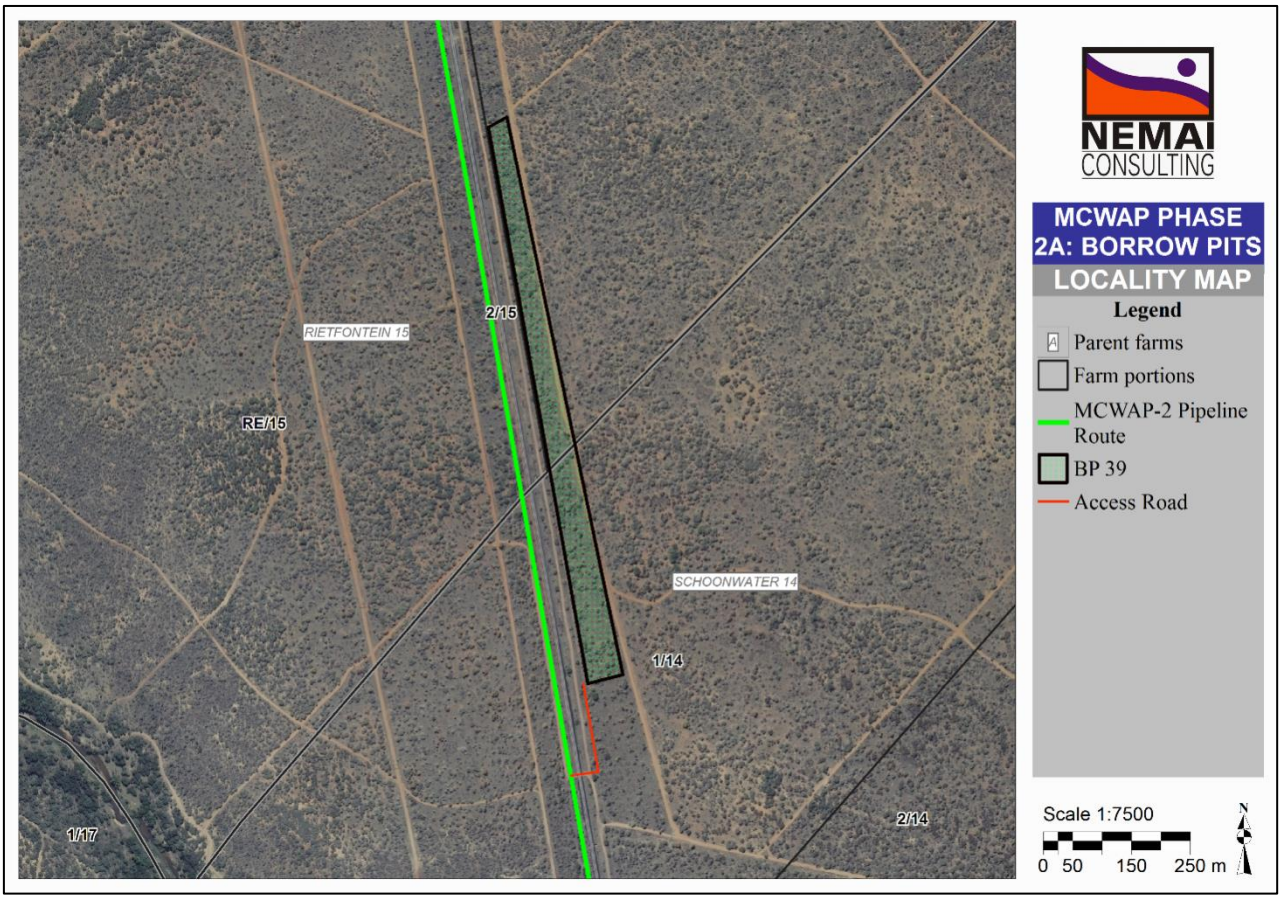
Borrow Pit 38

Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m³)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP38	7.0	8.7	100 000	Gravity Main from BPR to OR	31 200	Yes	Access will be from an existing farm road

Property Description	
Farm Name	HAARLEM OOST 51 KQ
Portion	16/51
SGI Code	T0KQ00000000005100016

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
24°10'57.3539"S	27°26'10.1793"E
24°10'53.9226"S	27°26'12.3131"E
24°10'52.207"S	27°26'16.0883"E
24°10'51.0632"S	27°26'14.4469"E
24°10'48.3544"S	27°26'12.8055"E
24°10'42.8463"S	27°26'10.803"E
24°10'41.9133"S	27°26'5.8132"E
24°10'43.1172"S	27°26'5.0581"E
24°10'52.6284"S	27°26'7.2248"E
24°10'55.0965"S	27°26'8.3738"E

Borrow Pit 39

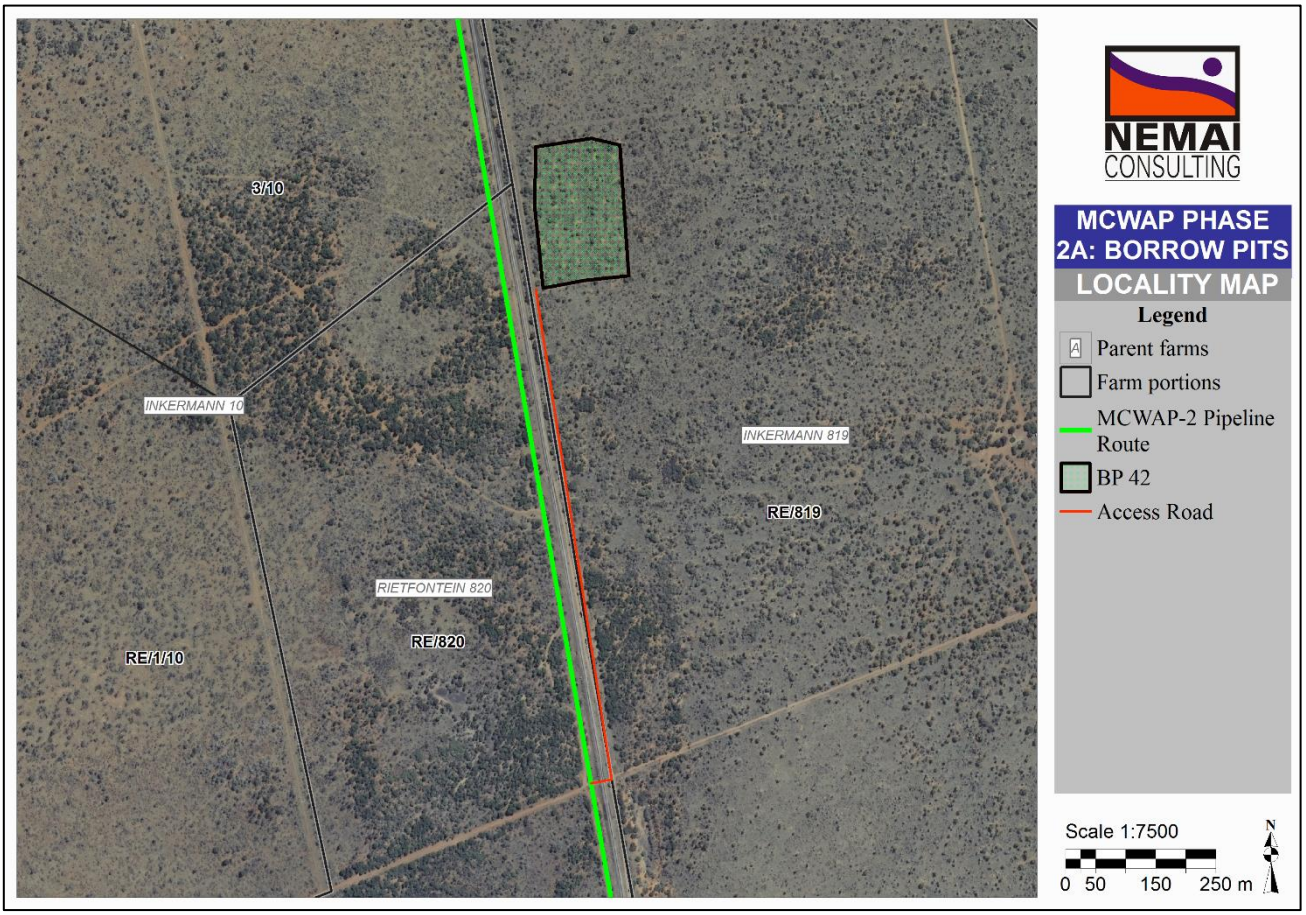


Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP39	4.5	6.0	105 000	Gravity Main from BPR to OR	42 900	Yes	0.21

Property Description		
Farm Name	RIETFONTEIN 15 KQ	SCHOONWATER 14 KQ
Portion	RE/15	1/14
SGI Code	T0KQ00000000001500000	T0KQ00000000001400001

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
24°4'39.4075"S	27°24'55.8886"E
24°4'38.913"S	27°24'58.0207"E
24°4'8.4484"S	27°24'51.0389"E
24°4'9.0074"S	27°24'49.9846"E

Borrow Pit 42



Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m³)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP42	3.3	4.6	150 000	Gravity Main from BPR to OR	46 900	Yes	0.88

Property Description	
Farm Name	INKERMANN 819 KQ
Portion	RE/819
SGI Code	T0KQ00000000081900000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
24°1'39.0922"S	27°24'21.9184"E
24°1'38.3999"S	27°24'26.935"E
24°1'31.4169"S	27°24'26.3776"E
24°1'31.1159"S	27°24'24.6398"E
24°1'31.6577"S	27°24'21.4266"E
24°1'35.1191"S	27°24'21.361"E

Borrow Pit 44

Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP44	5.1	6.6	140 000	Gravity Main from BPR to OR	54 800	Yes	Access will be from an existing farm road

Property Description	
Farm Name	DIEPSPRUIT 386 LQ
SGI Code	T0LQ00000000038600000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
23°57'59.608"S	27°23'30.3749"E
23°57'58.8856"S	27°23'35.8152"E
23°57'48.0799"S	27°23'31.6531"E
23°57'48.9227"S	27°23'26.8682"E

Borrow Pit 43

Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP43	4.3	5.7	110 000	Gravity Main from BPR to OR	63 000	Yes	Access will be along an existing farm road

Property Description	
Farm Name	ZANDFONTEIN 382 LQ
Portion	2/382
SGI Code	T0LQ00000000038200002

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
23°54'52.2554"S	27°23'43.0792"E
23°54'54.113"S	27°23'48.2459"E
23°54'45.4271"S	27°23'50.0056"E
23°54'44.8079"S	27°23'46.4862"E
23°54'44.7907"S	27°23'43.6034"E
23°54'48.4199"S	27°23'42.7797"E

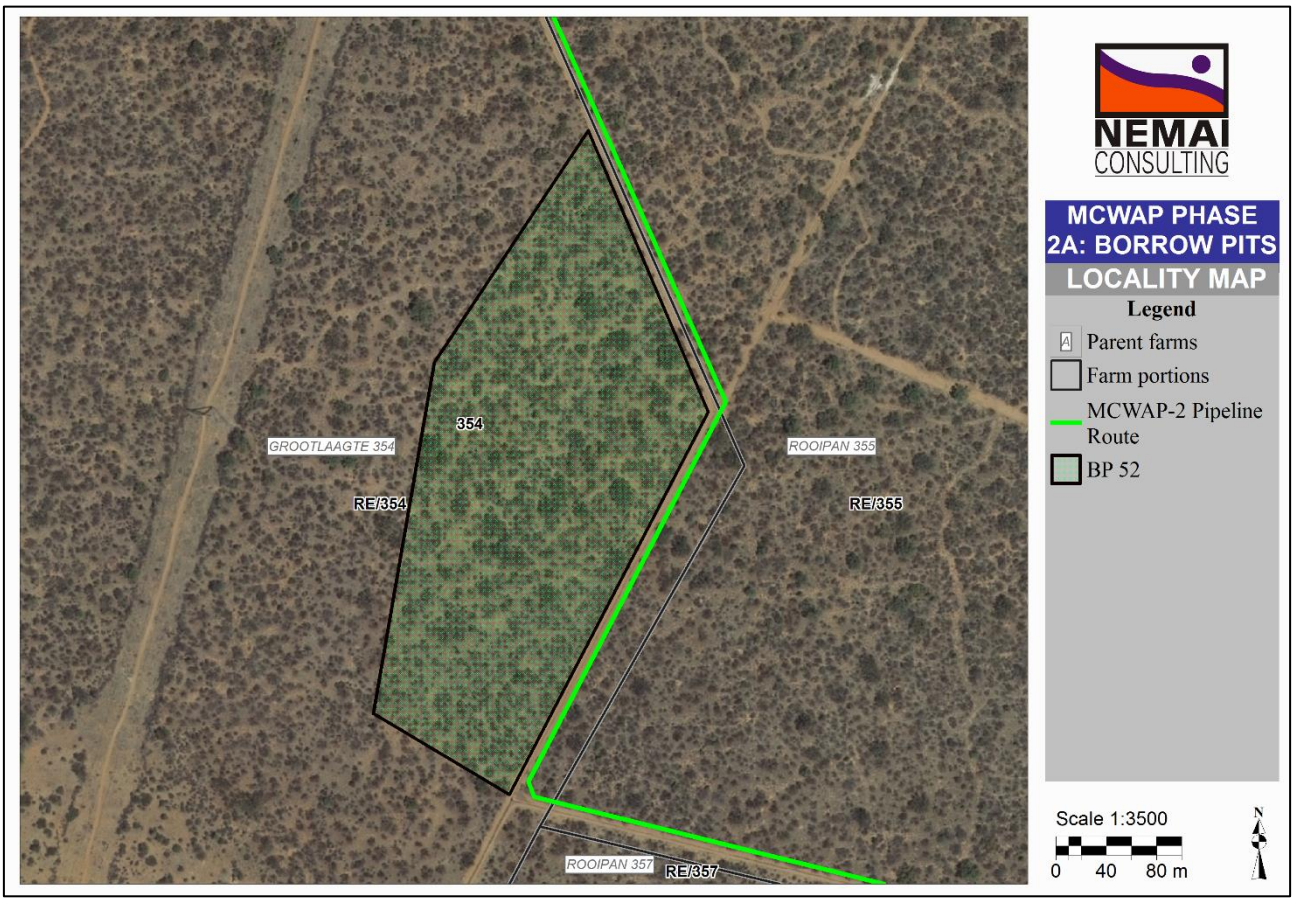
Borrow Pit 53

Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m³)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP53	2.3	3.5	60 000	Gravity Main from OR to Steenbokpan	2 300	No	Access will be along the pipeline servitude

Property Description	
Farm Name	ROOIPAN 357 LQ
Portion	4/357
SGI Code	T0LQ00000000035700004

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
23°52'31.2644"S	27°23'45.1659"E
23°52'32.0169"S	27°23'50.8855"E
23°52'27.5772"S	27°23'51.751"E
23°52'26.771"S	27°23'46.0198"E

Borrow Pit 52

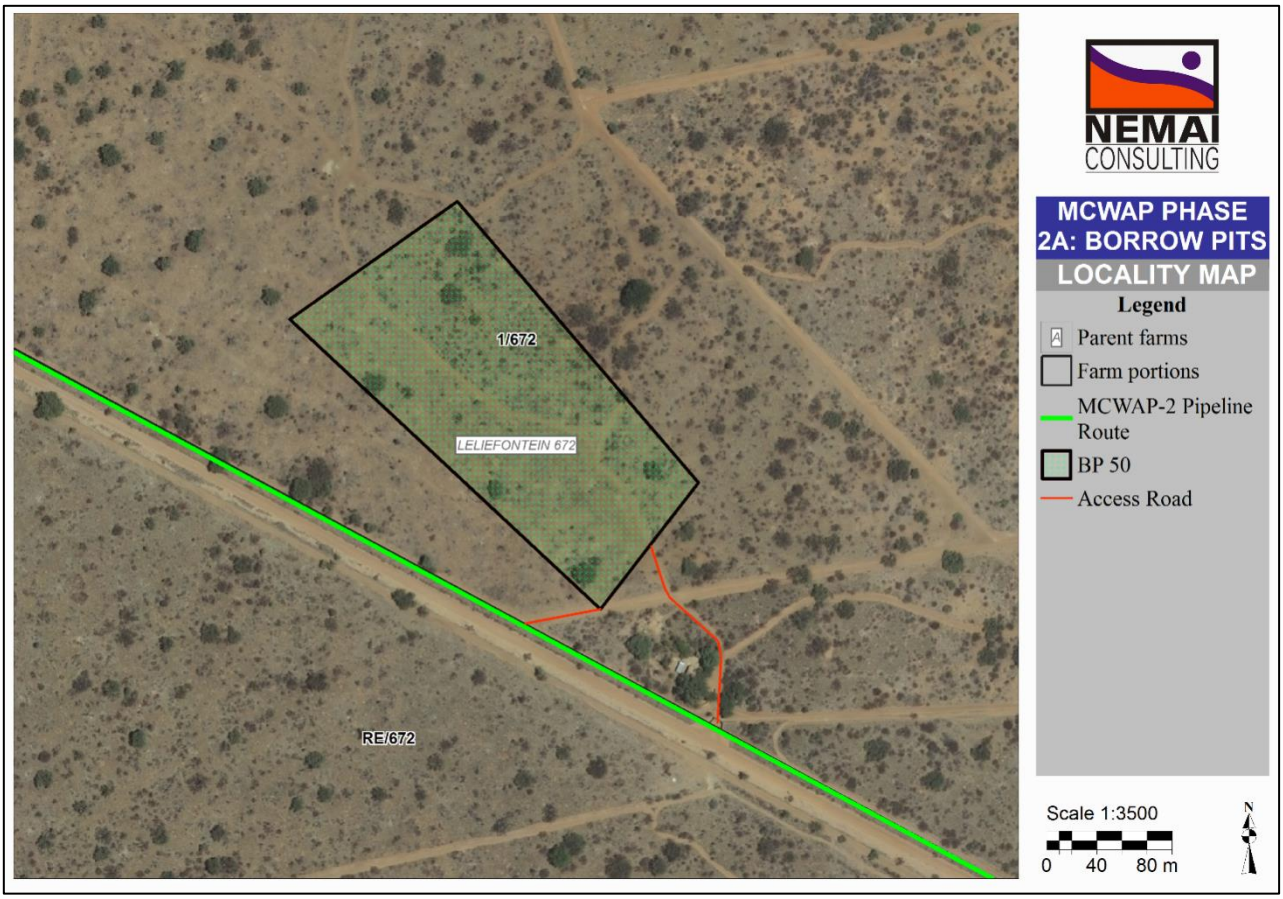


Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m³)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP52	7.2	8.9	100 000	Gravity Main from OR to Steenbokpan	6 000	No	Access will be along the pipeline servitude

Property Description	
Farm Name	GROOTLAAGTE 354 LQ
Portion	RE/354
SGI Code	T0LQ00000000035400000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
23°51'59.9173"S	27°21'45.4487"E
23°52'2.0844"S	27°21'49.2474"E
23°51'52.3923"S	27°21'54.6507"E
23°51'45.3188"S	27°21'51.3105"E
23°51'51.0679"S	27°21'47.1188"E

Borrow Pit 50



Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP50	4.4	5.8	100 000	Gravity Main from OR to Steenbokpan	12 800	Yes	Access will be along existing farm roads

Property Description	
Farm Name	LELIEFONTEIN 672 LQ
Portion	1/672
SGI Code	T0LQ00000000067200001

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
23°48'32.3825"S	27°21'2.1591"E
23°48'29.1919"S	27°21'4.876"E
23°48'22.0883"S	27°20'58.1657"E
23°48'25.008"S	27°20'53.6158"E

Borrow Pit 48

Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP48	10.7	12.8	100 000	Gravity Main from OR to Steenbokpan	16 500	Yes	Access will be along

Property Description		
Farm Name	ZANDHEUVEL 356 LQ	ZANDHEUVEL 356
Portion	1/356	RE/356
SGI Code	T0LQ00000000035600001	T0LQ00000000035600000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
23°47'27.0849"S	27°19'14.3643"E
23°47'23.7953"S	27°19'29.022"E
23°47'15.6468"S	27°19'26.8712"E
23°47'19.3878"S	27°19'12.3071"E

Borrow Pit 49

Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP49	5.2	6.7	100 000	Gravity Main from OR to Steenbokpan	20 700	No	Access will be along the pipeline servitude

Property Description	
Farm Name	SCHULDPADFONTEIN 328 LQ
Portion	RE/328
SGI Code	T0LQ00000000032800000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
23°46'9.4972"S	27°17'27.6226"E
23°46'7.0892"S	27°17'30.993"E
23°45'55.8919"S	27°17'22.256"E
23°45'57.8183"S	27°17'18.5256"E

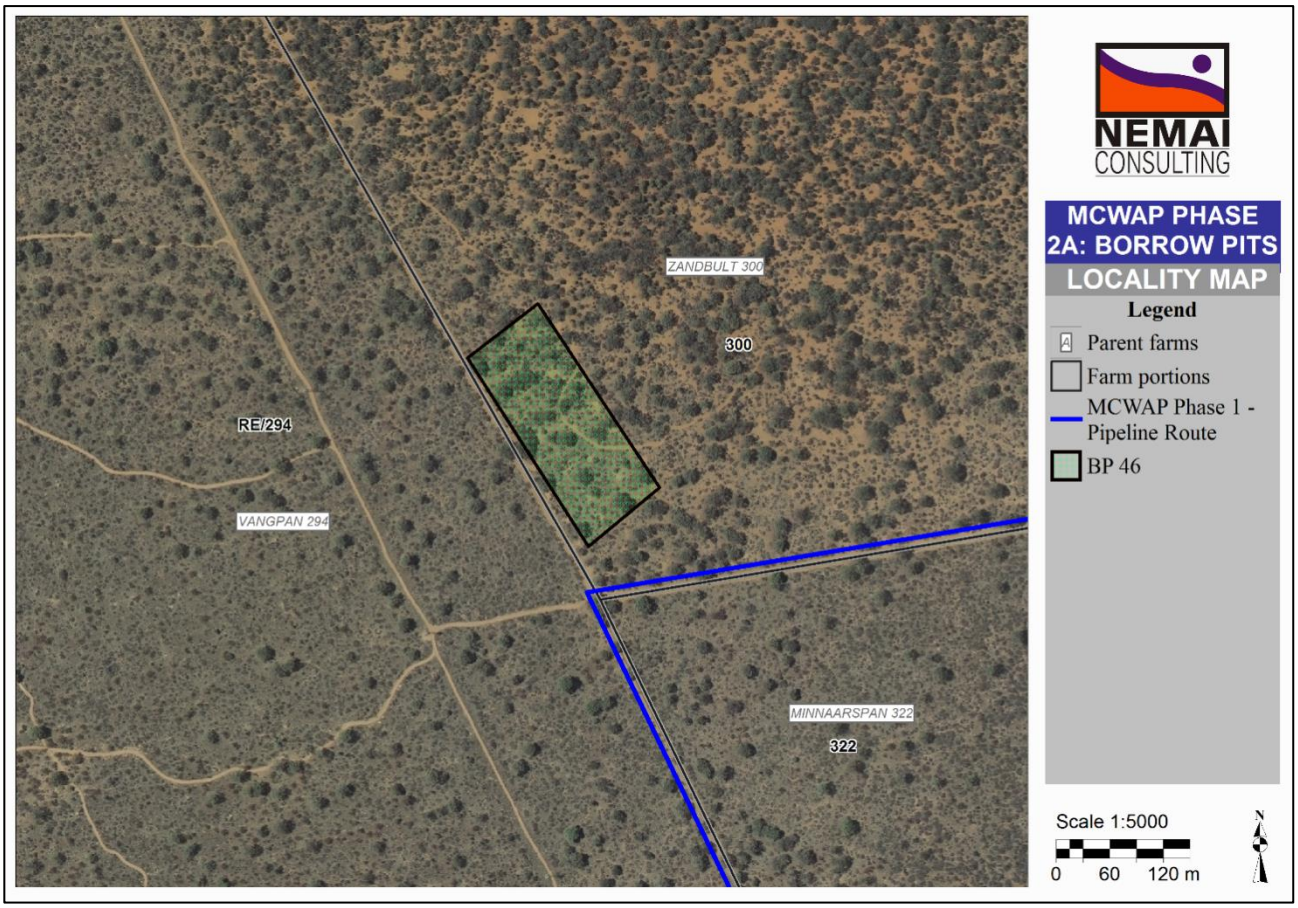
Borrow Pit 15

Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP15	3.3	4.6	100 000	Gravity Main from Steenbokpan to Medupi	1 100	No	Access will be along pipeline servitude

Property Description	
Farm Name	VANGPAN 294 LQ
Portion	1/294
SGI Code	T0LQ00000000029400001

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
23°43'35.4929"S	27°17'9.9853"E
23°43'32.8424"S	27°17'16.6937"E
23°43'26.4778"S	27°17'14.5049"E
23°43'29.4422"S	27°17'7.2659"E

Borrow Pit 46

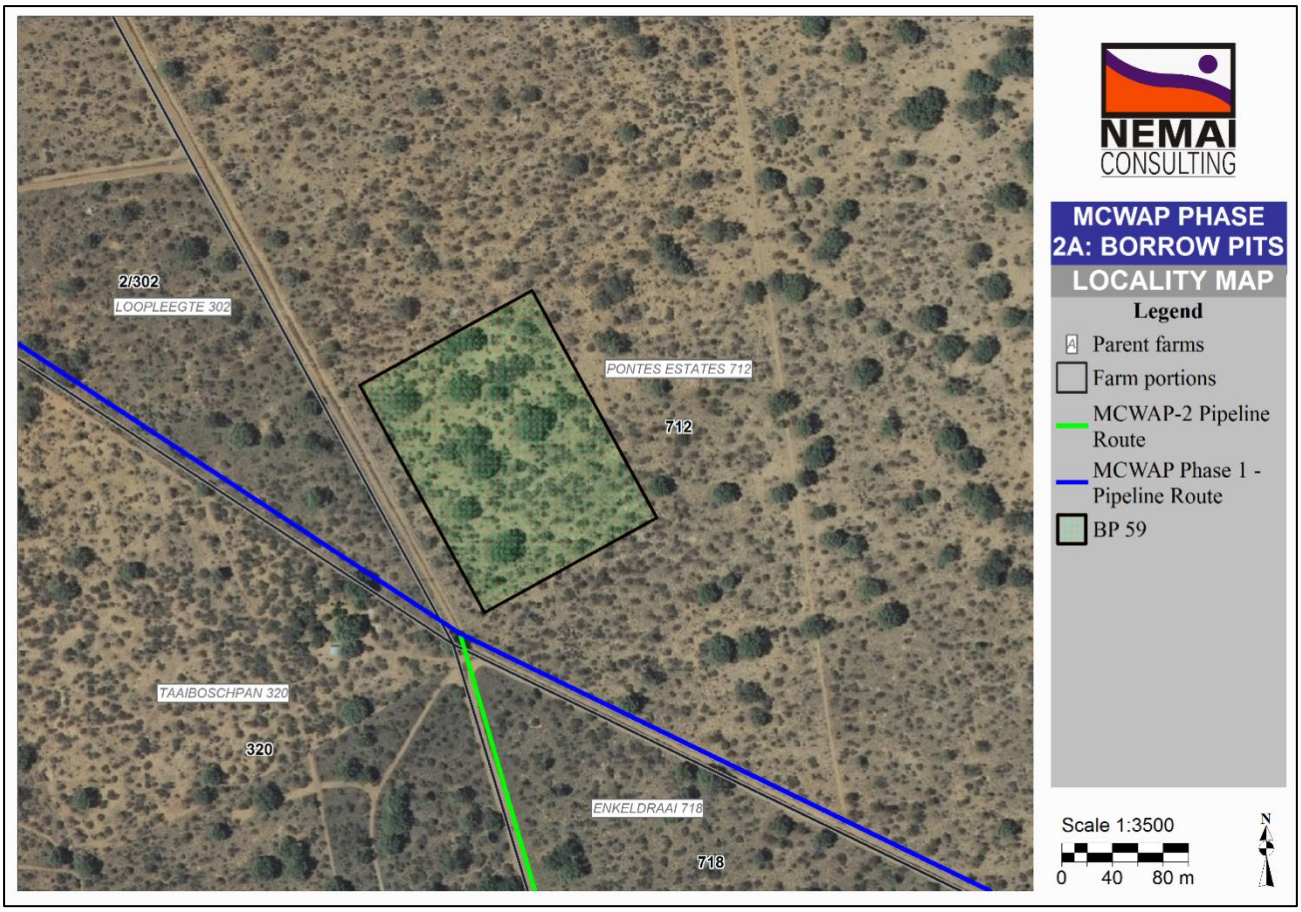


Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m³)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP46	2.5	3.8	100 000	Gravity Main from Steenbokpan to Medupi	6 800	No	Access will be along pipeline servitude

Property Description	
Farm Name	ZANDBULT 300 LQ
SGI Code	T0LQ00000000030000000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
23°42'15.3395"S	27°20'0.1334"E
23°42'13.2549"S	27°20'2.9162"E
23°42'6.614"S	27°19'58.1899"E
23°42'8.5348"S	27°19'55.4475"E

Borrow Pit 59

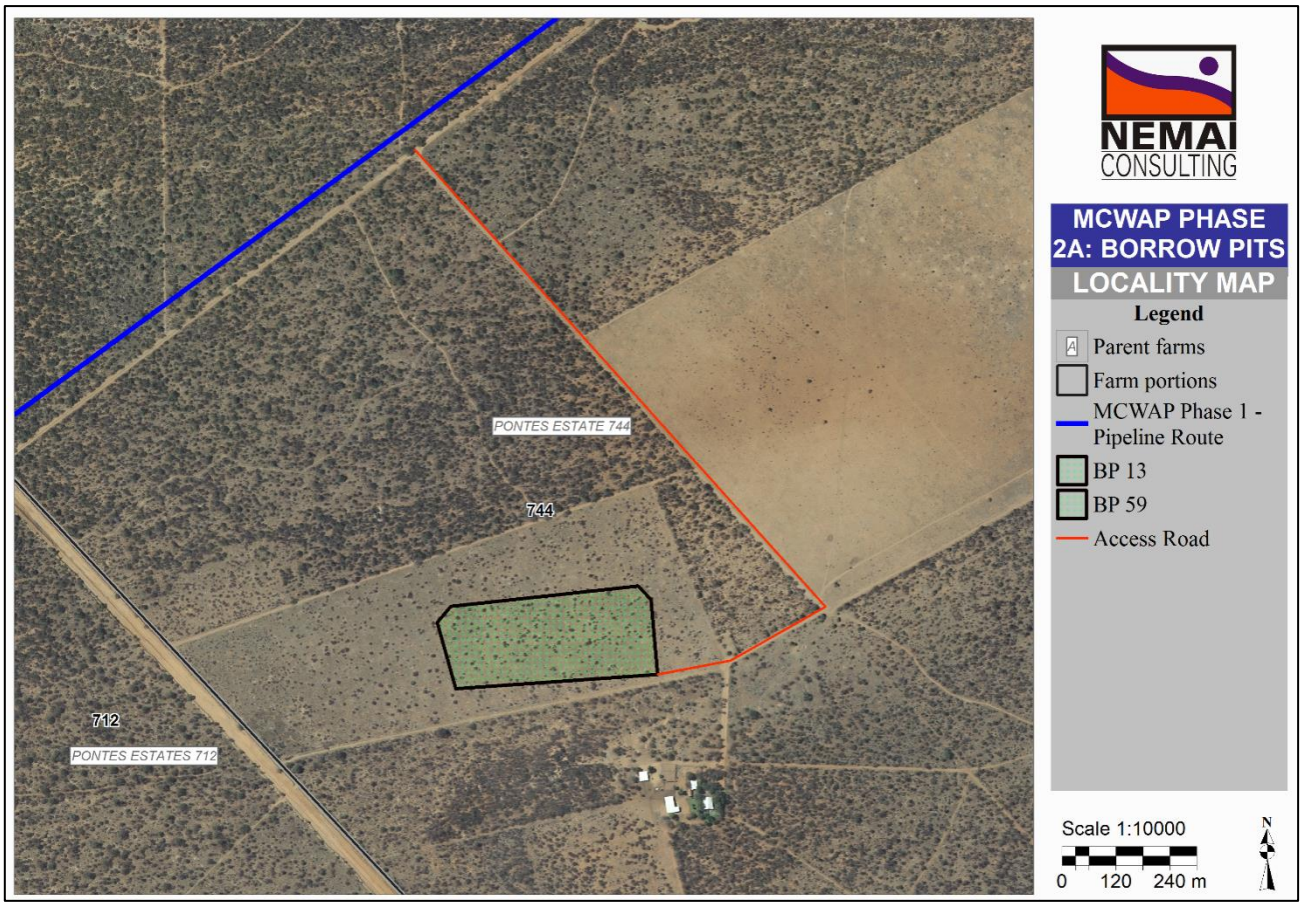


Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP59	3.0	4.3	100 000	Gravity Main from Steenbokpan to Medupi	14 800	No	Access will be along pipeline servitude

Property Description	
Farm Name	PONTES ESTATES 712 LQ
SGI Code	T0LQ00000000071200000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
23°43'23.7072"S	27°24'18.4376"E
23°43'21.3293"S	27°24'23.1154"E
23°43'15.7607"S	27°24'19.7134"E
23°43'18.0784"S	27°24'15.0356"E

Borrow Pit 13

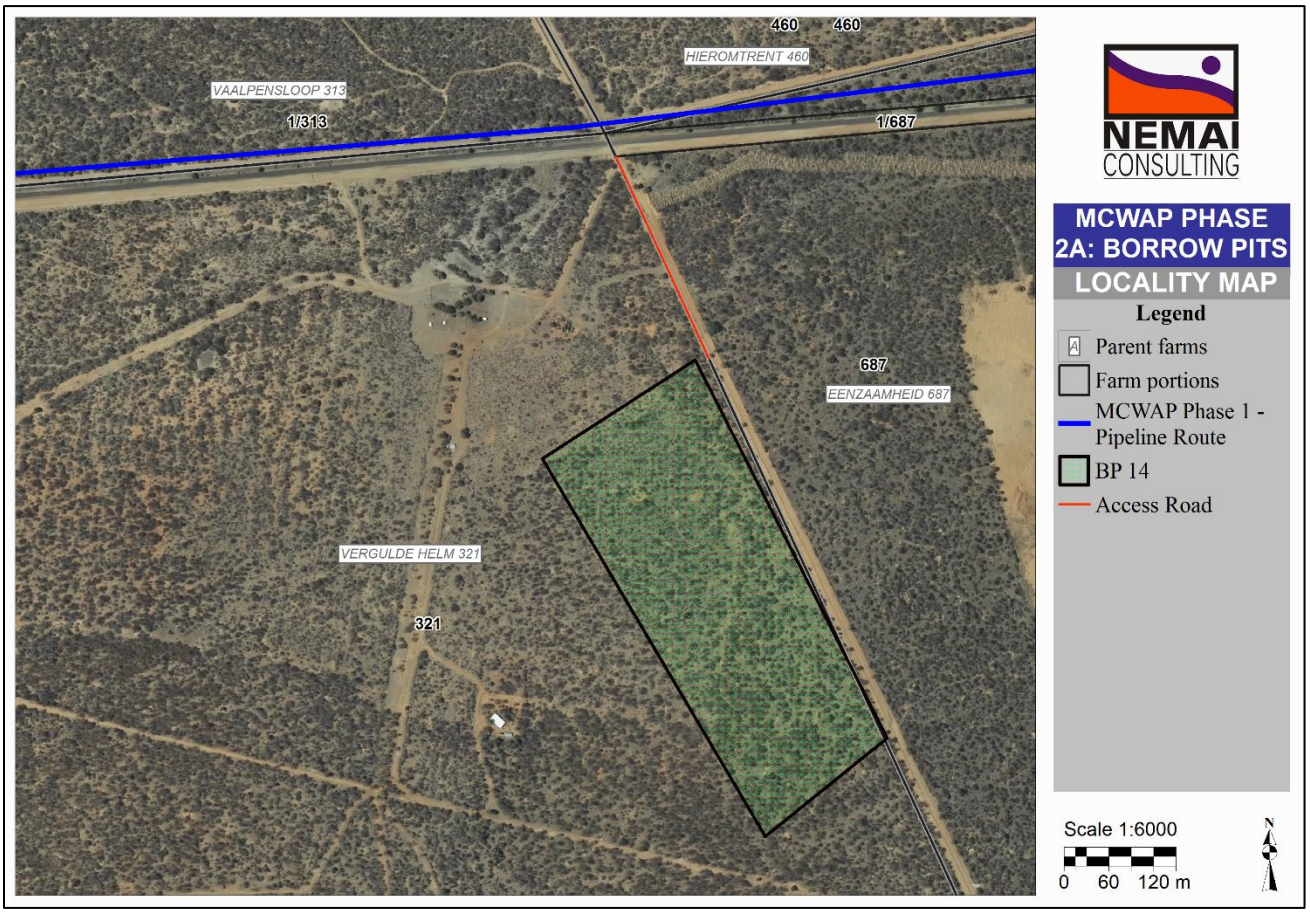


Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m³)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP13	7.7	9.5	100 000	Gravity Main from Steenbokpan to Medupi	20 000	Yes	1.04

Property Description	
Farm Name	PONTES ESTATE 744 LQ
SGI Code	T0LQ00000000074400000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
23°43'43.623"S	27°27'16.7588"E
23°43'44.3786"S	27°27'32.2353"E
23°43'39.0312"S	27°27'31.73"E
23°43'38.0721"S	27°27'30.8772"E
23°43'39.409"S	27°27'16.1903"E
23°43'40.7458"S	27°27'15.148"E

Borrow Pit 14



Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP14	12.6	14.9	100 000	Gravity Main from Steenbokpan to Medupi	25 300	Yes	0.33

Property Description		
Farm Name	VERGULDE HELM 321 LQ	EENZAAMHEID 687 LQ
SGI Code	T0LQ00000000032100000	T0LQ00000000068700000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
23°43'2.6628"S	27°29'55.8348"E
23°42'58.5708"S	27°30'1.409"E
23°42'44.836"S	27°29'53.0967"E
23°42'46.5507"S	27°29'45.4621"E

Borrow Pit 51

Borrow pit				Pipeline Reference		Access Road	
Name	**BP Area (ha)**	**Management Area (ha)****	**Volume (m^3)**	**Pipeline Section**	**Chainage (m)**	**Required?**	**Length (km)**
BP51	3.8	5.2	100 000	Gravity Main from Steenbokpan to Medupi	32 500	No	Access will be along pipeline servitude

Property Description	
Farm Name	NAAUW ONTKOMEN 509 LQ
SGI Code	T0LQ00000000050900000

Co-ordinates of corner points	
Latitude (S) (DDMMSS)	**Longitude (E) (DDMMSS)**
23°41'36.0895"S	27°33'53.6565"E
23°41'34.3351"S	27°34'4.7385"E
23°41'29.7942"S	27°34'3.2809"E
23°41'33.2859"S	27°33'52.7034"E

9.2.2 Access/haul Roads

Access and haul roads will be required to gain access to borrow areas and the construction sites of the MCWAP-2A project infrastructure. The access roads primarily follow existing farm roads or dirt roads, or the sites will be accessed from the pipeline servitude. However, due to the remote location of some borrow areas, access/haul roads will have to be constructed to allow the transportation of required construction material from the borrow areas to the necessary construction sites along the pipeline. Proposed access/haul roads are shown in Section 9.2.1.

9.2.3 Spoil Sites

In addition to the borrow pit sites discussed above, potential spoil sites (old borrow sites from construction of the railway line and roads) were identified as well. A description of each proposed spoil site is provided in the tables below, which emanates from the geotechnical investigations conducted in 2012. The locations of the proposed spoil sites is provided in the tables below.

Table 7: Potential Spoil Sites

Site no.	Co-ordinates (WGS84, Lo27)		Approx. km distance	Estimated volume (m^3)	Comments
	Y	X			
A	-031 600	2 719 400	8	30,000	Old BP
B	-041 150	2 702 400	34.3	20,000	Old BP
C	-040 650	2 699 850	36.6	30,000	Old BP (1km north along R510)
D	-045 491	2 698 008	19,8	40,000	Old BP

Site no.	Co-ordinates (WGS84, Lo27)		Approx. Chainage (m)	Estimated volume (m^3)	Comments
	Y	X			
D	-045 491	2 698 008	7,800	80,000	Old BP
E	-045543	2 693 229	12,700	20,000	Old BP
F	-045 760	2 687 880	18,000	80,000	Old BP(E of railway)
G	-045 734	2 686 134	19,800	50,000	Old BP(E of railway)
H	-045 603	2 682 846	23,100	45,000	Old BP

Site no.	Co-ordinates (WGS84, Lo27)		Approx. Chainage (m)	Estimated volume (m^3)	Comments
	Y	X			
I	-045 385	2 677 101	28,800	45,000	Old BP
J	-044 873	2 675 751	30,300	70,000	Old BP
K	-041 476	2 659 299	47,100	15,000	Old BP(E of railway)
L	040 900	2 656 731	49,800	20,000	Old BP

Site no.	Co-ordinates (WGS84, Lo27)		Approx. Chainage (m)	Offset (m) (from preferred route)	Estimated volume (m^3)	Comments
	Y	X				
M	-037 949	2 644 719	0,820/	7,000 N*	10,000	Old BP
N	-042 426	2 637 474	12,700	1,200 S*	50,000	Old BP
O	-035 909	2 642 131	18,000	3,000 S	5,000	Old BP
P	-027 383	2 624 039	19,800	1,400 W*	10,000	Old BP

9.2.4 Management Area

The management area (1ha) of all borrow pits, includes associated mining infrastructure and equipment listed below (see **Figure 8** for examples):

- Topsoil stockpile (10% of the borrow area);
- Screeners (if necessary);
- Site office/store;
- Waste storage facilities (hazardous and general waste); and
- Excavators, dozer, tipper trucks, front-end loader.

Figure 8: Example of borrow pit infrastructure and equipment

9.2.5 Pre-Mining Phase

The activities associated with the pre-mining phase of the borrow pit (ASPASA, 2013) include amongst others:

- Determine pre-existing drainage patterns and concentration of flow on the potential site;
  - Surface-water flow;
  - Groundwater conditions;
- Site preparation;
  - Construction of access and haul roads,
  - Fencing of borrow pit and associated management area and access/haul road,
- Land Clearing;
- Stripping of topsoil/overburden and temporary stockpiling.

9.2.6 Mining Phase

Activities associated with the mining phase of the borrow areas, are described below:

- Excavation of required material;
  - The material will be excavated from the borrow area by the use of an excavator in order to remove required volumes of construction material.
- Processing of material (screener):
  - Excavated material will be placed in a screener (if necessary), where the processed material will be stockpiled.
- Stockpiling of material:
  - All material will have demarcated stockpiling sites, to be used during mining operations at the borrow area. Specific stockpiles for overburden and topsoil removed during the pre-mining and mining phase, will be stored separately and used a backfilling during the rehabilitation and closure of the borrow area.
- Transferring of material to tipper trucks:
  - All required material for construction, will be loaded onto haul vehicles (i.e. tipper trucks) by a front end loader, where the material will then be transported to the necessary construction sites within the pipeline servitude.
- Haul roads:
  - Existing farm roads will be used as far as possible to transport required material to the construction sites. Where the borrow area is situated in close proximity to the pipeline servitude, access will be via the servitude. Dust suppression will be undertaken via a water tanker.
- Stormwater management:
  - Due to the borrow areas falling on relatively flat terrain, ponding of water during summer rainfall events is probable. A stormwater management procedure will thus be required on site. Measures to manage stormwater will be provided in the EMPr.

9.2.7 Post-Mining Phase

The following activities will occur during the post-mining phase of the borrow areas:

- All fences, infrastructure (site office/store), mining equipment (screener, haul vehicles), and waste/rubble on site will be removed;
- Overburden stockpiles from the mining phase will be used for the filling of old borrow pits; and
- Site stabilisation:
  - Borrow areas will be graded, revegetated and grassed in order to blend with surrounding environment. Hydro-seeding and fertilisation will be applied to the borrow areas.
- Closure of borrow area:
  - A closure plan will also be required for the proposed borrow pits. The closure plan will ensure that the borrow area is rehabilitated, and that after closure of the area, vegetation establishes effectively. Measures for rehabilitation of the borrow areas during closure will be provided in the EMPr.

Based on a Memorandum of Understanding in 2007 between the then DWAF and DME, it was agreed between these parties that for the construction and maintenance of Government Waterworks undertaken by the DWS's own Construction Unit, this Department shall be deemed to comply with the requirements of financial provision. Provided that the estimated costs for the management, rehabilitation and closure of such quarries and borrowed areas or works are provided for within the approved budget for such Government Waterworks.

9.3 Implementation Programme

The indicative implementation dates for MCWAP-2A Water Transfer Infrastructure component, are provided below:

- Commencement of construction : Fourth Quarter 2019
- Construction duration : 42 months
- Commissioning : Third Quarter 2023
- Site Closure & Rehabilitation : Fourth Quarter 2025

9.4 Resources Required for Pre-mining and Mining Phase

This section briefly outlines the resources that will be required to execute the project.

9.4.1 Water

During the mining stage, water will be required for various purposes, such as washing of plant and equipment in dedicated areas, dust suppression, potable use by construction workers, etc. Water for construction purposes will be sourced directly from watercourses on site and groundwater (boreholes) will also be utilised. Water tankers will also supply water to the site and be used for dust suppression. Water for operational purposes will include domestic supply. All

water uses triggered in terms of Section 21 of the NWA will comply with DWS' requirements. Further provisions for water uses will be included in the EMPr, as part of the EIA Report.

9.4.2 Sanitation

Sanitation services will be required for construction labourers in the form of chemical toilets, which will be serviced at regular intervals by the supplier. Conservancy tanks will be provided at the residential labour camps and site offices. Further provisions will be included in the EMPr as part of the EIA Report.

9.4.3 Waste

Solid waste generated during the mining phase will be temporarily stored at suitable locations (e.g. demarcated stockpiles) and will be removed at regular intervals and disposed of at approved waste disposal sites within each of the local municipalities that are affected by the project. All the waste disposed of will be recorded. Based on the Integrated Waste Management Plan for the Thabazimbi LM (2016), the Thabazimbi landfill and the Northam landfill are both licenced. According to the IDP for the Lephalale LM (2016), there is a permitted landfill within the municipality.

All storage of general or hazardous waste in a waste storage facility (e.g. onsite waste containers, skips) will comply with the national norms and standards (GN R. 926 of 29 November 2013). The waste storage facility will be established at the camp where waste from site will be collected, sorted, weighed and placed in skips and recycling containers for removal to service providers and appropriate registered landfill sites (hazardous and general sites, as required).

Wastewater, which refers to any water adversely affected in quality through mining-related activities and human influence, will include the following:

- Sewage;
- Water used for washing purposes (e.g. equipment, staff); and
- Drainage over contaminated areas (e.g. cement batching / mixing areas, workshop, equipment storage areas).

All wastewater discharges will comply with legal requirements associated with the NWA, including the General Authorisation that specifically deals with Section 21(f) and Section 21(g) water uses. Suitable measures will be implemented to manage all wastewater generated during the mining phase. Further provisions for the handling of waste, will be included in the EMPr as part of the EIA Report.

9.4.4 Roads

Temporary access and haul roads will need to be constructed for the mining phase of the borrow pits which are remote with no existing roads. Where the borrow pits fall next to the MCWAP Phase 2 pipeline servitude or have existing dirt or farm roads, those roads will be used as far as possible. Refer to **Section 9.2**.

9.4.5 Fencing

All the proposed borrow areas, and associated access/haul roads will be temporarily fenced off until the project is complete, and the sites have been completely rehabilitated.

9.4.6 Electricity

The power requirements during the pre-mining and mining phases of the project, will be sourced from the proposed substation and transformer yard which all MCWAP-2A power requirements will be serviced from. Eskom will submit a separate application to DEA to seek approval for the bulk power required for MCWAP-2A. Other sources of electricity on site will be in the form of generators.

9.4.7 Associated Facilities

It is anticipated that provision will be made for the following facilities within the management area of the borrow pits:

- Site offices;
- Workshops and stores;
- Demarcated topsoil, sand and crushed stone stockpile areas;
- Areas for the handling of hazardous substances;
- An explosives storage magazine;
- Wash bays for machinery and vehicles; and
- Ablution facilities.

9.4.8 Labour

The appointed Contractor will make use of skilled labour where necessary. In those instances where casual labour is required, DWS will request that such persons are sourced from local communities within each affected municipality, as far as possible.

9.5 Land Acquisition

Land is required for pre-mining, mining and post mining phases of the proposed borrow areas. Negotiations with the landowners to acquire and register the relevant land rights will be undertaken by TCTA, as the project's implementing agent. TCTA's land rights acquisition strategy will adhere to all statutory requirements prevailing at the time, as per the Promotion of Administrative Justice Act (No. 99 of 2000), the Expropriation Act (No. 63 of 1975) and the NWA as already delegated by the Minister of Water and Sanitation to TCTA. Determination of compensation will be done in terms of the prevailing Expropriation Act when the acquisition is done (currently Section 12 of the Expropriation Act (No. 63 of 1975)), which in case of the servitude right will include an amount to make good actual financial losses caused by the acquisition of the right. In case of the servitude-of-aqueduct along the new pipeline rights, in principle, compensation is payable for both temporary (during mining phase and rehabilitation) and permanent servitude rights, as may be required. In the case of existing permanent servitudes (where applicable), the available rights will need to be investigated.

10 ALTERNATIVES

10.1.1 Borrow Pit Location

There are no alternatives for the proposed borrow pit locations, as the previous geotechnical investigations (Mokolo Crocodile Consultants, 2012) confirmed the locations of the required borrow pits with the use of test pits. The proposed sites also provide the required volumes that would be excavated and used as construction material.

10.1.2 No Go Option

As the MCWAP-2A project cannot proceed without the borrow pits, the no go option will be the same as for the Water Transfer Infrastructure, which will have the following implications:

- If no material is sourced for construction, then no required MCWAP-2A infrastructure can be constructed. If no construction occurs, then the development of new power stations, which is of high strategic importance, cannot proceed. Without a suitable source of water, the new power stations will not be possible, with potential future energy shortages;
- No borrow pits means there will be no water pipeline. This causes the absence of water which will ultimately suppress development, with associated socio-economic implications on a national scale;
- Without MCWAP-2A, Eskom will not be able to implement the Flue-Gas Desulphurisation (FGD) technology at the Medupi Power Station to reduce sulphur emissions, which will violate the related condition in Eskom's World Bank loan.

In contrast, should the proposed MCWAP-2A and the required borrow pits not go ahead, any potentially significant environmental issues associated with the project (refer to **Section 13**) would be irrelevant and the status quo of the local receiving environment would not be affected by the borrow pits. The objectives of the project would, however, not be met.

11 PROFILE OF THE RECEIVING ENVIRONMENT

11.1 General

This section provides a general description of the status quo of the receiving environment in the project area. This serves to provide the context within which the Scoping exercise was conducted. It also allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed borrow pits. Where necessary, the regional context of the environmental features is also explained, with an ensuing focus on the local surrounding environment. More in-depth discussions on the receiving environment will be provided in the EIA Report, where the findings of the requisite specialist studies will be incorporated into the document.

A brief overview is also provided of the manner in which the environmental features may be affected (positively or negatively) by the proposed project during the project life-cycle. Significant environmental issues are discussed further in **Section 13**. These preliminary impacts are only discussed concisely on a qualitative level, as part of the Scoping phase. The EIA Report will provide a comprehensive evaluation of the potential impacts, and will quantify the effects to the environment based on the methodology presented in **Section 13.4**.

11.2 Land Use & Land Cover

Status Quo

The dominant land use and land cover in the areas earmarked for the proposed borrow pits (BPs) are shown in **Figure 9** and provided in **Table 8.** Further information will be included in the EIR.

The proposed borrow pits are mostly located on privately-owned properties, which are primarily used for agricultural practices or game-farming. Sensitive aspects associated with the aforementioned land uses include (amongst others) cultivated commercial fields, orchards and pivots (primarily in the Mooivallei area), agricultural infrastructure and facilities (e.g. pipelines, boreholes, dams), and sensitive game species (e.g. exotic game).

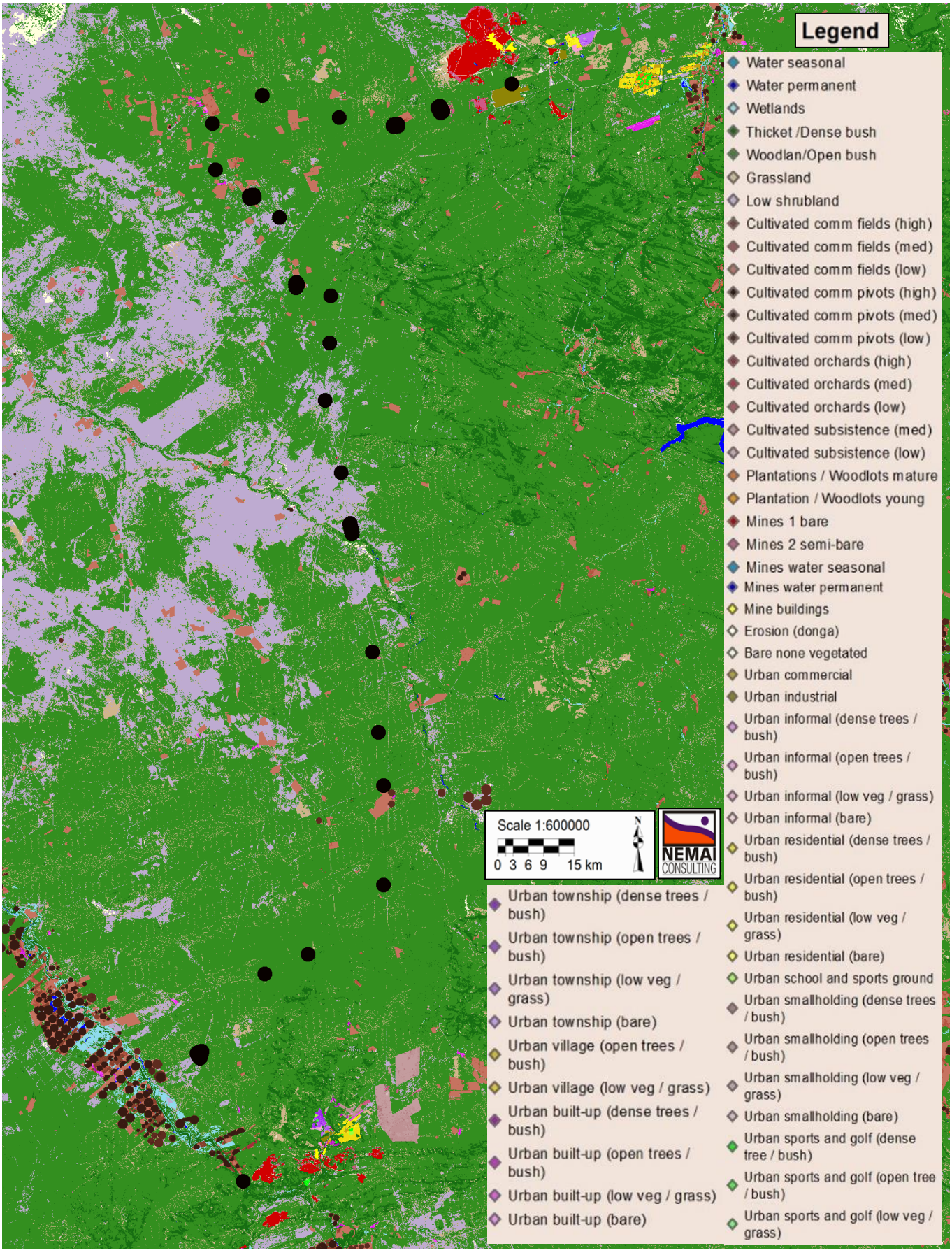


Figure 9: Land Use and Land Cover

Table 8: Land Cover in the study area

Borrow Pits (BP)	Dominant Land Use & Land Cover
BP SS1	Wetland
BP 25	Woodland/Open bush/Grassland
BP 30	Woodland/Open bush/Grassland
BP 35	Woodland/Open bush
BP 28	Woodland/Open bush
BP 33	Cultivated Fields
BP 41	Woodland/Open bush
BP 38	Woodland/Open bush/Grassland
BP 39	Low shrubland/Woodland/Open bush/Grassland
BP 42	Low shrubland/Woodland/Open bush
BP 44	Woodland/Open bush
BP 43	Woodland/Open bush
BP 53	Woodland/Open bush
BP 52	Woodland/Open bush
BP 50	Low shrubland
BP 48	Cultivated Fields/Low shrubland/Woodland/Open bush
BP 49	Cultivated Fields/Low shrubland/Woodland/Open bush
BP 15	Cultivated Fields
BP 46	Woodland/Open bush/Grassland
BP 59	Woodland/Open bush
BP 13	Woodland/Open bush/Low shrubland
BP 14	Woodland/Open bush/Grassland
BP 51	Woodland/Open bush/Grassland

Potential Impacts / Implications

- Impacts to agricultural infrastructure and facilities;
- Impacts to game farming (e.g. permanent loss of vegetation, noise, dust, light pollution);
- During site establishment and clearing, land originally used for agriculture and game farming, will be fenced off for the borrow areas and access roads. There will thus be a temporary loss of land use for this period;
- Mining infrastructure of borrow areas (including screeners, trucks, dozers etc.) are located within 250m from residential dwellings. Disturbances will be experienced particularly during the pre-mining and mining phase with regards to generation of noise, dust, and the visual impact of the borrow area and haul roads; and
- Traffic from the access and haul roads being used by tipper/haul trucks.

Specialist Study Triggered / Additional Investigations

Specialist studies to be conducted in the EIA phase that will consider land use and land cover include the following:

- Agricultural Impact Assessment;
- Terrestrial Ecological Study;
- Visual Impact Assessment (conducted as part of previous EIA for MCWAP-2);
- Socio-economic Impact Assessment;

- Heritage Impact Assessment; and
- Wildlife Impact Assessment.

11.3 Climate

Status Quo

The information to follow, was obtained from the South African Weather Service for the weather stations situated in Thabazimbi and Lephalale.

11.3.1 Temperature

Thabazimbi

Average daily maximum and minimum temperatures for the last ten years measured at the weather station in Thabazimbi, are shown in **Tables 9** and **10**, respectively.

Table 9: Average Daily Maximum Temperature (°C) by month– Thabazimbi station

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2006	29.8	29.5	27.2	27	23.2	22.6	24.8	24.7	29.5	32.9	30.8	33.6
2007	33.9	35.5	34.1	29.2	24.4=	23.7	22.9	27	32.2	29.2	31.3	29.6
2008	29.2	31	28.8	27.6	26.2	24.2	23.8	28.2	31.6	34.7	32.1=	33.2=
2009	31.9	30.5=	28.8	29.1	26	23.4	21.6	25.6	31.3	30.8=	31.5	33.3
2010	31.6	32.7	32.6	26.2	25.7	22.6	22.8	27.1	32.6	34.5	32.9	31.9
2011		31.4	31.5	26.4	25.3	23	22	26.5	31	29.6=	33.1=	31.1
2012	32.2	34	31.9	28.4	27.9	23.7	24.7	27.9	29.9	31.9	33.2	31
2013	32.9	34	32.1	28.4	26.4	24.9	23.8	26.6	31.4	31.8	34.4	31
2014	33.3	32.2	28.1	27	26.4	23.8	23.4	26.6	31.5	32.1	31.3	31.9
2015	33	35.3	32.9	29	29.1	23.4	24.4	29.4	31.1	35.3	34.8	37.5

= indicates that the average is unreliable due to missing daily values

Table 10: Average Daily Minimum Temperature (°C) by month– Thabazimbi station

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2006	20.2	19.1	16.8	11.5	4.5	1.6	2.4	6.3	10.3	16.5	17.6	20.1
2007	18.6	18.5	17.9	13.4	2.7=	3.6	1.9	5.4	14	16.1	17.5	18.1
2008	19	18.2	17	9.5	7.4	3.2	2.8	7.1	11.7	18.6	19.9=	21.1=
2009	20.7	19.6=	16.1	11.3	7.8	5.6	1.1	5.2	13.1	16.8=	18.3	19.3
2010	20.6	19.2	18.8	15.4	9.5	2.3	4.9	5.3	11.3	18.1	19.1	19.1
2011		19.1	17.9	14.5	7.8	2	1.3	5.5	13	13.1=	17.5=	20.2
2012	19.8	20.1	16.9	11.5	7	3.5	3.7	7.4	12.3	16.6	18.4	18.5
2013	20.4	20	18	12.5	6	3.2	4.6	6.4	14.1	17.6	19.4	20.2
2014	20.6	20.5	18.8	12.4	6.9	2.8	3.1	8	13.1	17.2	18.9	20.5
2015	20.4	20.2	19.3	14.4	7.8	4.3	5.6	8	15.4	19.6	19.3	21.9

= indicates that the average is unreliable due to missing daily values

Lephalale

Average daily maximum and minimum temperatures for the last ten years measured at the weather station in Lephalale are shown in **Tables 11** and **12**, respectively.

Table 11: Average Daily Maximum Temperature (°C) by month– Lephalale station

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2006	31.1	30.9	27.2	27.6	24.5	23.9	25.3	25.2	29.4	33	31.9	34.1
2007	32.6	35.3	33.2	28.5	26.1	24	23.2	27.3	31.9	28.8	30.3	28.8
2008	29.7	33.4	30.6	29.2	27.4	25.3	24.1	28.4	31.5	33.9	31.5	32.4
2009	31.6	30.8	28.9	29.4	26.5	24.3	22.5	26.3	31.2	31.9	33.3	35.8
2010	35.5	36.6	36.3	29.3	28.5	23.8	24	27.5	32.4	35.1	32.8	33.1
2011	31.2	32.5	34.1	28.2	27.9	24.8	23.7	27	32.6	32.7	33.5	31.2
2012	33.2	35	33.8	29.6	28.9	25.3	25.6	28.3	30.2	31	32.4	31.3
2013	32.1	33.8	31.3	28.8	27	26	24.9	27.1	32.1	32.1	34.8	30.8
2014	32.4	31.9	28.7	27.3	26.7	24.8	24.3	27.4	31.6	32.2	31.4	31.3
2015	33	35.2	33.3	29.8	30.6	25.3	26.2	30.5	31.7	36.3	34.9	36.7

Table 12: Average Daily Minimum Temperature (°C) by month– Lephalale station

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2006	20.3	20	17.2	13.1	6.9	5.4	5.7	7.1	11.5	17.1	18.1	19.8
2007	18.6	19	17.6	13.4	6.1	4.4	2.7	6.4	13.6	15.2	15.8	17.3
2008	19.2	18.7	17.9	11.8	10.4	6.4	5.8	8.9	12	17.6	19.3	19.9
2009	20.5	19.3	17	12.3	9.8	6.8	4.1	6.9	13.9	17.6	19.5	21.9
2010	22.9	23	22.3	19.2	14.2	6.5	7.3	8.4	13.6	18.3	19.8	20.2
2011	20.7	19.6	20.1	16.4	11.3	5.1	4.8	8.1	13.3	17.3	19.7	20.2
2012	20.6	21	18.9	13.9	10.3	7.1	6.6	8.8	14.2	17.5	18.5	19.9
2013	21	20.3	18.2	14.4	9.2	6.4	7.4	8.7	14.8	17	20	20.3
2014	21.1	20.6	19.3	14.7	9.9	6.3	5.9	9.1	14	16.7	18.9	20
2015	20.7	22	20.4	16.7	11.7	8.5	9	11.3	16.3	20.3	20.1	23

11.3.2 Precipitation

The study area is classified as semi-arid. Precipitation occurs mainly in the summer, where the maximum rainfall is normally experienced between the months of November - March.

Thabazimbi

The monthly daily rainfall for the last ten years for Thabazimbi is shown in **Table 13**.

Table 13: Monthly Daily Rain (mm) by month– Thabazimbi station

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2006	23	239.8	96.2	2	3.6	0.8	0	3.6	0	55.6	71.6	64.8
2007	32.4	11.4	0.4	22.2	0	17.8	4.4	0	58	65.4	42.2	83.2
2008	186.4	6.4=	79.0=	2.4	11.2	2.4	3.6	0	0	0.2	63.6=	24.2=
2009	50.6	0.0=	16.8	0	5.2	41	0	0	0	5.6=	0.4	9.4
2010	1.2	0	26.6	71	39.2	0	0	0	0	0	0	0.0=
2011				0.2	0.2	0.0=	0.0=	0.0=	0	0.0=	0.2=	0
2012	36.8	11	1	0	0	0	0	0	0	24	5.4	19
2013	14.2	12.8	92	22.6	0	0	0	0.6	29.4	41.2	11.8	89.4
2014	36.6	31.2	146.6	12.2	2.2	0	0	0	1.4	15.8	36.4	95.4
2015	75.6	40.6	54.2	37.8	0	0	0.6	0	16.2	12.4	46.4	67.4

= indicates that the average is unreliable due to missing daily values

Lephalale

The monthly daily rainfall for the last ten years for Lephalale is shown in **Table 14**.

Table 14: Monthly Daily Rain (mm) by month– Lephalale station

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2006	143.6	68.8	52.2	12.4	11	0	0	2	1.6	3.2	42	81.4
2007	11.8	24.2	47.4	36.6	0	0.2	1.4	0	30.2	90.2	113.4	74.6
2008	142.4	0	60.8	1.2	11	0	1	0	0	15.2	166.2	80.8
2009	116.8	62	69.8	0.6	4.8	8.4	0.2	0	0	42.6	74.6	85.4
2010	77.8	19.6	18.8	75.2	51	0	0	0	0	36	52.4	61.4
2011	150.4	3.4	3.6	2.4	0	0	0	0	0	73	51.8	82.8
2012	66	52	29.2	0	0	0	0	0	4	93.6	61.4	167.2
2013	118	9.2	21	55	0	0	0	0	0	21.2	19.2	122.8
2014	29.8	20.6	218.8	27.4	0.4	0.2	0	0	0	23.4	24.6	162.4
2015	24.6	48	29.4	21.6	0	1.6	2.2	0	12.2	29.8	57.6	63.8

Potential Impacts / Implications

In terms of global climate change factors, no noticeable impact on the climate of the region is anticipated.

Specialist Study Triggered / Additional Investigations

The EMPr will contain measures to minimise the carbon footprint within the management area of the borrow pit. Emergency measures to deal with flash floods will also be included in the EMPr.

11.4 Geology

Status Quo

11.4.1 General Geological Setting

The information to follow is a summary taken from the Geotechnical Investigations (Mokolo Crocodile Consultants, 2012), which was conducted in July 2012. Test pits were excavated at a nominal 200 m spacing along the pipeline route and at a nominal spacing of 30 m at proposed borrow pit locations. This was the basis of the geotechnical investigation for the MCWAP-2A project. Due to the amount of borrow areas required, geotechnical investigations for the borrow areas were conducted at different stages (Stage 1 - 4).

The specific stages and borrow areas which fall within each stage, are shown in the **Figure 10** below, and their findings are provided in the subsections to follow. The findings for the borrow areas are presented in order, starting from the first borrow area, BP SS1 in the south, moving in a north easterly direction up to the last borrow area, BP 15 in the north-east.

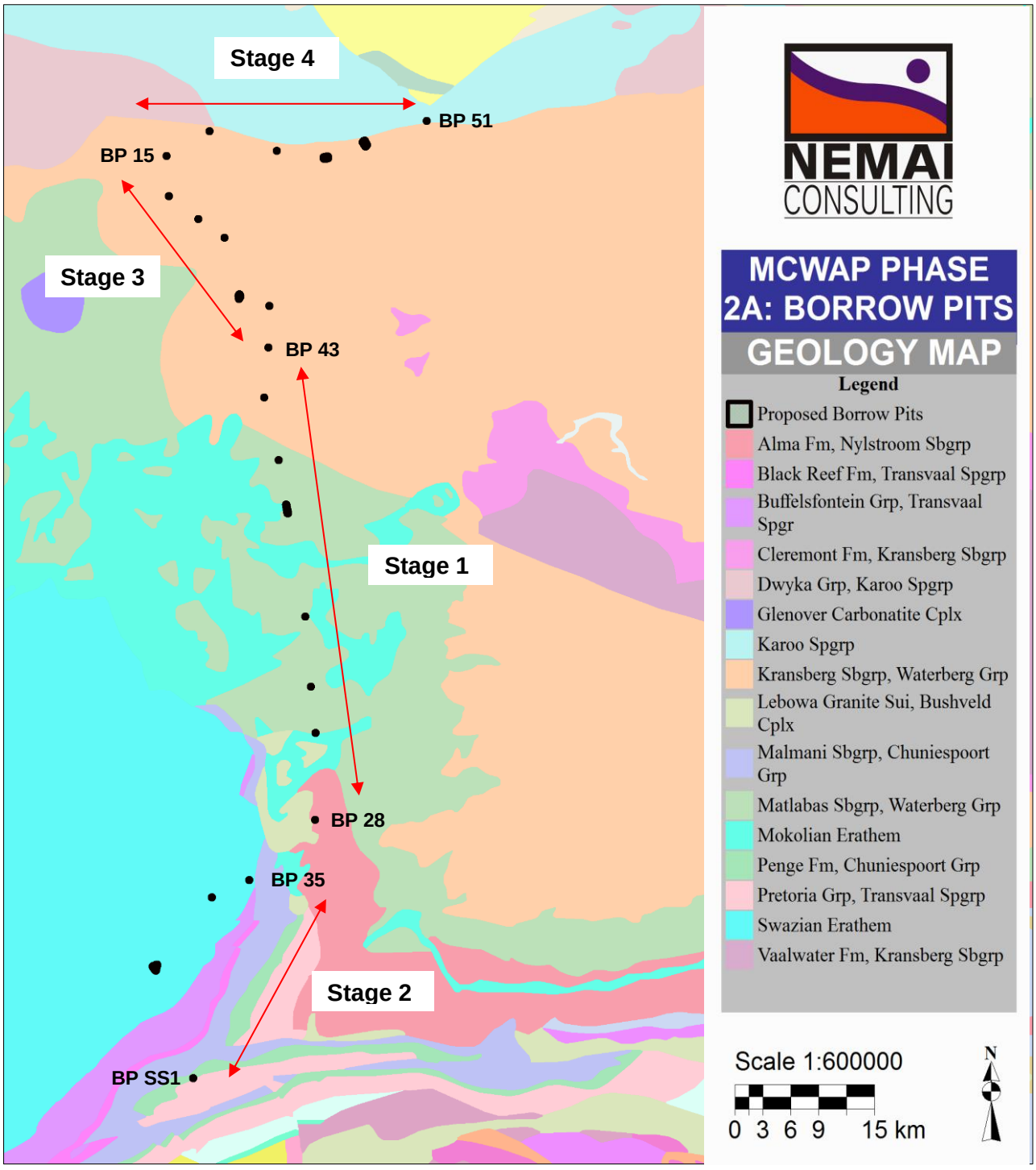


Figure 10: Geology Map

BP SS1 to BP 35 (Stage 2)

The geology of the pipeline route commences in the south on Pretoria Group strata (dolomite, chert, shale, quartzite and andesite), passes onto Ventersdorp Supergroup strata (lava, quartzite, conglomerate), then onto Basement Granite (1G). The route then swings north-eastwards and passes back onto Pretoria Group strata before crossing onto the Lebowa Granite Suite (3G1), which has been intruded by diabase (probably in the form of sills), with patches of Waterberg sandstone. Deposits of Quaternary sand occur to the north and west of Thabazimbi, blanketing the older rocks (Mokolo Crocodile Consultants, 2012a).

BP 28 to BP 43 (Stage 1)

The geology of the area comprises Waterberg sandstone over most of the route, with limited exposures of granite in the south. Diabase is intruded into the Waterberg and granite over the southern half (essentially south of the Matlabas River). North of the Matlabas River, extensive occurrences of Quaternary sand occur, blanketing the sandstone. Calcrete and ferricrete (with occasional silcrete) occur at the base of the sand (Mokolo Crocodile Consultants, 2012b).

BP 43 to BP 15 (Stage 3)

The geology of the area comprises Waterberg sandstone, which occurs over the whole of the route. Extensive deposits of Quaternary sand are present, blanketing the sandstone. Calcrete and ferricrete (with occasional silcrete) occur at the base of the sand (Mokolo Crocodile Consultants, 2012c).

BP 15 to BP 51 (Stage 4)

Karoo sediments (sandstone, mud rocks, coal) are present to the north of the east-west trending Eenzaamheid Fault. The Karoo sediments are downthrown into contact with older Waterberg sandstone, which are present along the southern side of the fault. Extensive deposits of Quaternary sand are present, blanketing the underlying geology, particularly in the west. Calcrete and ferricrete frequently occur at the base of the sand (Mokolo Crocodile Consultants, 2012d).

Potential Impacts / Implications

According to the investigations, no adverse geological conditions are expected that would prohibit the mining of the proposed borrow pits. Other important considerations from a geological perspective for the EIA phase include *inter alia* blasting and spoil material that will need to be disposed of during the mining of the borrow areas and installation of the pipeline through filling of old borrow pits or other suitable environmental practices.

Specialist Study Triggered / Additional Investigations

- Geotechnical Study undertaken as part of the Feasibility Study. Additional findings will be included in the EIA Report, as necessary; and
- Further geotechnical investigations will be undertaken during the design phase. This investigation would result in more information to evaluate the geological conditions.

11.5 Soils

Status Quo

The soil classes encountered in the project area are shown in **Figure 11**. The majority of the borrow pits fall within areas characterised by freely drained, structure less soils. However, some borrow areas fall within red or yellow structureless soils and lithosols, which are shallow soils found on hard or weathering rock.

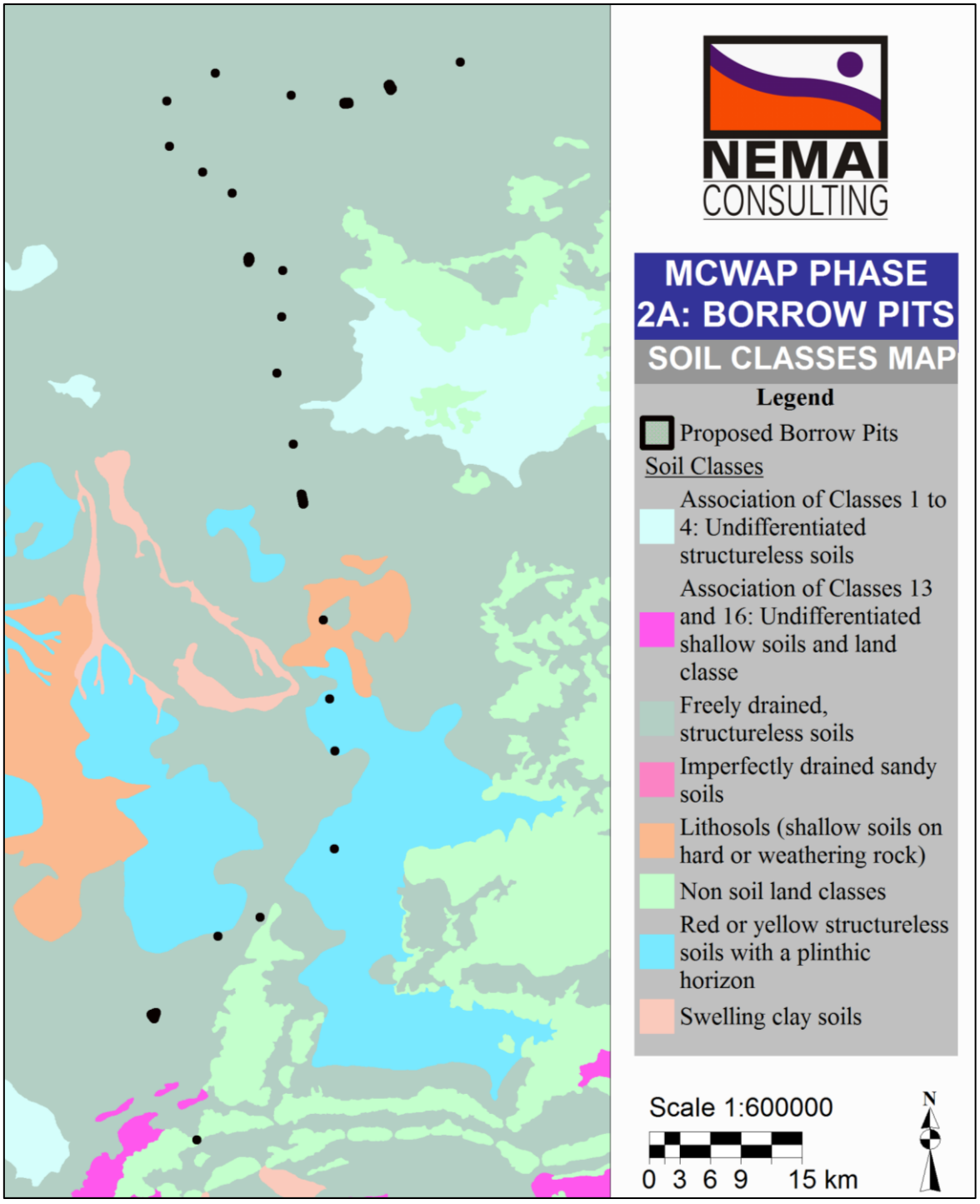


Figure 11: Soil classes

Potential Impacts / Implications

During the pre-mining phase of the borrow pits, large areas will be stripped and cleared of their topsoil, which may lead to soil erosion during rainfall events. Soils with a high agricultural potential could also be disturbed and permanently cleared. During the mining phase, soil could become contaminated through inadequate stockpiling and handling of hazardous materials, spillages from the mining equipment, stagnant haul trucks and poor management of waste and wastewater on site. Where borrow areas are created in terrain that is characterised by a steep

gradient, as well as at the BP SS1 which will require instream works, erosion could take place in the absence of suitable stormwater management procedures.

Specialist Study Triggered / Additional Investigations

- Details on soil types and soil potential will be provided in the Agricultural Impact Assessment;
- Geotechnical investigations were carried out as part of the Technical Feasibility Study. Additional findings will be included in the EIA Report, as necessary; and
- The EMPr will contain measures to mitigate against impacts to soil, for example the management of topsoil stockpiles, preventing soil contamination during mining, erosion protections, spoil site management, stormwater management, rehabilitation etc.

11.6 Geohydrology

Status Quo

11.6.1 Geotechnical Investigations

The main findings from the 2012 Geotechnical Investigations (Mokolo Crocodile Consultants, 2012) with regards to groundwater found beneath the borrow areas, follow:

BP SS1 to BP 35:
No seepage was encountered in any test pits, even though some were dug in the vicinity of the Crocodile River (The investigation was carried out during February and July - August 2010) (Mokolo Crocodile Consultants, 2012a).

BP 28 to BP 43:
A total of 269 test pits were dug along the pipeline route and in only one was groundwater encountered – slight seepage at 2.1 m depth in test pit CC/202. Caving of the sides of the test pit occurred, preventing measurement of an overnight water rest level. No significant occurrences of hydrophilic vegetation, which might be indicative of shallow groundwater conditions, were observed along the route (Mokolo Crocodile Consultants, 2012b).

BP 43 to BP 15:
A total of 163 test pits were dug along the two pipeline routes and in only 3 was groundwater encountered - slight seepage at between 2 and 3 m depth in test pits CN/01, CN/12 and CN/94. None of these test pits showed signs of instability. A number of non-perennial pans occur along the route and elevated water tables may be found in their vicinity, when they contain water. No occurrence of hydrophilic vegetation, which might be indicative of shallow groundwater conditions, was observed along the route (Mokolo Crocodile Consultants, 2012c).

BP 15 to BP 51:
A total of 196 test pits were dug along the pipeline route. Seepage was encountered in 5 test pits, all north of the Medupi construction site. No occurrence of hydrophilic vegetation, which might be

indicative of shallow groundwater conditions, was observed along the route (Mokolo Crocodile Consultants, 2012d).

Potential Impacts / Implications

- Potential disturbance of the aquifer from blasting.
- Possible influence to groundwater flow as a result of excavations at borrow pits during mining phase.
- Potential contamination of groundwater during the mining phase of the borrow areas with poor stormwater management; and
- Possible influence to groundwater flow as a result of instream works during the pre-mining and mining phases.

Specialist Study Triggered / Additional Investigations

- Geotechnical Study undertaken as part of the Feasibility Study. Additional findings will be included in the EIA Report, as necessary;
- Further geotechnical investigations will be undertaken during the design phase. This investigation would result in more information to evaluate the geo-hydrological conditions;
- The EIA phase will investigate potential impacts to groundwater (e.g. pollution during mining activities, blasting) and suitable mitigation measures will be identified; and
- The EIA phase will need to investigate potential disturbance of the aquifer from blasting, and mitigation measures to manage the potential contamination of groundwater during the mining phase.

11.7 Topography

Status Quo

The terrain in the first section of the project footprint in the Vlieëpoort region (i.e. south-western part of project area) consists of low mountains. From there the terrain transforms to plains for the remainder of the project area, which comprises flat and undulating topography. Refer to **Figure 12** for the contours in the greater area.

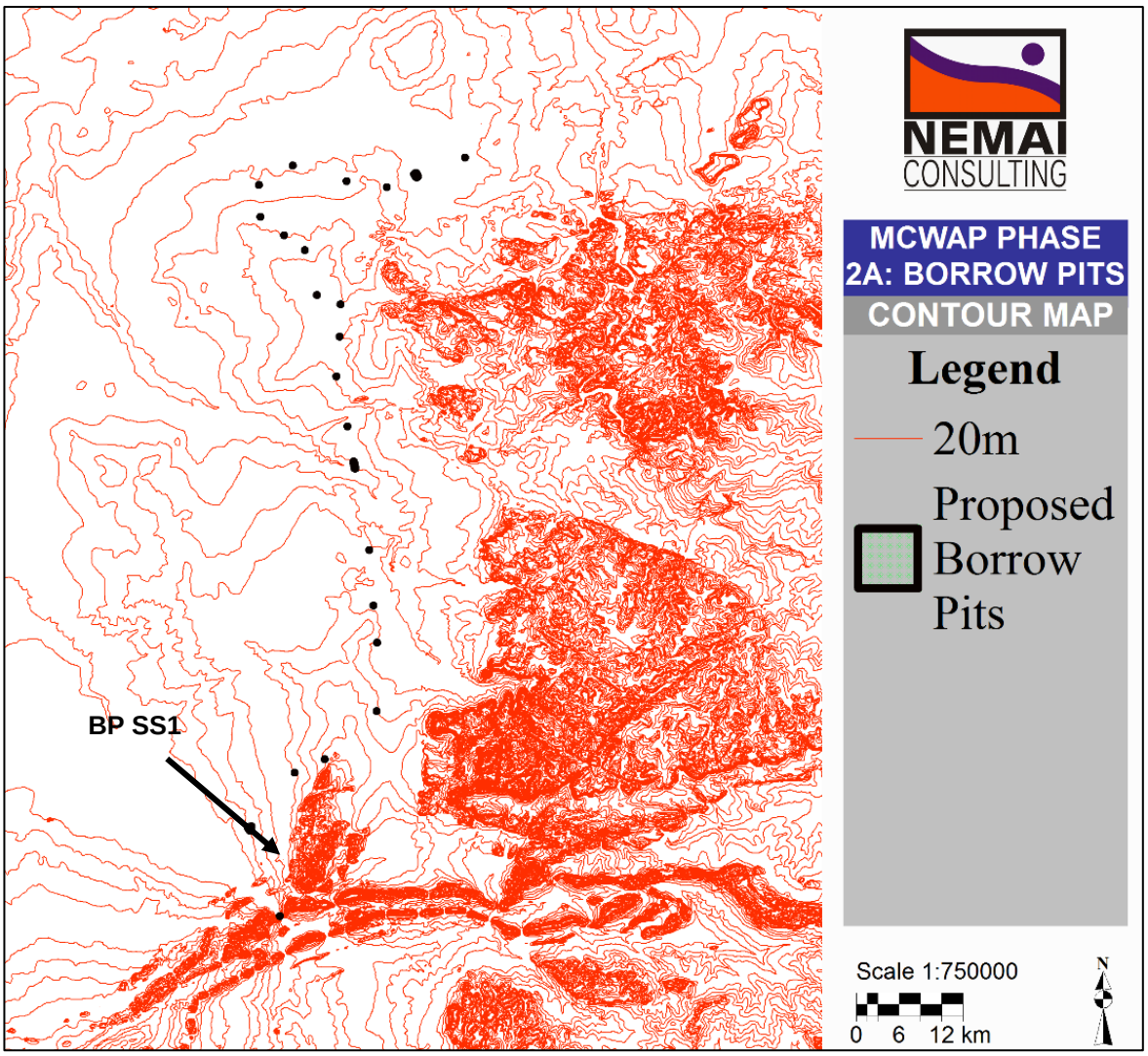


Figure 12: 20m Contours

The first borrow area, BP SS1, is located in a narrowing valley where the Crocodile River (West) cuts through the Vlieëpoort mountains, below the proposed weir site (see **Figure 13**). The site is characterised by a relatively wide river section, estimated in the order of 350m.

Figure 13: BP SS1 site below Vlieëpoort Mountains

Potential Impacts / Implications

From a technical perspective, the MCWAP-2A infrastructure and associated borrow pits, purposefully attempt to avoid steep areas for ease of construction and operational aspects, such as minimising any influence to the hydraulic gradient. Likewise, topographical features like ridges are not preferred for the pipeline route or associated structures to prevent impacts to environmental features such as aesthetics, soil (erosion), and biodiversity (usually high on ridges).

The topography provides a picturesque backdrop to the project area. The project activities associated with the pre-mining and mining phase, could impact on the visual quality of the local environment (refer to further discussion on this matter contained in **Section 11.20**).

Specialist Study Triggered / Additional Investigations

- The EMPr will make provision for erosion protections, stormwater management, reinstatements and rehabilitation, etc., to be adhered to on site; and
- Incorporate the findings from the Visual Impact Assessment conducted as part of previous EIA for MCWAP-2, as relevant.

11.8 Surface Water

11.8.1 Hydrology

Status Quo

According to the G.N. 1056 (16 September 2017) “New Nine (9) Water Management Areas of South Africa”, the study area is situated within the Limpopo Water Management Area (WMA). As seen in the **Figure 14**, the proposed BPs also fall within Quaternary Catchments within the Limpopo WMA.

The southern sections of the proposed BPs fall within the A24J quaternary catchment area, whereas the middle section falls within the A41A, A41C quaternary catchments. The northern section of proposed BPs fall within two quaternary catchments, namely A41E and A42J.

The Crocodile River, which is a major tributary of the Limpopo River, is primarily fed by the Pienaars, Apies, Moretele, Hennops, Jukskei, Magalies and Elands Rivers. The total area of the Crocodile River Catchment is 29 400 km^2 (DWAF, 2004b). The major watercourses in the region are shown in **Figure 15**.

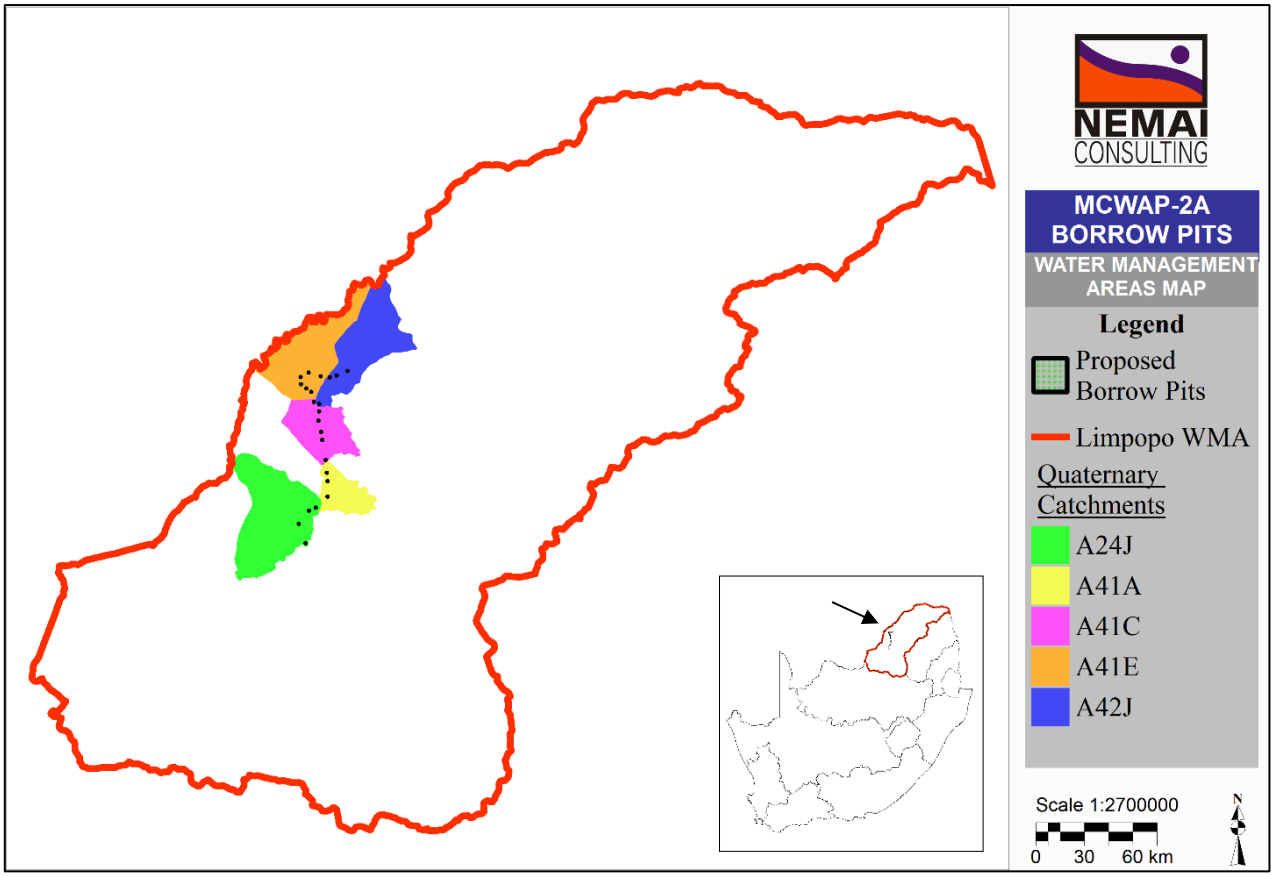


Figure 14: WMAs and quaternary catchments

The natural Mean Annual Runoff (MAR) of the Limpopo River is 5 067 million m³ per annum, which mainly occurs during large floods. According to the Water Research Commission (WRC) (2004), some key features of the Limpopo River catchment include the following:

- Parts of Johannesburg and Pretoria are situated in the upper reaches of the Crocodile River (in the Crocodile (West) Marico WMA) and are supplied with 650 million m³ per annum of water transferred from Vaal Dam (in Upper Vaal WMA);
- Some 340 million m³ per annum of this imported water is returned to the upper tributaries of the Crocodile River as treated but nutrient rich effluent, which has resulted in eutrophication of dams, whereas the natural runoffs of the Crocodile and Marico Rivers (in the Crocodile West/Marico WMA) together equal only 202 million m³ per annum. Dolomitic aquifers supply 111 million m³ per annum; and
- The demand for water in all the South African tributaries of the Limpopo River is dominated by the irrigation requirements, followed by urban usage.

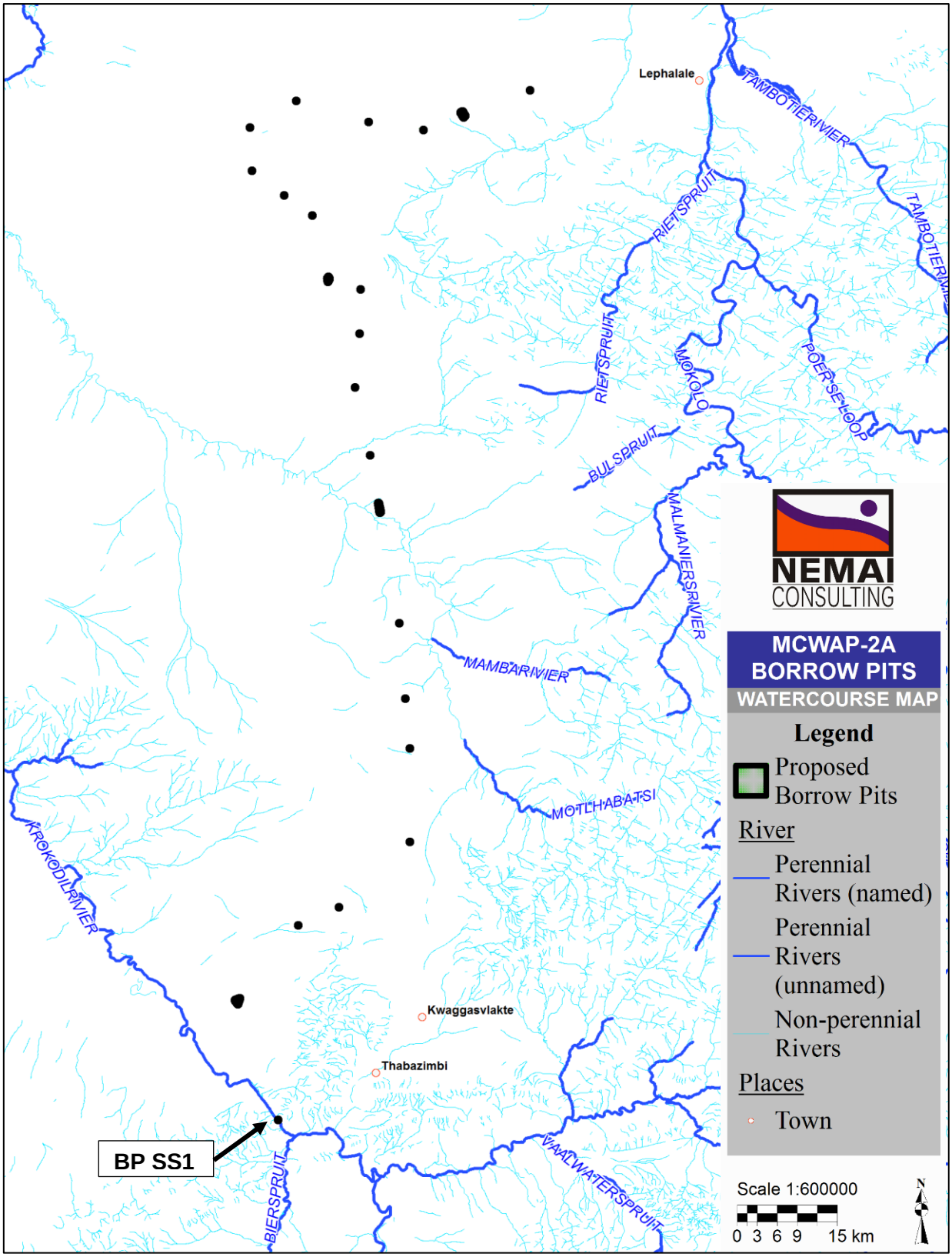


Figure 15: Perennial and non-perennial rivers

From the confluence of the Crocodile River (West) and Marico River, the river is known as the Limpopo River, which forms the northern border of South Africa with Botswana and then with Zimbabwe, before flowing into Mozambique where it discharges into the Indian Ocean. South

Africa has international agreements and obligations with each of these countries that need to be adhered to in terms of any new water resource developments within the catchment. The Crocodile River system is regulated by the following 9 major dams:

- Rietvlei, Hartbeespoort and Roodekopjes Dams in the Crocodile River (West);
- Roodeplaat and Klipvoor Dams in the Apies/Pienaars River; and
- Olifantsnek, Bospoort, Lindleyspoort and Vaalkop Dams in the Elands River area.

Potential Impacts / Implications

BP SS1 is the only site that is located within a watercourse (main stem of the Crocodile River (West)). All other 22 BPs do not fall within watercourses, with the exception of a few borrow areas and their associated access/haul roads falling within 500m of non-perennial rivers/drainage lines, however these rivers are not traversed. The site clearing and mining of a borrow pit within a watercourse may lead to the alteration of the morphology (i.e. impeding surface flow, altering river bed/banks) and water quality of the watercourse. Any changes to the structure of these watercourses will require adequate rehabilitation and stabilisation measures, which will be addressed through specific mitigation measures during the EIA phase.

Specialist Study Triggered / Additional Investigations

The impacts to the watercourse affected by the BP SS1 pre-mining and mining phases, will be evaluated as part of an Aquatic Ecological Study, during the EIA phase.

11.8.2 Affected Rivers and Streams

Status Quo

The Crocodile River (West) is directly affected by first proposed borrow area known as BP SS1, and associated infrastructure that will fall within the management area of the borrow pit (refer to **Figure 16** below). BP SS1 is approximately 2.2km downstream of the confluence of the Bierspruit and is situated downstream of the proposed Vlieëpoort Weir Site.

Figure 16: Directly Affected Watercourse

Potential Impacts / Implications

Activities linked to the pre-mining and mining phases of BP SS1, can cause significant adverse impacts to the "resource quality" of the affected watercourse, which is defined by the NWA as the following:

- Quantity, pattern, timing, water level and assurance of in-stream **flow**;
- **Water quality**, including physical, chemical and biological characteristics of the water;
- Character and condition of the in-stream and riparian **habitat**; and
- Characteristics, condition and distribution of the **aquatic biota**.

The BP SS1, which is situated in the middle of the Crocodile River (West), may lead to the alteration of the morphology and water quality of the watercourse. Thus, any changes to the morphology and water quality of the watercourse, will require adequate monitoring, rehabilitation and stabilisation measures which will be addressed through specific mitigation measures during the EIA phase, and will be adhered to on site.

Specialist Study Triggered / Additional Investigations

Aquatic Ecological Study to be conducted during the EIA phase to investigate impacts to resource quality of the affected watercourse. Best practices to mitigate impacts to be included in EMPr.

11.8.3 Water Use

Status Quo

Existing water users from the portion of the Crocodile River (West) catchment downstream of the borrow area BP SS1 are mainly irrigators (see **Figure 17**) that fall within the Mooivalei and Makoppa areas.

Figure 17: Indication of irrigation areas in the Crocodile River (West) (downstream of BP SS1)

Potential Impacts / Implications

Instream works during the pre-mining and mining phase of BP SS1 will increase the silt levels in the water, which may impact on the irrigation infrastructure (such as pumps and pipelines) of downstream agricultural water users. Siltation may also increase the sand levels above the downstream alluvial aquifer from which water is abstracted. Mitigation measures to manage sedimentation as a result of instream works will be provided in the EMPr.

Specialist Study Triggered / Additional Investigations

The Aquatic Impact Assessment and EMPr to include mitigation measures to manage instream works/mining of BP SS1, situated within the Crocodile River (West).

11.8.4 Ecological Status

Status Quo

The Reserve is central to water resource management and enjoys priority of use according to the National Water Act (No. 36 of 1998) (NWA). According to Chapter 1(1) (xviii) of the NWA, the "Reserve" relates to the quantity and quality of water required to satisfy the basic human needs

by securing a basic water supply for individuals; and to protect aquatic ecosystems in order to secure ecologically sustainable development and use of water resources.

As part of a Reserve study, EWR sites are set at specific points on the river which are critical localities within a reach of the river. Factors that guide the selection of EWR sites include:

- The suitability of the site for accurate hydraulic modelling throughout the range of possible flows, especially low flows;
- Accessibility of the sites; and
- An area or site that could be critical for ecosystem functioning.

A comprehensive study was initiated in 2010 and completed in 2012 for the Crocodile (West) Marico WMA (DWA, 2012a). No Reserve study has been undertaken in the Matlabas catchment. **Table 15** shows the results from the Reserve Study in terms: Present Ecological Status (PES); Ecological Importance and Sensitivity (EIS); and Recommended Ecological Category (REC) associated with each EWR site. The locations of the EWR sites are shown in **Figure 18**. EWR 8 (downstream of the confluence with the Bierspruit in Ben Alberts Nature Reserve) is of particular relevance in terms of the location of the abstraction weir, and the BP SS1 borrow area.

Table 15: Summary of PES, EIS and REC per resource unit for the Crocodile (West) (DWA, 2012a)

EWR Site number	EWR site name	River	Resource unit	Quaternary catchment	PES	REC	EIS
EWR 1	Upstream of the Hartbeespoort Dam	Crocodile	MRU Crocodile 3	A21H	**D**	**D**	Moderate
EWR 2	Heron Bridge School	Juskei	MRU Crocodile 1	A21C	**E**	**D**	Moderate
EWR 3	Downstream of Hartbeespoort Dam in Mount Amanzi	Crocodile	MRU Crocodile 5	A21J	**C/D**	**C/D**	High
EWR 4	Downstream of Roodeplaat Dam	Pienaars	MRU Pienaars 5	A23B	**C**	**C**	High
EWR 5	Downstream of the Klipvoor Dam in Borakalalo National Park	Pienaars	MRU Pienaars 8	A23J	**D**	**D**	High
EWR 6	Upstream of Vaalkop Dam	Hex	MRU Hex 5	A22J	**D**	**D**	Moderate
EWR 7	Upstream of the confluence with the Bierspruit	Crocodile	MRU Crocodile 10	A24C	**D**	**D**	Moderate
EWR 8	Downstream of the confluence with the Bierspruit in Ben Alberts Nature Reserve	Crocodile	MRU Crocodile 11	A24H	**C**	**C**	Moderate

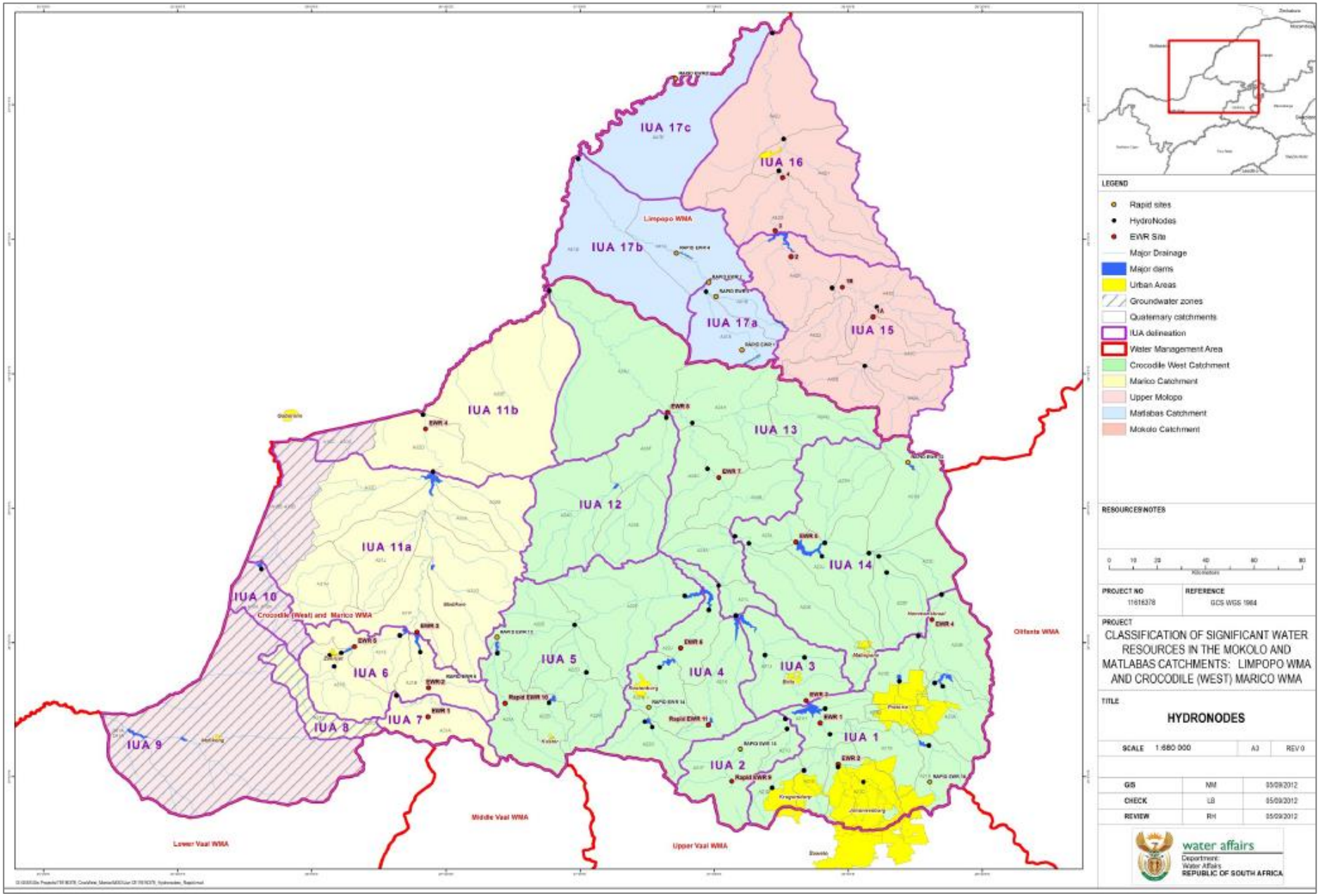


Figure 18: EWR sites applicable to the study area (DWA, 2012a)

According to the River Health Programme (RHP) (2005), the drivers of change that adversely affect the ecological status of the Crocodile River (West) include:

- Extensive water use for agricultural purposes – abstraction for irrigation impacts on natural flow regime of the river;
- Dams and weirs act as barriers to flow and the migration of fauna; and
- Reduced water quality due to agricultural return flows.

Results from the RHP (2008) indicate that the Matlabas catchment has a fair Eco-status and moderate Ecological Importance and Sensitivity (EIS), largely due to the fact that a substantial portion of the catchment falls in Marakele National Park, private nature reserves or game farms.

According to the RHP (2005), only hardy fish species are present in the lower Crocodile River, which can be ascribed to the loss of habitat and connectivity of the river. The Fish Assemblage Integrity was thus found to be poor. The Macro-invertebrate Integrity was also categorised as poor, with reduced water quality and diminished flows leading to dry sections and isolated pools. This reduction in suitable habitat has a severe impact on invertebrate diversity. Also the Instream Habitat Integrity was identified as poor due to extensive irrigation and multiple abstraction points along this reach of river which has a severe impact on river functioning.

Due to the non-perennial nature of the Matlabas, the RHP (2008) found an absence of flow dependent and migratory fish species and low invertebrate biodiversity. **Table 16** contains a list of all the fish species historically recorded in the Crocodile West and Matlabas catchments.

Table 16: All fish species historically recorded in the Crocodile West and Matlabas catchments (RHP, 2008)

Species	English Common Name	Crocodile (West)	Matlabas
Anguilla bengalensis labiata	African mottled eel	✓	
Anguilla mossambica	Longfin eel	✓	
Aplocheilichthys johnstoni	Johnston's topminnow	✓	
Barbus annectens	Broadstriped barb		✓
Barbus bifrenatus	Hyphen barb		✓
Barbus brevipinnis	Shortfin barb	✓	✓
Barbus marequensis	Largescale yellowfish		✓
Barbus mattozi	Papermouth	✓	
Barbus paludinosus	Straightfin barb	✓	✓
Barbus trimaculatus	Threespot barb	✓	✓
Barbus unitaeniatus	Longbeard barb	✓	✓
Barbus viviparus	Bowstripe barb	✓	✓
Chetia flaviventris	Canary Kurper	✓	
Chiloglanis paratus	Sawfin rock catlet	✓	
Chiloglanis pretoriae	Shortspine suckermouth	✓	
Clarias gariepinus	Sharptooth catfish	✓	✓
Labeo cylindricus	Redeye labeo	✓	✓
Labeo molybdinus	Leaden labeo	✓	✓

Species	English Common Name	Crocodile (West)	Matlabas
Labeo rosae	Rednose labeo	✓	✓
Labeo ruddi	Silver labeo		✓
Marcusenius macrolepidotus	Bulldog	✓	✓
Mesobola brevianalis	River sardine	✓	✓
Micralestes acutidens	Silver robber	✓	
Oreochromis mossambicus	Mozambique tilapia	✓	✓
Pseudocrenilabrus philander	Southern mouthbrooder	✓	✓
Schilbe intermedius	Silver catfish	✓	✓
Synodontis zambezensis	Brown squeaker		✓
Tilapia rendalli	Redbreast tilapia	✓	
Tilapia sparrmanii	Banded tilapia	✓	✓

Potential Impacts / Implications

- Most indigenous fish species in this country undertake annual migrations within river systems for a number of reasons, such as feeding, dispersal, refuge areas during unfavourable conditions and reproductive success. The abstraction weir and the borrow area BP SS1 downstream of the weir on the Crocodile River (West), will act as a barrier that will prevent the up- and downstream movement of aquatic biota. The weir may also lead to the fragmentation of the river, where the interconnected relationship of the system could be adversely influenced;
- During the mining phase, the instream works (i.e. BP SS1) will increase the turbidity in the affected watercourse (Crocodile River (West)), which could lead to the clogging of gills of aquatic fauna from increased silt loads and the alteration of micro-habitats; and
- The proposed borrow area (BP SS1) will serve as a morphological modification. This will result in changes to the aquatic community structure and remove certain habitats from potential utilisation.

Specialist Study Triggered / Additional Investigations

- Aquatic Ecological Study to be conducted during the EIA phase. Amongst others, the EWR, National Freshwater Ecosystem Priority Areas (NFEPA) maps, will be further scrutinised by the relevant specialists; and
- Suitable mitigation measures for instream works will be included in the EMPr, which will form part of the EIA Report, to ensure the safeguarding of the aquatic biota.

11.8.5 Water Quality

Status Quo

DWS conducts an ongoing water quality monitoring programme on the Crocodile River. There are long term monitoring sites for the preliminary resource units and EWR sites identified during the Reserve determination.

Some of the relevant monitoring sites are listed in **Table 17** below. All the DWS long term monitoring sites include the monitoring of electrical conductivity (EC), pH, the major ions (Mg+, Na+, Ca+, K+, SO4- and Cl-), total alkalinity and nutrients (PO4-P, NH3, NO2, NO3) (DWA, 2012a).

Table 17: DWS water quality sites related to the Crocodile (West) EWR sites (DWA, 2012a)

WATER QUALITY SITE	QUARTENARY CATCHMENT	OTHER INFORMATION
A2H012 – Crocodile River at Kalkheuwel	A21H	Downstream of the confluences of the Jukskei, Hennops and Rietspruit Rivers with the Crocodile River, and upstream of Hartebeespoort Dam.
A2H023 – Jukskei River at Nietgedacht	A21C	Situated at the confluence of the Jukskei River with the Upper Crocodile River, and upstream of Hartebeespoort Dam.
A2H083 – Hartebeespoort Dam: downstream weir	A21J	Crocodile River immediately downstream of Hartebeespoort Dam
A2H006 – Pienaars River at Klipdrift	A23B	Weir is downstream of EWR site
A2H021 – Pienaars River at Buffelspoort	A23L	Weir is 21 km downstream of EWR site
A2H094 – Bospoort Dam: downstream weir	A22J	Weir is situated at Tweedepoort, 4 km downstream of EWR site
A2H060 - Crocodile River at Nooitgedacht	A24C	WQ site is 23 km upstream of the EWR
A2H116 – Paul Hugo Dam: downstream weir	A24F/H/J	Weir is situated at Haakdoorndrift

According to DWA (2012a), the Crocodile River is highly impacted in terms of water quality which is attributed to the following:

- The Lower Crocodile River water quality is deteriorating because of increased salts and nutrients. There are also increased levels of toxicants in the middle reaches of the river;
- Urbanisations, industrial diffuse sources and high agricultural return flows are the major impacting activities; and
- Treated wastewater return flows from the Upper Vaal WMA play an important role downstream where the water is used in the Crocodile West catchment area.

Noteworthy point sources of pollution in the Crocodile River, and the watercourses into which they discharge their effluent, include the following:

- Northern Waste Water Treatment Works (WWTW) - Jukskei River;
- Driefontein WWTW - Muldersdrif-se-loop River;
- Sunderland Ridge WWTW - Hennops River;
- Baviaanspoort and Zeekoegat WWTW - Pienaars River;
- Baviaanspoort and Zeekoegat WWTW - Pienaars River;
- Daspoort, Rooiwal, Temba and Babelegie WWTW - Apies River;
- Sandspruit and Klipgat WWTW - Sand Spruit;
- Rietgat WWTW - Soutpan Spruit; and
- Brits WWTW - Crocodile River.

Organic pollution from point and diffuse pollution sources is a significant contributor to the poor water quality in the Crocodile River, which is evident in the highly eutrophic Hartbeespoort Dam. According to DWAF (2004a), there are no reported water quality problems in the Matlabas Area, either surface or groundwater. Due to the low levels of development in this area, no water quality problems are anticipated.

Potential Impacts / Implications

During the mining phase, potential contamination of surface water could occur through sedimentation from instream works (BP SS1 and road crossings), silt-laden runoff from disturbed areas, and improper practices (e.g. poor management of waste water and disposal of solid waste in close proximity to watercourses).

Specialist Study Triggered / Additional Investigations

Impacts caused by instream works and mining phase of BP SS1 to be managed by environmental best practises that will be contained in the EMPr, including measures prescribed in the Aquatic Impact Assessment.

11.8.6 Habitat

Status Quo

The riparian vegetation at the borrow area BP SS1 is dominated by Lowveld Alluvial Vegetation, which has retained much of its ecological integrity (see **Figure 19** below). The instream habitat of the river is dominated by slow-flowing, medium to deep channel. Prominent sand banks and marginal reed beds are present in the watercourse.

Figure 19: Riparian vegetation along the Crocodile River (West)

Potential Impacts / Implications

- Damage to habitat found within and surrounding BP SS1 and at road crossings; and
- Disturbances of riparian vegetation may lead to erosion encroachment of exotic vegetation.

Specialist Study Triggered / Additional Investigations

- Aquatic Impact Assessment to be conducted, which will include an appraisal of the riparian habitat at the area affected by the borrow pit infrastructure and activities. The riparian habitat of the directly affected watercourses will be delineated as part of the Aquatic Impact Assessment; and
- Mitigation measures will be established during the EIA phase to manage the potential impacts to riparian vegetation and to address the overall reinstatement and rehabilitation of areas affected by the instream works at BP SS1, as well as at road crossings.

11.8.7 Pans and Wetlands

Status Quo

In terms of the National Water Act (No. 36 of 21998), a wetland means "*land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil*".

According to a preliminary review of the National Wetlands Map II of the South African National Biodiversity Institute (SANBI), which was extracted from the National Land Cover 2000 dataset, no wetlands are directly affected by the borrow pit BP SS1. **Figure 20** shows the occurrence of wetlands, adjacent to the Crocodile River (West) on the Farms Hampton 320 KQ, Stratford 462 KQ and Bridgewater 307 KQ, downstream of the borrow area, BP SS1

Figure 20: Wetlands found downstream of BP SS1

Potential Impacts / Implications

- Wetlands downstream of the borrow area BP SS1 may be indirectly affected by the instream works during the pre-mining and mining phases.

Specialist Study Triggered / Additional Investigations

- The status of wetlands in the project area and the potential impact of the project and concomitant management measures will be considered during a specialist Aquatic Ecological Study (including delineation), earmarked for the EIA phase.

11.9 Flora

Status Quo

11.9.1 Regional Vegetation

Mucina and Rutherford (2016) described the study area as falling within the Savanna Biome (**Figure 21**). The Savanna Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one-third the area of South Africa. It is well developed over the Lowveld and Kalahari region of South Africa and is also the dominant vegetation in Botswana, Namibia and Zimbabwe. It is characterized by a grassy ground layer and distinct upper layer of woody plants (Low and Rebelo, 1996).

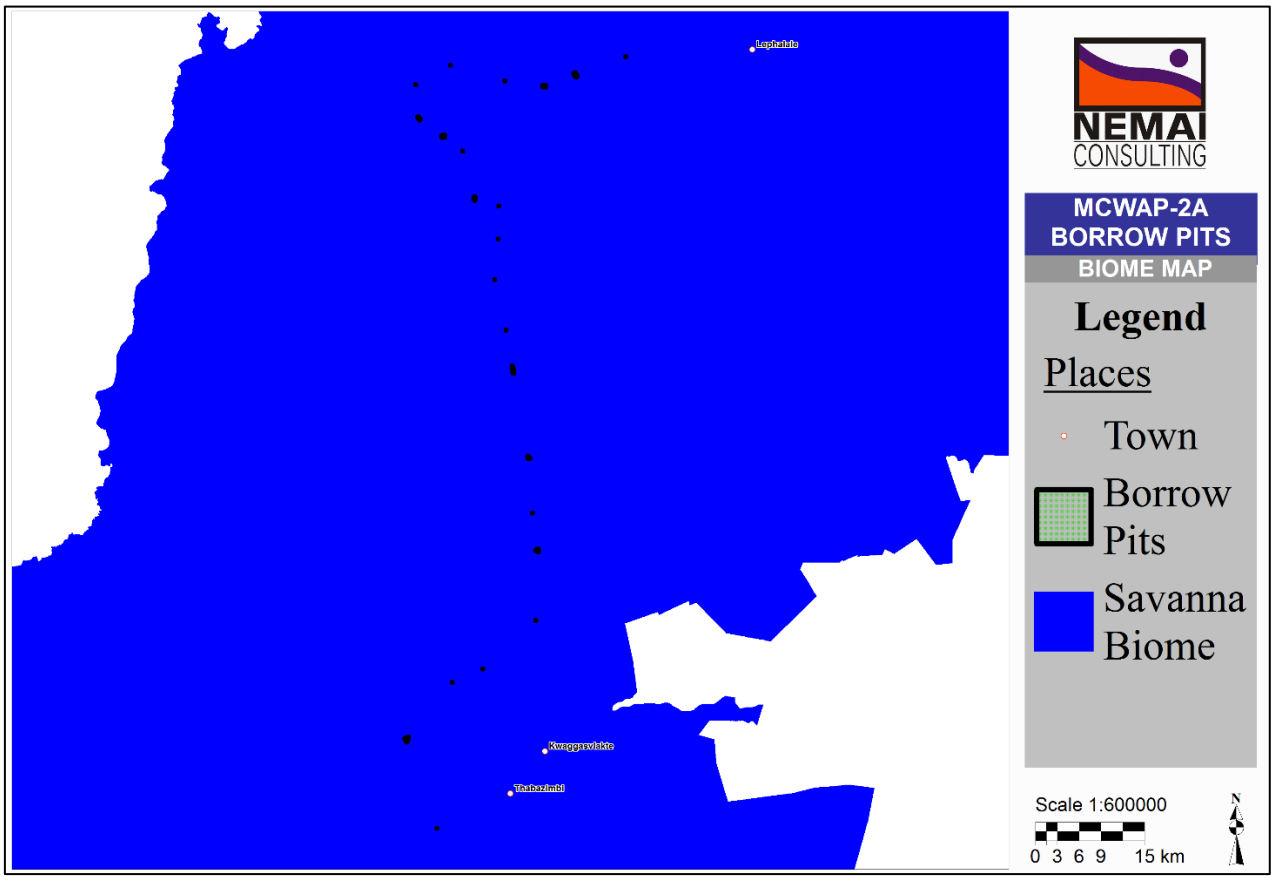


Figure 21: Savanna Biome

The study area traverses five (5) vegetation types-namely (**Figure 22**):

1. Limpopo Sweet Bushveld;
2. Western Sandy Bushveld;
3. Dwaalboom Thornveld;
4. Waterberg Mountain Bushveld; and
5. Subtropical Alluvial Vegetation.

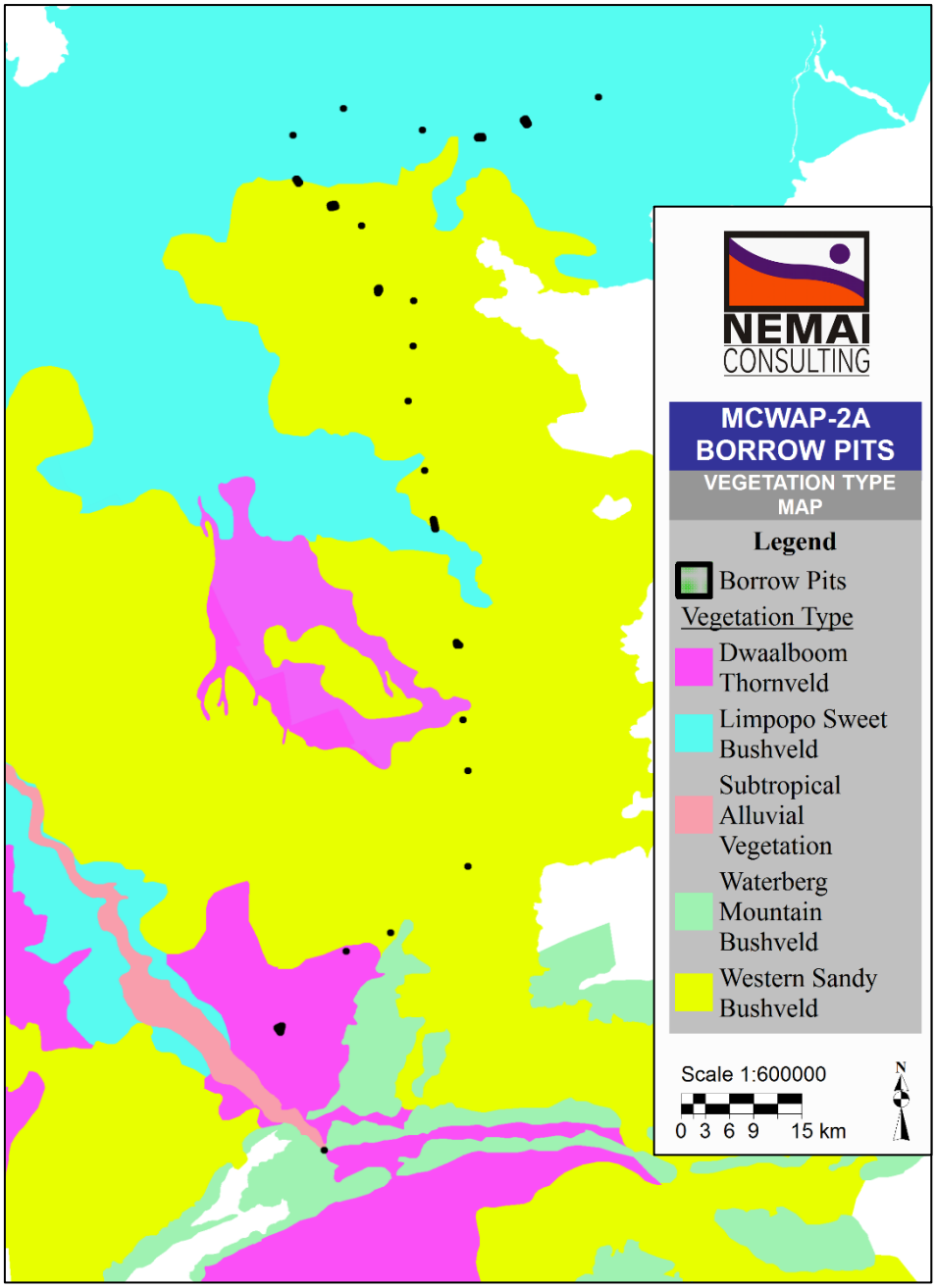


Figure 22: Vegetation types

Limpopo Sweet Bushveld

The Limpopo Sweet Bushveld is found in Limpopo Province. It extends from the lower reaches of the Crocodile and Marico Rivers around Makoppa and Derdepoort, respectively, down the Limpopo River Valley including Lephalale and into the tropics past Tom Burke to the Usutu border post and Taaiboschgroet area in the north. The unit also occurs on the Botswana side of the border (Mucina and Rutherford, 2006).

This vegetation type is listed as **least threatened** with a national conservation target of 19%. Less than 1% is statutorily conserved and limited to reserves straddling the southeastern limits of the unit, for example the D'Nyala Nature Reserve. Very little of this vegetation type is conserved in other reserves. About 5% is transformed, mainly by cultivation (Mucina and Rutherford, 2006).

Borrow areas (BP 15 to BP 51) which are situated in the northern most part of the study area, fall within this vegetation type.

Western Sandy Bushveld

Western Sandy Bushveld vegetation type is found in Limpopo and North-West Provinces. It occurs on flats and undulating plains from Assen northwards past Thabazimbi and remaining west of the Waterberg Mountains towards Steenbokpan in the north. Some patches occur between the Crocodile and Marico Rivers to the west (Mucina and Rutherford, 2006).

This vegetation type is listed as **least threatened** with a national conservation target of 19%. About 6% is statutorily conserved, just over half of which in the Marakele National Park. About 4% is transformed, mainly by cultivation (Mucina and Rutherford, 2006). As seen in **Figure 22,** approximately 60 % of the proposed borrow areas, fall within this vegetation type.

Dwaalboom Thornveld

The abovementioned vegetation type is found in Limpopo and North-West Provinces. It falls north of the Dwarsberge and associated ridges mainly west of the Crocodile River in the Dwaalboom area, but including a patch around Sentrum. South of the ridges, it extends eastwards from the Nietverdiend area, north of the Pilanesberg to the Northam area (Mucina and Rutherford, 2006).

This vegetation type is listed as **least threatened** with a national conservation target of 19%. Some 6% is statutorily conserved, mostly within the Madikwe Game Reserve in the west. About 14% is transformed mainly by cultivation. Main use is extensive cattle grazing (Mucina and Rutherford, 2006). In the southern section of the study area, BP 25 and BP 30 fall within the vegetation type.

Subtropical Alluvial Vegetation

Subtropical Alluvial vegetation unit is found in Limpopo, Mpumalanga and KwaZulu-Natal Provinces and in Swaziland. It occurs in broad river alluvia and around some river-fed pans in the subtropical regions of eastern South Africa, in particular in the Lowveld, Central Bushveld and in northern KwaZulu-Natal. The most important alluvia include the Limpopo, Luvubu, Olifants, Sabie, Crocodile, Phongolo, Usutu and Mkuze Rivers. This unit is fully embedded within the Savanna Biome (Mucina and Rutherford, 2006).

The conservation status is **least threatened** with a national conservation target of target of 31%. Much of the area has been transformed for cultivation, urban development and road building. Alien woody species commonly occurring in this vegetation type include *Melia azedarach, Chromolaena discolor etc* (Mucina and Rutherford, 2006). The first borrow area in the southern most region of the study area, BP SS1, falls within this vegetation type.

11.9.2 Terrestrial Threatened Ecosystems

According to the data sourced from SANBI, none of the borrow areas are situated within terrestrial threatened ecosystems. The closest to the proposed borrow pits, is the Springbokvlakte Thornveld, show in **Figure 23** below, which is approximately 73km from the BP SS1 borrow area.

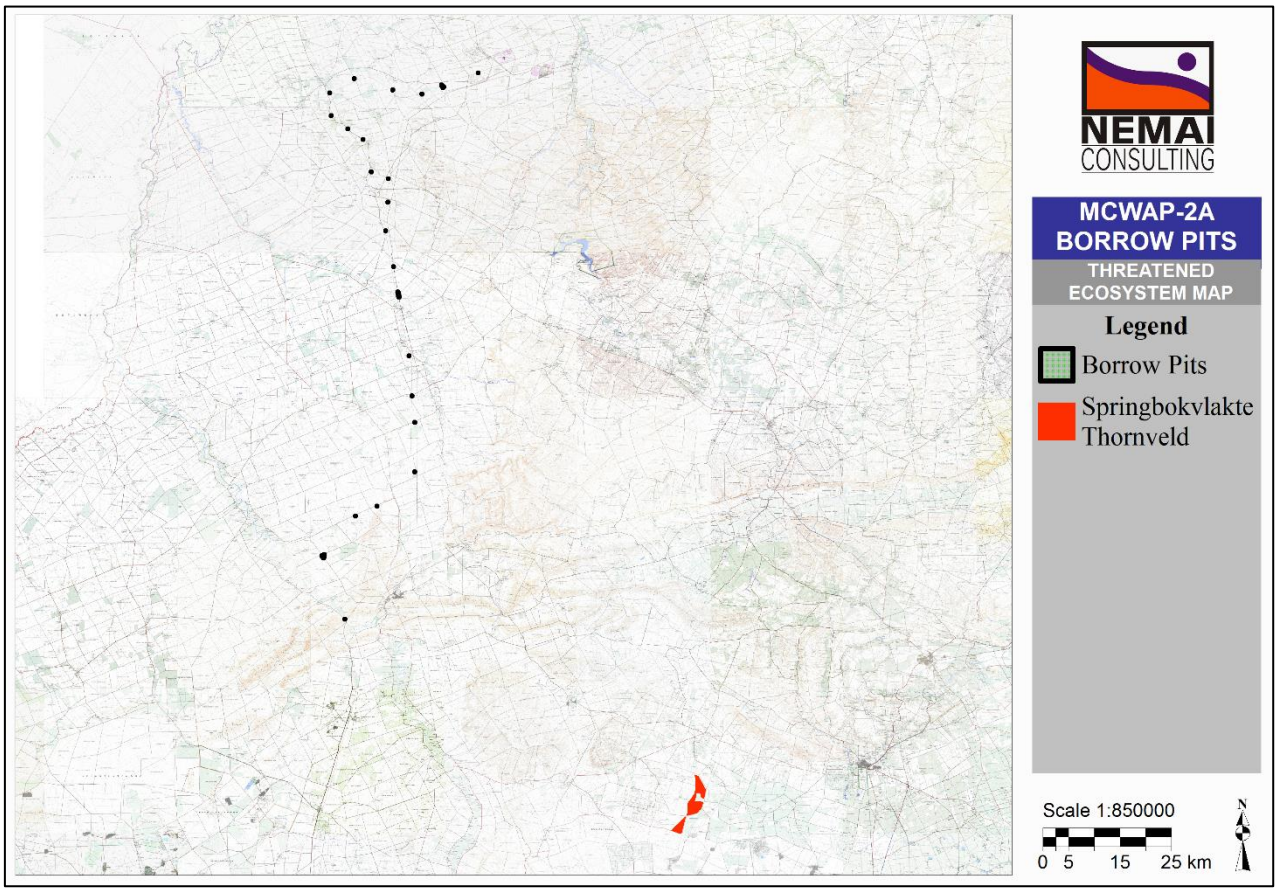


Figure 23: Terrestrial Threatened Ecosystems

11.9.3 Limpopo Conservation Plan

Critical Biodiversity Areas (CBAs) within the bioregion are the portfolio of sites that are required to meet the region's biodiversity targets, and need to be maintained in the appropriate condition for their category (Desmet, 2013). An objective of the CBA map is to identify a network of areas, which if managed according to the land use guidelines would meet the pattern targets for all important biodiversity features, while at the same time ensuring the areas necessary for supporting necessary ecological processes remain functional.

The systematic conservation planning process resulted in 40% of the Limpopo Province being identified as CBAs (CBA1 22% and CBA2 18%). Ecological Support Areas (ESAs) cover a further 22% of the province, of which 16% are intact natural areas (ESA 1) and 7% are degraded or areas with no natural remaining which are nevertheless required as they potentially retain some value for supporting ecological processes (ESA 2) (Desmet, 2013). A CBA map, indicating the Limpopo C Plan categories in relation to the project footprint, is shown in **Figure 24**.

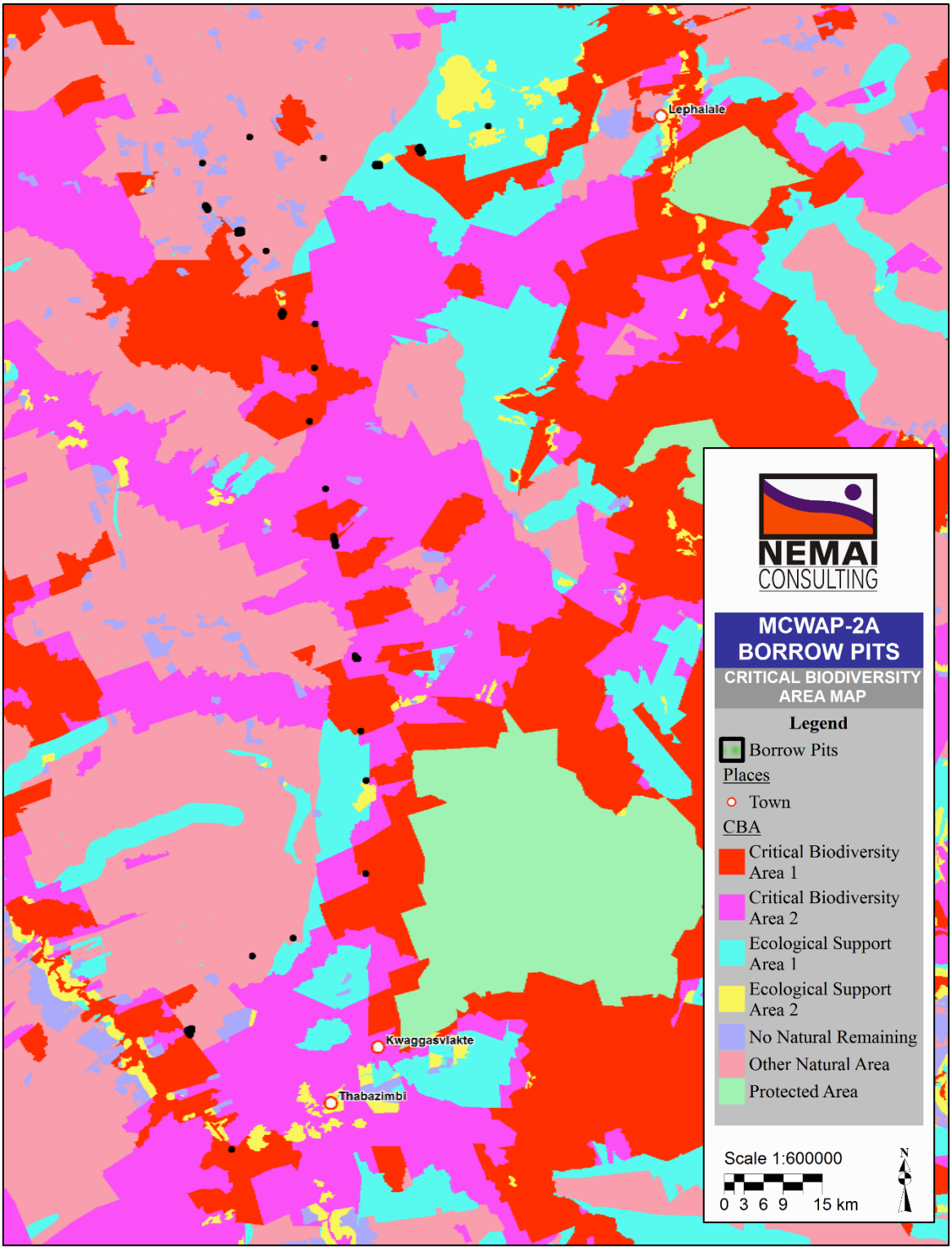


Figure 24: Limpopo Conservation Plan (CBAs and ESAs)

It can be derived from the **Figure 24** above, that the highest percentage of borrow pits fall within the CBA 1 and CBA 2 Categories. It must also be noted that none of the borrow pits fall within any protected areas. The general description of the Limpopo C-plan categories and their associated land management objectives are listed in **Table 18**.

Table 18: General description of CBA Map categories and associated land management objectives

CBA Map Category	Description	Land Management Objective	Land Management Recommendations	Compatible Land-Use	Incompatible Land-Use
Protected Areas	Formal Protected Areas and Protected Areas pending declaration under NEMPAA.	Maintain in a natural state with limited or no biodiversity loss. Rehabilitate degraded areas to a natural or near natural state, and manage for no further degradation. Development subject to Protected Area objectives and zoning in a NEMPAA compliant and approved management plan.	Maintain or obtain formal conservation protection.	Conservation and associated activities (e.g. ecotourism operations), and required support infrastructure.	All other land-uses.
Critical Biodiversity Areas (1)	Irreplaceable Sites. Areas required to meet biodiversity pattern and/or ecological processes targets. No alternative sites are available to meet targets.	Maintain in a natural state with limited or no biodiversity loss. Rehabilitate degraded areas to a natural or near natural state, and manage for no further degradation.	Obtain formal conservation protection where possible. Implement appropriate zoning to avoid net loss of intact habitat or intensification of land use.	Conservation and associated activities. Extensive game farming and eco--- tourism operations with strict control on environmental impacts and carrying capacities, where the overall there is a net biodiversity gain. Extensive Livestock Production with strict control on environmental impacts and carrying capacities. Required support infrastructure for the above activities. Urban Open Space Systems	Urban land-uses including Residential (including golf estates, rural residential, resorts), Business, Mining & Industrial; Infrastructure (roads, power lines, pipelines). Intensive Animal Production (all types including dairy farming associated with confinement, imported foodstuffs, and improved/irrigated pastures). Arable Agriculture (forestry, dry land & irrigated cropping). Small holdings
Critical Biodiversity Area (2)	Best Design Selected Sites. Areas selected to meet biodiversity pattern and/or ecological process targets. Alternative sites may be available to meet targets.	Maintain in a natural state with limited or no biodiversity loss. Maintain current agricultural activities. Ensure that land use is not intensified and that activities are managed to minimize impact on threatened species.	Avoid conversion of agricultural land to more intensive land uses, which may have a negative impact on threatened species or ecological processes.	Current agricultural practices including arable agriculture, intensive and extensive animal production, as well as game and ecotourism operations, so long as these are managed in a way to ensure populations of threatened species are maintained and the ecological processes which support them are not impacted. Any activities compatible with CBA1.	Urban land-uses including Residential (including golf estates, rural residential, resorts), Business, Mining & Industrial; Infrastructure (roads, power lines, pipelines). More intensive agricultural production than currently undertaken on site. Note: Certain elements of these activities could be allowed subject to detailed impact assessment to ensure that developments were designed to CBA2. Alternative areas may need to be identified to ensure the CBA network still meets the required

CBA Map Category	Description	Land Management Objective	Land Management Recommendations	Compatible Land-Use	Incompatible Land-Use
					targets.
Ecological Support Areas (1)	Natural, near natural and degraded areas supporting CBAs by maintaining ecological processes.	Maintain ecosystem functionality and connectivity allowing for limited loss of biodiversity pattern.	Implement appropriate zoning and land management guidelines to avoid impacting ecological processes. Avoid intensification of land use. Avoid fragmentation of natural landscape.	Conservation and associated activities. Extensive game farming and eco-tourism operations. Extensive Livestock Production. Urban Open Space Systems. Low density rural residential, smallholdings or resorts where development design and overall development densities allow maintenance of ecological functioning.	Urban land-uses including Residential (including golf estates), Business, Mining & Industrial; Infrastructure (roads, power lines, pipelines). Intensive Animal Production (all types including dairy farming associated with confinement, imported foodstuffs, and improved/irrigated pastures). Arable Agriculture (forestry, dry land & irrigated cropping). Note: Certain elements of these activities could be allowed subject to detailed impact assessment to ensure that developments were designed to maintain overall ecological functioning of ESAs.
Ecological Support Areas (2)	Areas with no natural habitat that is important for supporting ecological processes.	Avoid additional/ new impacts on ecological processes.	Maintain current land-use. Avoid intensification of land use, which may result in additional impact on ecological processes.	Existing activities (e.g. arable agriculture) should be maintained, but where possible a transition to less intensive land uses or ecological restoration should be favoured.	Any land use or activity that results in additional impacts on ecological functioning mostly associated with the intensification of land use in these areas (e.g. Change of floodplain from arable agriculture to an urban land use or from recreational fields and parks to urban).
Other Natural Areas	Natural and intact but not required to meet targets, or identified as CBA or ESA	No management objectives, land management recommendations or land-use guidelines are prescribed. These areas are nevertheless subject to all applicable town and regional planning guidelines and policy. Where possible existing Not Natural areas should be favoured for development before "Other natural areas" as before "Other natural areas" may later be required either due to the identification of previously unknown important biodiversity features on these sites, or alternatively where the loss of CBA has resulted in the need to identify alternative sites.			
No natural habitat remaining	Areas with no significant direct biodiversity value. Not Natural or degraded natural areas that are not required as ESA, including intensive agriculture, urban, industry; and human infrastructure.				

11.9.4 Protected Areas

The nearest protected areas, with a formal status in terms of the National Environmental Management Protected Areas Act (Act No. 57 of 2003), to the study area include the following (see **Figure 25**):

- **Marakele National Park** – located approximately 3.5 km to the east of BP 28 and BP 41;
- **Atherstone Nature Reserve** – located approximately 40 km to the west of BP SS1;
- **Hans Strijdom Nature Reserve** – located approximately 30 km to the east of BP 42; and
- **D'nyala Nature Reserve** – located approximately 20 km to the east of BP 51.

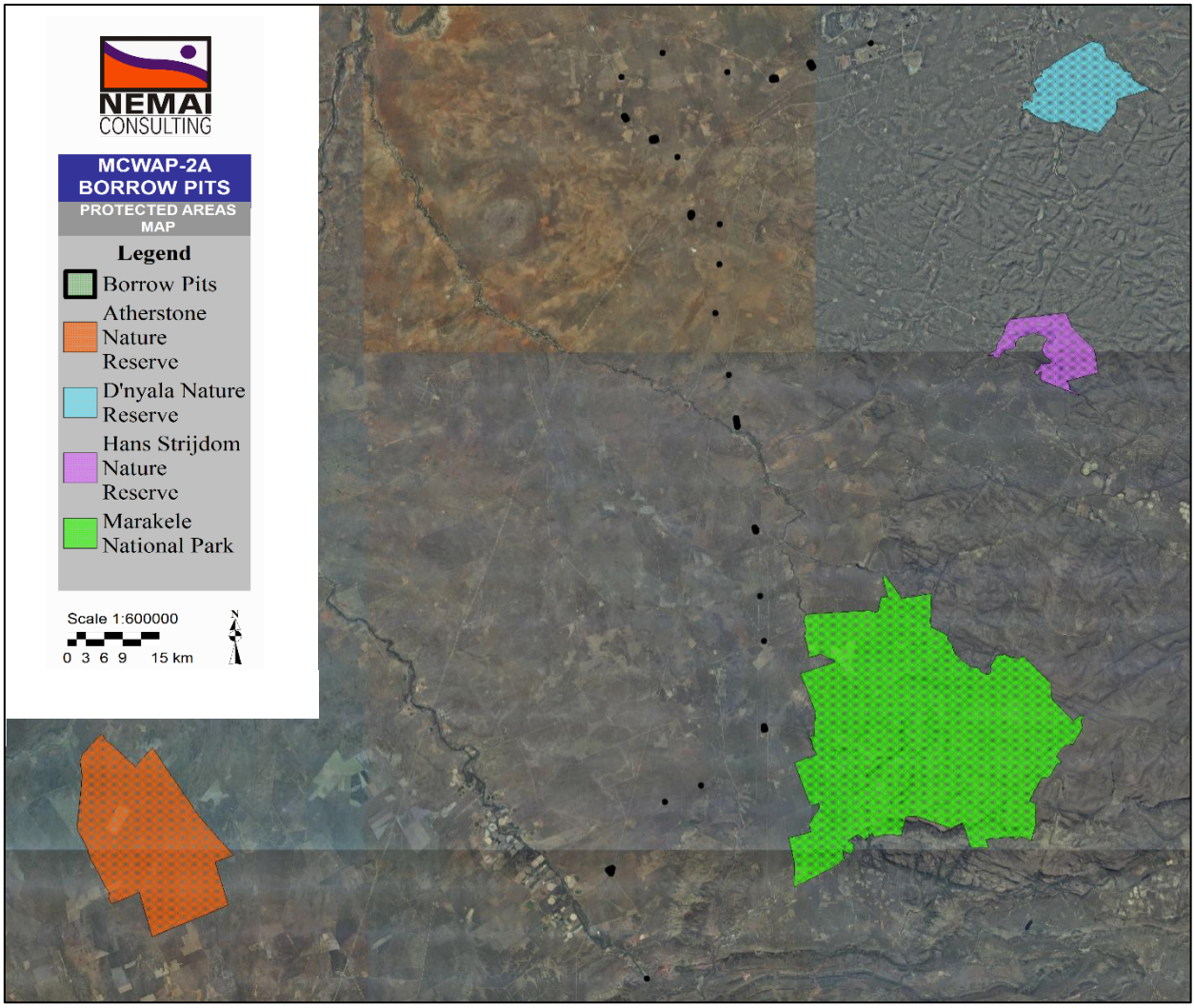


Figure 25: Protected Areas

The Waterberg Biosphere, which is located to the east of the project area (see **Figure 26**), represents a considerable area of the savanna biome and contains a high level of biological diversity. It stretches from Marakele National Park in the south-west to Wonderkop Nature Reserve in the north-east with Vaalwater as the gateway town. According to UNESCO (2009), Biosphere reserves are areas of terrestrial and coastal marine ecosystems which are internationally recognized under UNESCO's Man and the Biosphere (MAB) Programme.

Biosphere Reserves are protected areas and they promote and demonstrate a balanced relationship between people and nature. Sections of the Central Route as well as Alternatives B and C encroach into the transition zone of the biosphere, which is a flexible area of co-operation, which may contain a variety of agricultural activities, settlements and other uses and in which local communities, management agencies, scientists, non-governmental organizations, cultural groups, economic interests and other stakeholders work together to manage and sustainably develop the area's resources (Waterberg DM, 2013).

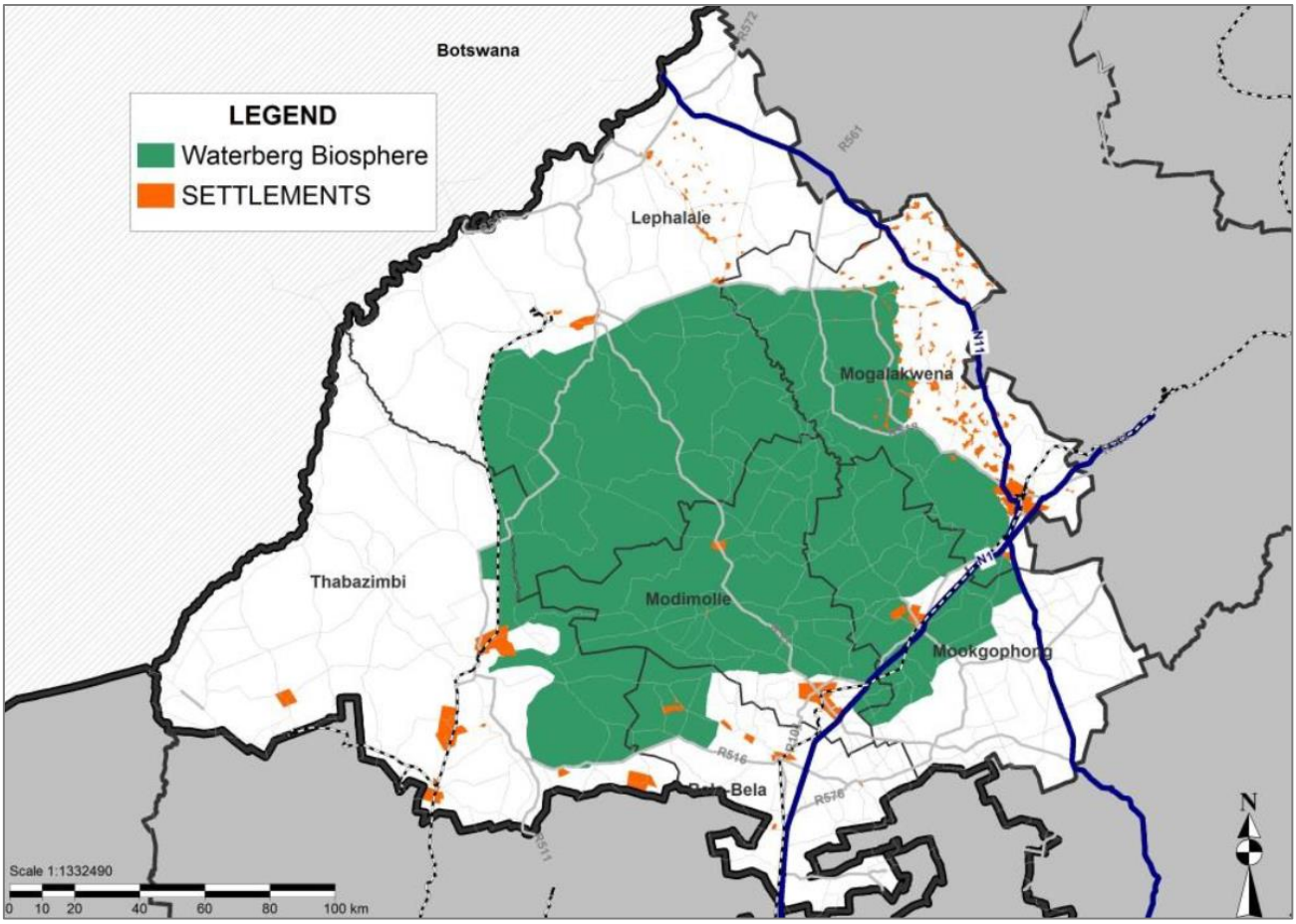


Figure 26: Waterberg Biosphere (Waterberg DM, 213)

The Ben Alberts Nature Reserve lies immediately southeast of the BP SS1. The reserve belongs to Kumba Iron Ore, Thabazimbi mine, which is currently in its closure phase.

11.9.5 Flora Species

The study area is located within 2327CB, 2327CD, 2427AB, 2427AD, 2427CB and 2327 DA quarter degree squares in terms of the 1:50 000 grid of South Africa. SANBI uses this grid system as a point of reference to determine any Red Data plant species or any species of conservation importance occurring in South Africa. **Table 19** provides details on the Red Data plant species which have been recorded in grid cells 2427AD and 2427CB (No Red Data plant species were recorded in grid cells 2327CB and 2327CD). The definitions of the conservation status are provided in **Table 20**.

Table 19: Threatened plant species recorded in grid cells 2427AD and 2427CB

Family	Species	Threat status	Growth forms
Scrophulariaceae	*Freylinia tropica* S.Moore	Rare	Shrub
Scrophulariaceae	*Jamesbrittenia bergae* P.Lemmer	VU	Dwarf shrub
Zamiaceae	*Encephalartos eugene-maraisii* I.Verd.	EN	Shrub, tree

Note: EN=Endangered, VU=Vulnerable

Table 20: Definitions of Red Data status (Raimondo *et al*. 1999)

Symbol	Status	Description
EN	Endangered	A taxon is Endangered when the best available evidence indicates that it meets any of the five International Union for Conservation of Nature (IUCN) criteria for Endangered, and is therefore facing an extremely high risk of extinction in the wild.
VU	Vulnerable	A taxon is Vulnerable when the best available evidence indicates that it meets any of the five IUCN criteria for Vulnerable and it is therefore considered to be facing a high risk of extinction in the wild.
	Rare	A taxon is rare when it does not meet any of the four South African criteria for rarity, but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to the five IUCN criteria.

Potential Impacts / Implications

- The proposed 23 borrow areas encroach into CBAs and ESAs, which are important in terms of biodiversity, ecosystem functionality and ecological processes;
- Vegetation will be permanently lost that is cleared for the operation of the borrow areas. Loss of significant flora species may occur, which needs to be investigated further;
- Clearing of vegetation during the pre-mining phases may result in the proliferation of exotic vegetation, which could spread beyond the domain of the borrow areas. This potential impact will need to be managed and mitigation measures to be provided in the EMPr, with regards to site clearance and establishment; and
- Possible protected trees affected by the removal of vegetation during the site clearing of the borrow pits.

Specialist Study Triggered / Additional Investigations

- Terrestrial Ecological Assessment to be undertaken. Areas to be affected by the proposed borrow pits will be surveyed to identify sensitive and significant floral species;
- Amongst others, the following information sources will be scrutinised further by the relevant specialists:
  - Limpopo Conservation Plan;
  - SANBI's spatial information, including CBAs; and
  - Waterberg Bioregional Plan.
- Mitigation measures will be established during the EIA phase to manage the potential impacts to vegetation, removal of protected trees and medicinal plants, encroachment by exotic species and to address the overall reinstatement and rehabilitation of the area affected within the domain of the borrow pits; and

- Permit(s) will be obtained under the National Forests Act (No. 84 of 1998) if protected trees are to be cut, disturbed, damaged, destroyed or removed. The borrow pit footprint will attempt to avoid protected trees, where possible.

11.10 Fauna

Status Quo

11.10.1 Mammals

The greater area was historically commonly used for cattle grazing. Game farms are now more common, with an associated high faunal biodiversity. Various mammal species (e.g. buffalo) have been introduced through this practice. Numerous farms also keep exotic game species. Proper conservation measures on game farms also afford protection to other species that naturally occur in the area, which include leopard, warthog, baboon and aardvark.

Known mammal distributions correlate well with biomes as defined by Acocks (1953), Low and Rebelo (1998), Knobel and Bredenkamp (2005) as well as Mucina and Rutherford (2006). However, the local occurrences of mammals are more closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (treeliving), rupiculous (rock-dwelling) and wetland-associated vegetation cover. The riverine areas and ridges in the area are regarded as significant in terms of the habitat that they provide to fauna. Riparian zones also serve as important corridors to allow for animal migration.

The Red Data mammal species that could potentially naturally occur in the project area are those which have been recorded in the grid cells 2327CB, 2327CD, 2327DA, 2427AB, 2427AD and 2427CB (ADU, 2016) are listed in **Table 21**.

Table 21: Red data Mammal species recorded in the grid cells 2327CB, 2327CD, 2327DA, 2427AB, 2427AD and 2427CB (ADU, 2016)

Family	Genus	Species	Subspecies	Common name	Red list category	Atlas region endemic
Bovidae	*Hippotragus*	*equinus*		Roan Antelope	Vulnerable	Yes
Bovidae	*Hippotragus*	*niger*	*niger*	Sable Antelope	Vulnerable	
Felidae	*Acinonyx*	*jubatus*		Cheetah	Vulnerable	Yes
Felidae	*Leptailurus*	*serval*		Serval	Near Threatened	Yes
Hyaenidae	*Hyaena*	*brunnea*		Brown Hyena	Near Threatened	Yes
Felidae	*Acinonyx*	*jubatus*		Cheetah	Vulnerable	Yes
Manidae	*Smutsia*	*temminckii*		Ground Pangolin	Vulnerable	Yes
Mustelidae	*Mellivora*	*capensis*		Honey Badger	Near Threatened	Yes
Vespertilionidae	*Myotis*	*tricolor*		Temminck's Myotis	Near Threatened	Yes

Previous studies found a bat cave that is situated in the Mooivalei area. The bats recorded from the cave are reported to be *Rhinolophus darlingi* and *Miniopterus schreibersii*, and are both ranked as 'Near Threatened'.

11.10.2 Avifauna

The banks of the Crocodile River, where BP SS1 is situated, are steep with reeds that grow in most areas followed by riparian vegetation that varies in density from place to place. The Matlabas River is a smaller river system with more or less the same vegetation that grows on its banks. These rivers are sensitive for bird species that depend on them for food, water and breeding purposes. Bird species such as herons, crakes, moorhens, bishops, weavers, cisticolas and warblers will breed in the reeds growing on the banks of the river systems and will also feed on insects that live within the reeds and semi-aquatic vegetation. Fish living in the water of these rivers will also attract birds such as kingfishers, cormorants and darters. Frogs and crabs also occur and will attract bird species that feed on them such as Hadeda, herons, hamerkop and kingfishers.

The vegetation within the riparian zone consists of large Acacia and broadleafed trees, which are taller than those trees further away from the river due to the availability of water. This riparian vegetation will favour species typically associated with a bushveld habitat. These birds include a great variety of arboreal passerines such as drongos, warblers, flycatchers, shrikes, sunbirds, waxbills and weavers as well as arboreal nonpasserines such as doves, cuckoos and woodpeckers. Many of these species make use of the thorny nature of these trees to build their nests. Acacia trees generally attract many insects and in turn attract a good diversity of typical “Bushveld” bird species.

The bird species within the woodland habitat include a great variety of arboreal passerines such as drongos, warblers, flycatchers, shrikes, sunbirds, waxbills and weavers as well as arboreal non-passerines such as doves, cuckoos and woodpeckers. Many of these species make use of the thorny nature of these trees to build their nests. Acacia trees generally attract many insects and in turn attract a good diversity of typical Acacia savanna bird species. The ground cover between the trees consists of mainly short to long grass interspersed with shrubs.

Several, mainly seasonal, pans are found in the region. Not only are these pans important for Red Data species but also for many Palaearctic waders which visit southern Africa during the summer months. The pans will attract several water bird species such as lapwings, ducks, herons and egrets for foraging, breeding and roosting purposes. They will feed on prey species such as frogs and their tadpoles and fish that aestivate and hibernate in the mud during times when the pans are dry as well as aquatic insects and plants. The pans are also an important source of water for many woodland bird species such as waxbills, buntings, sparrows, weavers and doves especially during hot and dry periods.

Bird distribution data of the Southern African Bird Atlas Project (SABAP1 – Harrison *et al.* 1997) obtained from the Avian Demography Unit of the University of Cape Town was used in order to ascertain which Red Data bird species occur in the study area (see **Table 22**). The more recent SABAP2 data was also consulted online (http://sabap2.adu.org.za/v1/gap_analysis.php).

Table 22: Red data bird species recorded in the grid cells 2327CB, 2327CD, 2327DA, 2427AB, 2427AD and 2427CB (ADU, 2016)

Common Name	Scientific Name	Conservation Status	2327CB	2327CD	2427AB	2427AD	2427CB
Kori Bustard	*Ardeotis kori*	VU	✓		✓	✓	✓
White-bellied Korhaan	*Eupodotis senegalensis*	VU				✓	
Yellow-throated Sandgrouse	*Pterocles gutturalis*	NT			✓		✓
Greater Painted-snipe	*Rostratula benghalensis*	NT					✓
Black-winged Pratincole	*Glareola nordmanni*	NT	✓				✓
White-backed Vulture	*Gyps africanus*	VU	✓	✓	✓		✓
Cape Vulture	*Gyps coprotheres*	VU	✓		✓		✓
Lappet-faced Vulture	*Aegypius tracheliotus*	VU	✓		✓		
Bateleur	*Terathopius ecaudatus*	VU	✓		✓		
African Marsh-Harrier	*Circus ranivorus*	VU					✓
Tawny Eagle	*Aquila rapax*	VU	✓	✓	✓		✓
Martial Eagle	*Polemaetus bellicosus*	VU			✓	✓	✓
Secretarybird	*Sagittarius serpentarius*	NT	✓	✓	✓	✓	✓
Lesser Kestrel	*Falco naumanni*	VU			✓		✓
Lanner Falcon	*Falco biarmicus*	NT					✓
Yellow-billed Stork	*Mycteria ibis*	NT			✓		✓
Black Stork	*Ciconia nigra*	NT			✓		✓
Marabou Stork	*Leptoptilos crumeniferus*	NT			✓		✓
Red-billed Oxpecker	*Buphagus erythrorhynchus*	NT			✓		✓

NOTE: VU = Vulnerable, NT = Near-threatened.

The Important Bird & Biodiversity Area (IBA) programme of southern Africa (Barnes, 1998) identified 124 IBAs in South Africa. IBAs are places of international significance for the conservation of birds and other biodiversity and are sites that together form part of a wider, integrated approach to the conservation and sustainable use of the natural environment.

The Waterberg System IBA occurs approximately 3.5 km to the east of BP 28, BP 33 and BP 41 which are situated in the middle of the study area, and the Northern Turf Thornveld IBA is situated approximately 2 km to the south of BP SS1 (see **Figure 27**). No borrow areas encroach into any of the surrounding IBAs.

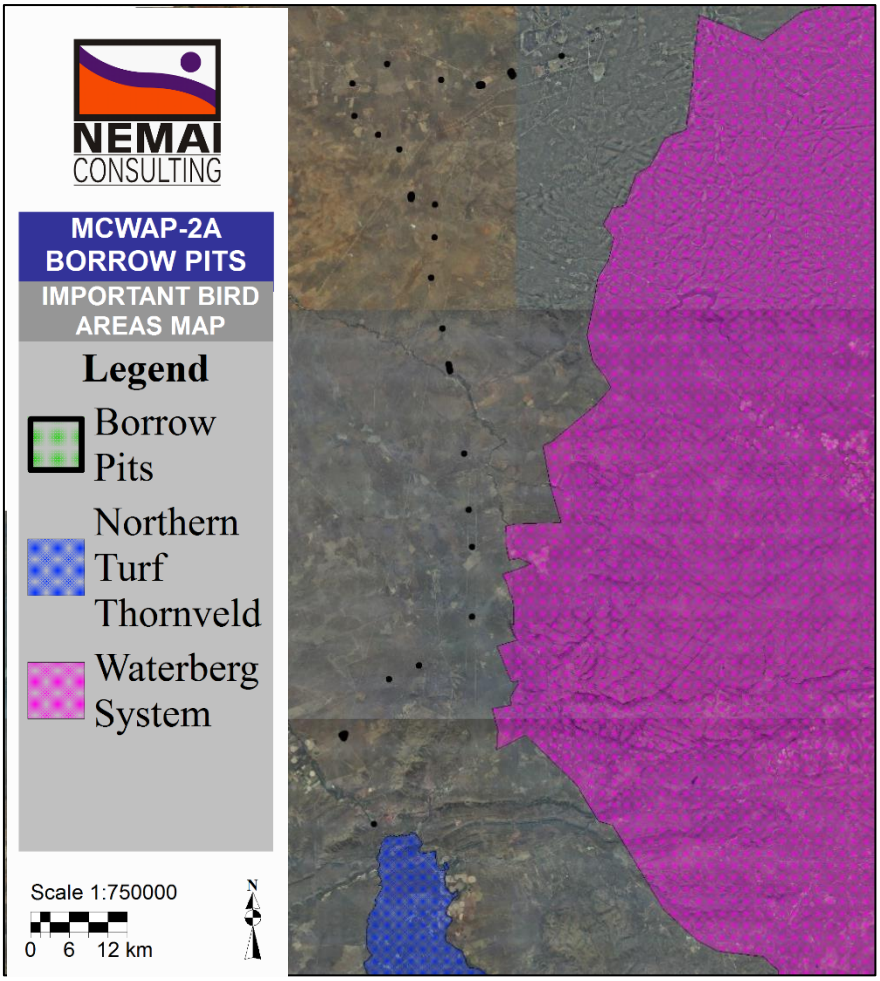


Figure 27: Important Bird Areas (IBA)

11.10.3 Herpetofauna (Reptiles and Amphibians)

In general, the habitat types affected by the proposed project are suitable for relatively high species diversity. The herpetofauna mainly consists of widespread, common Bushveld species with slight variation due to the presence of sandy substrate, stony to rocky terrain, water bodies, bush and trees. Riparian habitats are ordinarily rich in reptile diversity and densities due to the habitat supporting a high abundance of prey species, such as frogs, birds and small mammals (Branch, 2001). Reptilian species are largely dependent on habitat unit structures and prey abundance, which, in turn, also depends on general habitat unit structure and condition. Many reptilian species, together with a large proportion of their prey species, have been shown to be broadly tolerant to a variety of habitat types. Vegetative cover is also greater within this habitat type. Species are also very often “ousted” into wetland and riparian zones due to transformation of lands for urban and agricultural purposes.

Amphibians are an important component of South Africa’s exceptional biodiversity and are such worthy of both research and conservation effort. This is made additionally relevant by international concern over globally declining amphibian populations, a phenomenon currently undergoing intensive investigation but is still poorly understood (Wyman, 1990 & Wake, 1991). This decline seems to have worsened over the past 25 years and amphibians are now more

threatened than either mammals or birds, though comparisons with other taxa are confounded by a shortage of reliable data. Frogs are particularly restricted to aquatic habitats (wetlands and other surface water bodies) and, thus, impacts on these habitats (as a result of the clearing of the vegetation) are likely to negatively impact on amphibian species. Frogs also require terrestrial habitats adjoining aquatic habitats. Frogs are useful environmental bio-monitors (bio-indicators) and may acts as an early warning system for the quality of the environment. Frogs and tadpoles are good species indicator on water quality, because they have permeable, exposed skins that readily absorb toxic substances. Tadpoles are aquatic and greatly exposed to aquatic pollutants (Blaustein, 2003). The presence of amphibians is also generally regarded as an indication of intact ecological functionality.

Based on Jacobsen (1989), the SARCA Reptile Survey (2006 – 2009) and (Minter *et al*. 2004) the following list of Red Data herpetofauna species may occur within the project area:

- Giant Bullfrogs (*Pyxicephalus adspersus*);
- African Bullfrog (*Pyxicephalus edulis*); and
- Southern African Python (*Python natalensis*).

Potential Impacts / Implications

- Ecosystem disruption may occur where clearing is undertaken for the borrow areas;
- Fauna could be adversely affected through the pre-mining and mining phases (noise, dust, light pollution, illegal poaching, and habitat loss). This is especially relevant to sensitive game species (including exotic game) within the directly affected properties, or adjacent to the borrow areas;
- All borrow pits, and associated access/haul roads will be fenced off and constructed during the pre-mining phase, and thus will minimise animal movement in these sections of the affected properties temporarily;
- Impacts to sensitive fauna species and their habitats to be assessed by relevant specialists and suitable mitigation measures to be identified, where possible; and
- Possible disturbance to the bat cave that is situated in the Mooivalei area during the mining phase.

Specialist Study Triggered / Additional Investigations

- The probability of occurrences of conservation-worthy faunal species is based on their respective geographical distributional ranges and the suitability of on-site habitat. A Terrestrial Ecological Assessment will be undertaken and the areas to be affected by proposed borrow areas, will be surveyed to identify sensitive and significant fauna species or occurrence of suitable habitat;
- Amongst others, the following information sources will be scrutinised further by the relevant specialists:
    - Limpopo Conservation Plan;
    - SANBI's spatial information, including CBAs; and

- Waterberg Bioregional Plan.

- The potential impacts to fauna related to the mining stage, with particular emphasis on the animals on game farms (as also expressed by numerous landowners) and other sensitive species that naturally occur in the area (e.g. bats in Mooivalei area), will be addressed during the EIA phase; and
- Wildlife Impact Assessment to be conducted, taking into consideration the types of game kept on the farms and the requisite mitigation measures for the pre-mining, mining and post-mining phases of the proposed borrow areas.

11.11 Socio-Economic Environment

Status Quo

11.11.1 General

Waterberg DM consists mainly of agricultural/commercial farms, game farms (including exotic game), subsistence farms, rural settlements and small towns. The district's economy is mainly characterised by mining, tourism, agriculture and manufacturing. According to the SDF (Waterberg DM, 213), the dominant economic sectors in the district are shown in the **Figure 28** below.

Figure 28: Dominant economic sectors in Waterberg DM (Waterberg DM, 213)

11.11.2 Local Socio-economic Factors

The borrow areas, and associated infrastructure and access/haul roads are mostly located on privately-owned properties that are primarily used for agriculture, game farming and eco-tourism.

Apart from cultivated land and game farms, some notable socio-economic features in the project area include *inter alia* the following:

- Proximity of farm houses and dwellings of farm labourers to borrow pit locations (e.g. BP 38 and BP 49 are in close proximity to existing residential structures **Figure 29**); and
- Smaller / narrower farms will be affected by project infrastructure and fencing off of borrow areas and haul roads, which may influence future agricultural and game farming practices.

Figure 29: Structures impacted by the close proximity of borrow pits (BP 38 and BP 49)

11.11.3 Socio-Economic Baseline

Data pertaining to the socio-economic profile of Thabazimbi and Lephalale LMs, based on Census 2011, is presented below.

The majority of the population in Thabazimbi LM reside in urban areas, whereas in Lephalale LM the majority resides in traditional areas (see **Table 23**).

Table 23: Geo type for Person weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
Urban area	70062	46120
Tribal or Traditional area	-	52355
Farm	15172	17291

The majority of residents in the two LMs fall in the Black African category (see **Table 24**).

Table 24: Population group for Person weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
Black African	71845	104964
Coloured	527	1023
Indian or Asian	205	344
White	12309	9120
Other	347	317

The male population in the two LMs is higher than the female population (see **Table 25**).

Table 25: Gender for Person weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
Male	49877	62819
Female	35357	52948

Setswana is the dominant language in Thabazimbi LM, whereas Sepedi is dominant in Lephalale LM (see **Table 26**).

Table 26: Language for Person weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
Afrikaans	12345	8690
English	2808	3338
IsiNdebele	754	1277
IsiXhosa	9679	1044
IsiZulu	1672	1972
Sepedi	6264	55539
Sesotho	3085	1813
Setswana	32407	25944
Sign language	247	195
SiSwati	624	259
Tshivenda	1051	1669
Xitsonga	5812	3218
Other	1829	2565
Not applicable	6657	8245

Education levels are assessed in order to understand the potential grade or level of employment as well as livelihood of the community. Furthermore, it indicates the functional literacy and skill level of a community. **Table 27** shows the highest level of education reached for both LMs falls within the “some secondary” category.

Table 27: Highest educational level (grouped) for Person weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
No schooling	5919	7431
Some primary	15753	24447
Completed primary	4464	5559
Some secondary	24597	33315
Grade 12/Std 10	15069	16707
Higher	4578	7986
Unspecified	156	204
Not applicable	14700	20121

The majority of people in both LMs are employed (see **Table 28**).

Table 28: Official employment status for Person weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
Employed	32916	35328
Unemployed	8562	10101
Discouraged work-seeker	1236	1563
Other not economically active	22437	33699
Age less than 15 years	-	-
Not applicable	20082	35076

The main type of dwelling encountered in both LMs is a house or brick/concrete block structure on a separate stand or yard or on a farm (see **Table 29**).

Table 29: Type of main dwelling for Household weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
House or brick/concrete block structure on a separate stand or yard or on a farm	15917	22816
Traditional dwelling/hut/structure made of traditional materials	469	408
Flat or apartment in a block of flats	306	849
Cluster house in complex	75	95
Townhouse (semi-detached house in a complex)	209	114
Semi-detached house	190	62
House/flat/room in backyard	905	340
Informal dwelling (shack; in backyard)	2925	2098
Informal dwelling (shack; not in backyard; e.g. in an informal/squatter settlement or on a farm)	3580	2456
Room/flatlet on a property or larger dwelling/servants quarters/granny flat	121	321
Caravan/tent	99	74
Other	282	246
Unspecified	-	-
Not applicable	-	-

The majority of annual household income ranges between R 38 201 - R 76 400 in Thabazimbi LM and R 19 601 - R 38 200 in Lephalale LM (see **Table 30**).

Table 30: Annual household income for Household weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
No income	3518	3745
R 1 - R 4800	686	958
R 4801 - R 9600	1027	1876
R 9601 - R 19 600	3165	4876
R 19 601 - R 38 200	4048	6046
R 38 201 - R 76 400	5021	4608
R 76 401 - R 153 800	3517	3354
R 153 801 - R 307 600	2474	2358
R 307 601 - R 614 400	1160	1417
R 614 001 - R 1 228 800	313	445
R 1 228 801 - R 2 457 600	105	126
R 2 457 601 or more	45	68
Unspecified	2	3

11.11.4 Service Delivery

This section provides a summary of level of services in the two affected LMs. The majority of people in the Thabazimbi LM have piped (tap) water inside dwelling/institution. In the Lephalale LM more people have piped (tap) water inside yard (marginally higher than the aforementioned) (see **Table 31**).

Table 31: Piped water for Person weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
Piped (tap) water inside dwelling/institution	42360	36501
Piped (tap) water inside yard	18867	37854
Piped (tap) water on community stand: distance less than 200m from dwelling/institution	9921	28176
Piped (tap) water on community stand: distance between 200m and 500m from dwelling/institution	3123	6783
Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling /institution	2343	1875
Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution	1203	570
No access to piped (tap) water	6852	3366
Unspecified	492	519
Not applicable	75	117

The primary source of water for both LMs is regional / local water scheme (operated by municipality or other water services provider) (see **Table 32**).

Table 32: Source of water for Person weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
Regional/local water scheme (operated by municipality or other water services provider)	54036	83595
Borehole	12885	20685
Spring	141	423
Rain water tank	183	345
Dam/pool/stagnant water	267	2316
River/stream	165	1527
Water vendor	2028	1992
Water tanker	13557	3399
Other	1899	1368
Not applicable	75	120

The majority of people have flush toilets in both LMs (see **Table 33**).

Table 33: Toilet facilities for Person weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
None	5034	4539
Flush toilet (connected to sewerage system)	55176	43803
Flush toilet (with septic tank)	3798	4887
Chemical toilet	1848	870
Pit toilet with ventilation (VIP)	2547	33234
Pit toilet without ventilation	13512	26289
Bucket toilet	522	663
Other	2235	846
Unspecified	492	519
Not applicable	75	120

Electricity is the primary from of energy used for cooking, heating and lighting purposes (see **Tables 34 - 36**).

Table 34: Energy or fuel for cooking for Person weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
Electricity	58416	66270
Gas	4494	2838
Paraffin	10908	5364
Wood	10470	40344
Coal	99	51
Animal dung	18	42
Solar	150	57
Other	27	45
None	90	120
Unspecified	492	519
Not applicable	75	117

Table 35: Energy or fuel for heating for Person weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
Electricity	60201	69231
Gas	1272	999
Paraffin	5121	3852
Wood	9945	28092
Coal	108	84
Animal dung	90	69
Solar	177	888
Other	3	-
None	7746	11910
Unspecified	492	519
Not applicable	75	117

Table 36: Energy or fuel for lighting for Person weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
Electricity	67920	101124
Gas	174	108
Paraffin	4023	459
Candles (not a valid option)	11970	12942
Solar	321	276
None	255	219
Unspecified	492	519
Not applicable	75	120

In Thabazimbi LM most of the refuse is removed by the local authority / private company at least once a week. In Lephalale LM most people make use of own refuse dumps for refuse disposal. Refer to **Table 37**.

Table 37: Refuse disposal for Person weighted (Statistics South Africa, 2013)

	LIM361: Thabazimbi	LIM362: Lephalale
Removed by local authority/private company at least once a week	53046	43482
Removed by local authority/private company less often	1218	924
Communal refuse dump	3699	3777
Own refuse dump	21651	53442
No rubbish disposal	4143	13089
Other	909	414
Unspecified	492	519
Not applicable	75	120

11.11.5 Land Claims

The land claims in the district, based on the SDF (Waterberg DM, 2013), are shown in **Figure 30**. The project area around the Matlabas River seems to be the most affected by land claims.

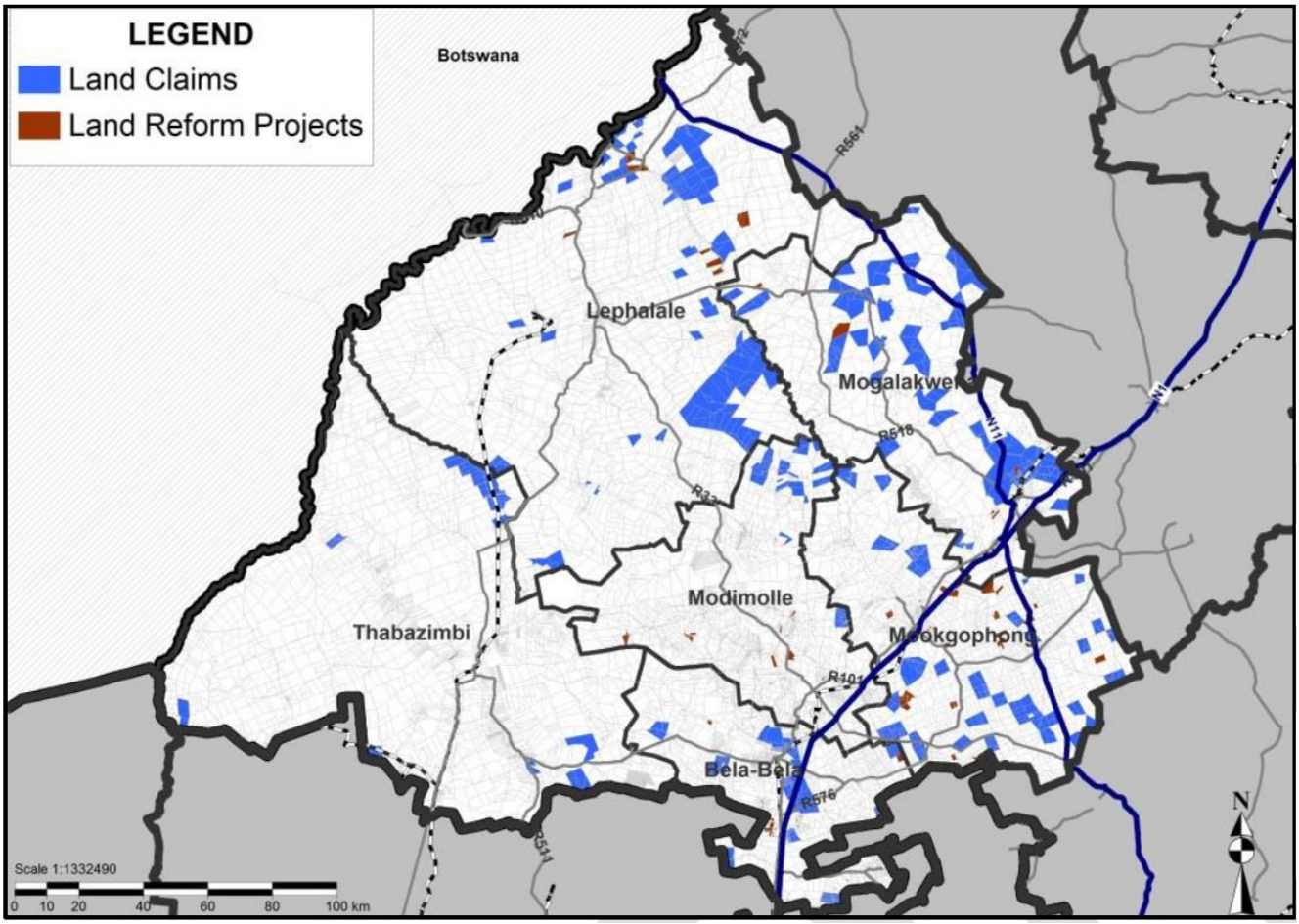


Figure 30: Land claims in district (Waterberg DM, 2013)

Potential Impacts / Implications

Possible adverse impacts to the socio-economic environment, which are anticipated to be temporary due to the nature of the mining activities, include (amongst others):

- Loss of land/vegetation (including agricultural areas) through borrow areas and associated access roads;
- Loss of agricultural production;
- Risk to game and livestock as a result of mining related hazards and fenced off borrow pits;
- Loss of income in eco-tourism sector (hunting and game farming);
- Access restrictions to farm portions that contain borrow areas;
- Traffic impacts due to the use of local road network by construction vehicles;
- Safety and security risks;
- Impact to visual quality and sense of place;
- Nuisance from dust and noise from borrow areas in close proximity to households and structures;
- Light pollution;

- Impacts to smaller properties, where the entire management area of the borrow pit may affect the critical mass required to continue with the current land use;
- Influx of people seeking employment and associated impacts (e.g. foreign workforce, cultural conflicts, squatting, demographic changes, anti-social behaviour, and incidence of HIV/AIDS);
- Reduction in property value due to permanent vegetation loss; and
- If the projected development materialise the population and specifically the urban population of Lephalale will grow substantially.

Positive impacts associated with the entire MCWAP-2A include:

- MCWAP-2A will enable developments associated with the Waterberg coalfields to proceed;
- Employment opportunities will be created during the construction phase of the pipeline, and pre-mining, mining and post mining phases of the borrow pits with accompanying skills transfer; and
- Where possible, goods and services will also be sourced locally during the mining phase of the borrow areas.

Specialist Study Triggered / Additional Investigations

- A Socio-economic Impact Assessment will be undertaken as part of the EIA phase, and mitigation measures will need to be identified to manage the impacts to the local social and economic environments;
- Findings from the Economic Impact Assessment (macro-economic analysis), which was undertaken under the Technical Feasibility Study, will be incorporated into the EIA Report.
- The status of land claims needs to be assessed before the project can proceed; and
- Compensation to be fair and complaint with the prevailing regulatory framework.

11.12 Agriculture

Status Quo

11.12.1 Irrigation

In general, the study area is regarded as arid, and irrigation is hence limited to major watercourses, as is evident immediately downstream of the proposed BP SS1 (shown in **Figure 31**). Agricultural practices are mainly reliant on the abstraction of water from the Crocodile River (West), in order to irrigate crops.

Formal agricultural groups in the study area include the following:

- Hartbeespoort Irrigation Board;
- Crocodile River (West) Irrigation Board;
- Makoppa Farmers;
- Transvaal Agricultural Union South Africa (TAU SA); and

- Agri-SA Lephalale.

The Makoppa Farmers are downstream of the proposed weir and BP SS1 situated in the Vlieëpoort region (refer to **Figure 31**).

Figure 31: Agricultural practices alongside the Crocodile River (West) downstream of BP SS1

11.12.2 Land Capability

The following observations are made with regards to the land capability map in **Figure 32**:

- Marginal potential arable land is affected by majority of the borrow areas that fall in the central and southern parts of the study area; and
- The borrow areas that fall within the northern region of the study area affect non-arable land (grazing, woodland or wildlife).

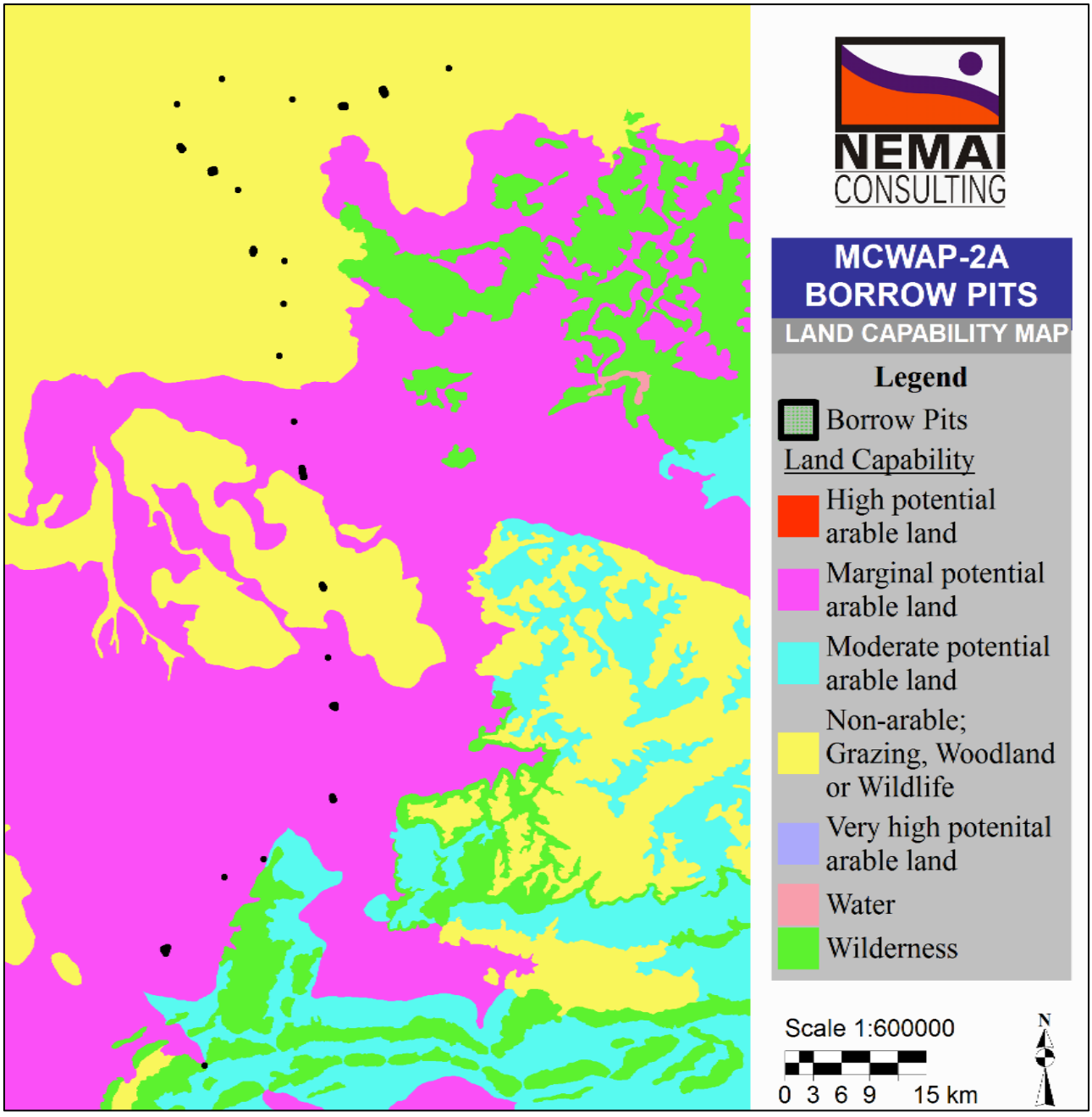


Figure 32: Land capability map

11.12.3 Existing Agricultural Activities

According to the Crocodile (West) Marico Internal Strategic Perspective (ISP) (DWAF, 2004b), smallholding and commercial agricultural activities (limited formal irrigation) take place in the area to the north west of Johannesburg (south of the Magaliesberg northern range). The area between Rustenburg and Brits is known for its citrus farming activities, whereas irrigated cash crop farming takes place below the Hartbeespoort Dam and Brits. Irrigation also occurs along the main stem of the Crocodile River (West), the most significant areas being just south and north of the town of Thabazimbi. The rest of the area is used for dryland farming (limited), cattle grazing and game ranching (DWAF, 2004b). Generally, there has been a movement away from cattle farming towards game farming in the greater area.

The project footprint of BP 33 affects existing cultivated fields (see **Figure 33**).

Figure 33: Agricultural activities affected by BP 33

Potential Impacts / Implications

- Temporary loss of agricultural land in the development footprint and the associated loss of income.

Specialist Study Triggered / Additional Investigations

- An Agricultural Impact Assessment will be conducted during the EIA phase. Amongst others, this will quantify the agricultural areas affected by the proposed project and consider possible mitigation measures.
- The loss of cultivated land will need to be considered in terms of the impact to the current agricultural operations. Compensation to be fair and complaint with the prevailing regulatory framework. Affected areas to be suitably rehabilitated to allow for continued agricultural use.

11.13 Air quality

Status Quo

Due to the predominantly rural nature of the study area, the air quality is regarded to be good. Obvious sources of air pollution in the greater region include the following:

- Grootegeluk coal mining operations;
- Dust from areas affected by the previous Thabazimbi iron ore mining operations
- Urban-related emissions from towns (notably Lephalale and Thabazimbi);
- Emissions from Matimba and Medupi power stations (stacks) and its associated ash dump;
- Dust from agricultural lands, bare areas and use of dirt roads;
- Tailpipe emissions from vehicles travelling along the road network;
- Burning of wood for household purposes in areas without electricity;
- Waste treatment and disposal;
- Burning of biomass (veld fires); and
- Veld fires.

Potential Impacts / Implications

- Dust will be generated during the mining period from various sources, including blasting, construction of haul roads, mining activities within the borrow areas, topsoil and overburden stockpiles, use of haul/access roads and existing dirt roads, transportation of spoil material, and general activities within the management area of the borrow pits; and
- Sensitive receptors to dust and other air quality impacts in the study area include farm dwellings, human settlements, sensitive game species and eco-tourists.

Specialist Study Triggered / Additional Investigations

No specialist air quality study will be undertaken for the proposed project, as it is not deemed necessary for the type of activities associated with this project. Mitigation measures will be included in the EMPr to ensure that the air quality impacts during the site clearing and mining phases are suitably monitored (dust fallout and particulate matter) and managed and that regulated thresholds are not exceeded. The EMPr will also include measures to control and minimize greenhouse gas emissions by optimizing the utilisation of construction resources.

11.14 Noise

Status Quo

The rural state of the study area affords it tranquillity. Noise in the region emanates primarily from the following sources:

- Mining operations;
- Human settlements;
- Operations at the Matimba power station and ash dump;
- Farming operations (e.g. use of farming equipment);
- Vehicles on the road network;
- Trains utilising the railway line; and
- Occasional overflying aircrafts.

The ridges in the southern part of the route serve as noise attenuation features, although the ambient noise levels are regarded as insignificant.

Potential Impacts / Implications

- During the mining phases, localised increases in noise will be caused by blasting, mining activities within the borrow areas, use of haul/access roads and existing dirt roads, and general activities on site. Vibration could be felt close to mining areas;
- Similar to air quality, the sensitive receptors to noise impacts in the study area include farm dwellings, human settlements, sensitive game species and eco-tourists; and
- Refer to **Section 11.17** for further discussions on possible buildings affected by the proposed borrow areas and associated haul roads.

Specialist Study Triggered / Additional Investigations

- Noise that emanates from mining activities will be addressed through targeted best practices for noise management in the EMPr.

11.15 Historical and Cultural Features

Status Quo

11.15.1 General

The Waterberg Biosphere is rich in cultural heritage. Bushmen entered Waterberg around two thousand years ago, and they produced rock paintings at Lapalala within the Waterberg. Early Iron Age settlers in Waterberg were Bantu, who had brought cattle to the region. Later people left the first Stone Age artefacts recovered in northern South Africa. Starting about the year 1300 AD, Nguni settlers arrived with new technologies, emanating from the Iron Age.

Some historical information of the district's administrative areas follows (sourced from Waterberg DM, 2013):

- The heritage and sense of place of the Waterberg lies in its cultural diversity, history, and natural environment. The natural environment is of particular importance due to the prominence of its topography, the unique range of habitats, its tourist attractions and its wildlife;
- Lephalale is the youngest town in the district. It was established in 1960 and got municipal status only in 1986. During the first half of the nineteenth century, Lephalale served as a nexus for hunting parties operating from Vaalwater and the Waterberg in the east, Thabazimbi in the south and Botswana in the north-east; and
- The Thabazimbi-Rooiberg area is known for the prehistoric mining of tin and evidence for pre-historic iron smelting and habitation has been recorded. Thabazimbi is the Tswana word for 'mountain of iron'. The exceptionally rich iron deposits at the Vlieggepoort defile was re-discovered' by J.H. Williams in 1939. The government bought the ore body and Iscor started with production in 1931. The township of Thabazimbi was mainly established for the employers of Iscor. It was laid out on the farm Kwaggashoek and officially proclaimed on 4 May 1953.

11.15.2 Local Historical Features

Potential historical features within the study area include the following:

- Archaeological sites (possibly linked to the Stone Age and Iron Age);
- Structures of historical value (e.g. farm houses older than 60 years) (see example in **Figure 34** on the page to follow);
- Grave sites; and
- Intangible historical attributes.

Figure 34: Example of an old structure in the study area

11.15.3 Palaeontology

Based on the Palaeontological (Fossil) Sensitivity Map, sourced from South African Heritage Resources Information System (SAHRIS), (see **Figure 35**), the following is noted in terms of the project footprint in relation to areas of palaeontological sensitivity:

- Very high sensitivity – Possibly affected by BP SS1in the south, and by BP 51 in the north;
- Moderate sensitivity - affected by all the borrow pits which fall within the southern region of the study area (mainly BP 44 – BP 15); and
- Insignificant / zero sensitivity – remainder of proposed borrow pits.

Table 38: Palaeontological Sensitivity Index

Colour	Sensitivity	Required Action
RED	**VERY HIGH**	Field assessment and protocol for finds is required
ORANGE/YELLOW	**HIGH**	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	**MODERATE**	Desktop study is required
BLUE	**LOW**	No palaeontological studies are required however a protocol for finds is required
GREY	**INSIGNIFICANT/ZERO**	No palaeontological studies are required
WHITE/CLEAR	**UNKNOWN**	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

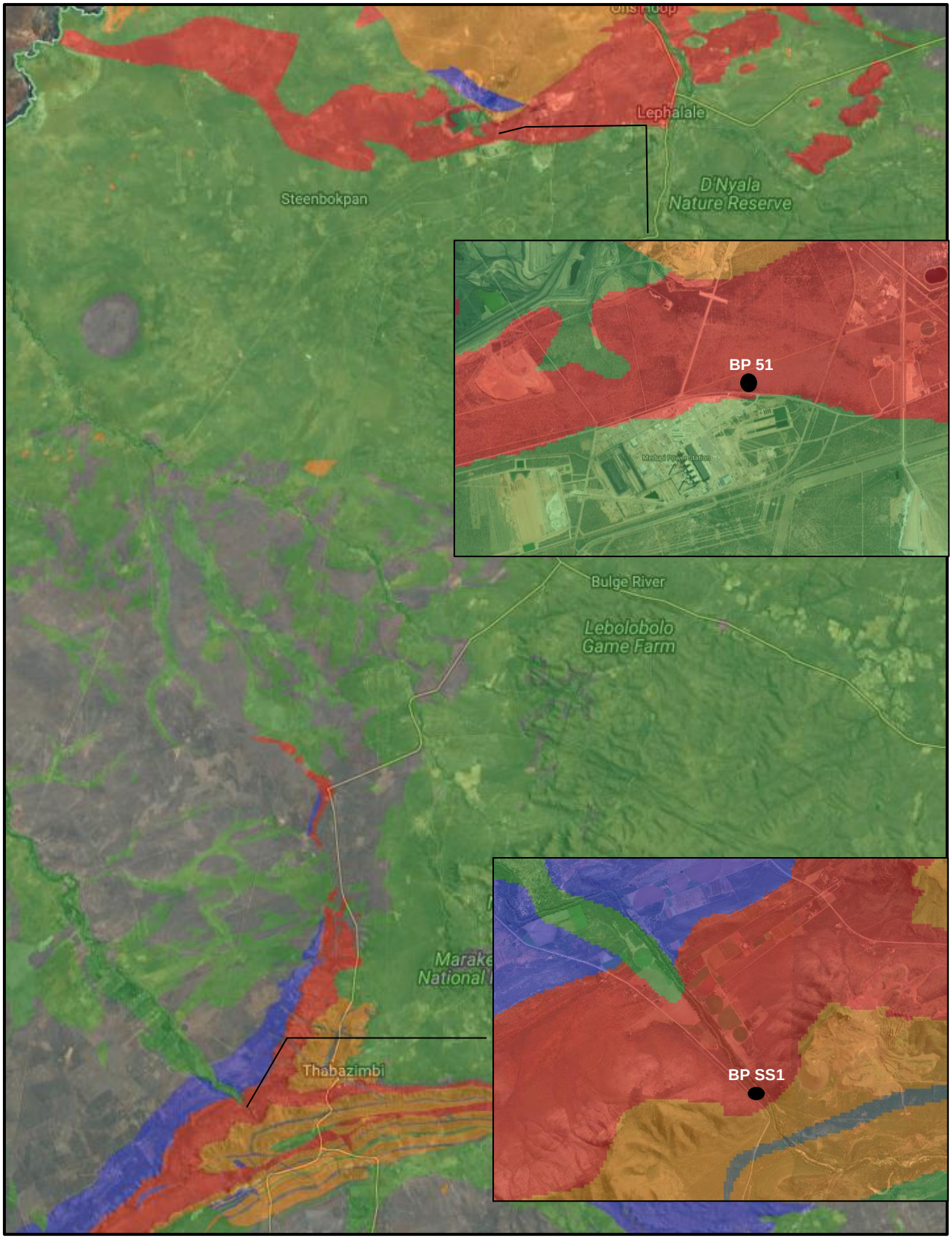


Figure 35: Palaeontological Sensitivity Map (SAHRIS)

Potential Impacts / Implications

- Heritage and cultural resources could be destroyed or damaged through mining activities; and
- The chances of encountering heritage and cultural resources are reduced where the proposed footprint follows existing infrastructure and where it is located on cultivated land, due to past disturbances.

Specialist Study Triggered / Additional Investigations

- A Phase 1 Heritage Impact Assessment, in accordance with the National Heritage Resources Act (Act No. 25 of 1999), will be conducted during the EIA phase and will be submitted to LIHRA for review;
- A palaeontological assessment will be undertaken for areas identified by SAHRIS as having very high to moderate sensitivity;
- All the relevant protocols must be abided by and permits will need to be obtained with regard to heritage resources (where necessary); and
- All work will cease for chance finds of heritage resources during the mining phase and LIHRA will be notified. Additional mitigation measures will be included in the EMPr for the management of heritage resources and chance finds on site.

11.16 Planning

Status Quo

11.16.1 General

Waterberg DM covers an area of approximately 4 951 882 ha. It consists mainly of commercial farms, game farming, rural settlements and small towns. The district is geographically, the largest municipality in the Limpopo Province but has the smallest population compared to the other districts (Waterberg DM, 2015). It is located on the western part of the Province.

Thabazimbi LM is located in the south-western part of the Limpopo Province and Waterberg DM. The total area of the municipality is 10 882 km^2, which constitutes 21.97% of the overall DM. The project footprint is located Wards 1 and 3 of the Thabazimbi LM (based on 2015 delimitation of wards).

Lephalale LM is located in the western part of the Limpopo Province and north-western part of the Waterberg DM. The total area of the municipality is 14 000 km^2, which constitutes 28.3% of the overall DM. The project footprint is located Wards 3 and 5 of the Lephalale LM (based on 2015 delimitation of wards).

As mentioned, the proposed borrow areas, and associated haul roads are mostly located on privately-owned properties that are primarily used for agriculture, game farming and eco-tourism.

11.16.2 Spatial Development Framework (SDF)

Limpopo Province SDF

The Limpopo SDF is dated September 2007 and indicates the following elements (Waterberg DM, 213) (see **Figure 36**):

- Infrastructure;
- Nodes;
- Environmentally sensitive areas; and
- Corridors: Four corridors are identified as Strategic Development Initiatives. Two of these impact on the District: namely the Trans-Limpopo Corridor along the N1 and the east-west Corridor from Polokwane via Lephalale to Botswana.

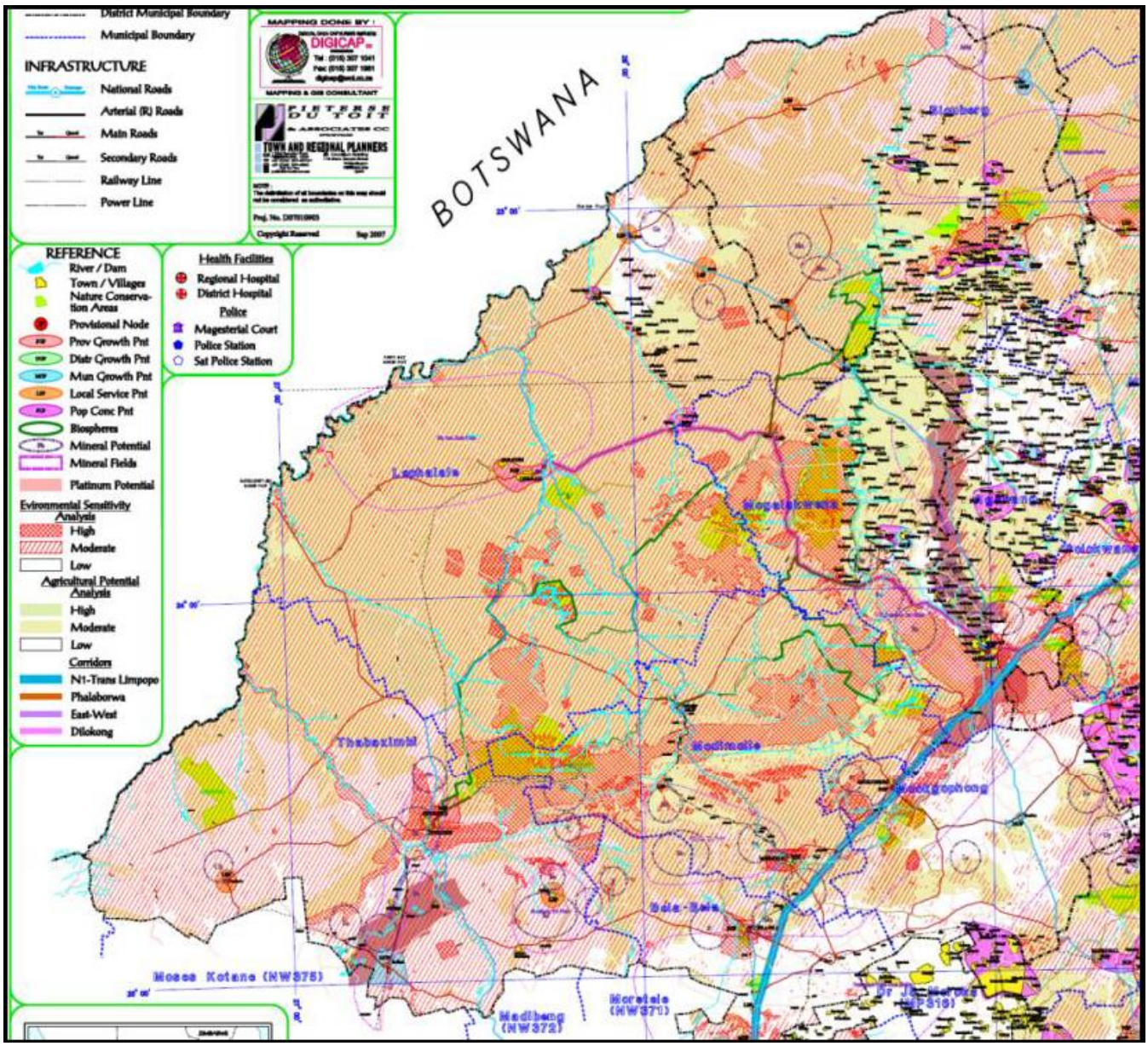


Figure 36: Limpopo Province SDF

Waterberg DM SDF

There is an existing SDF for the Waterberg District, which was approved in 2009, and indicates the following (Waterberg DM, 213) (see **Figure 37**):

- Nodes;
- Networks;
- Conservation and Tourism;
- Mining; and
- Urban and Rural Development.

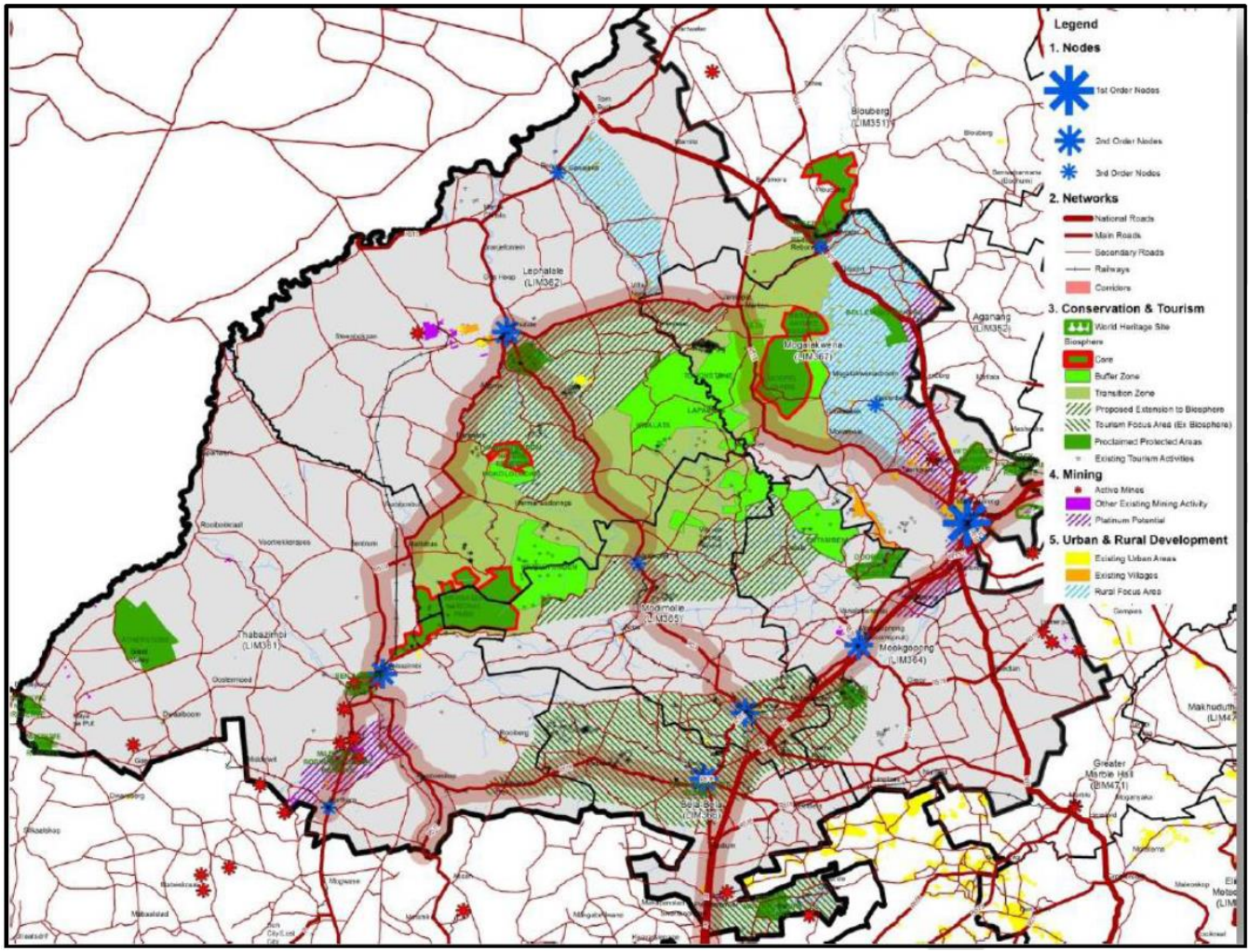


Figure 37: Waterberg DM SDF

Lephalale LM SDF

The Lephalale SDF is dated November 2012 and indicates the following (Waterberg DM, 213) (see **Figure 38**):

- Development corridors and strategic roads;
- Nodal points;
- Human settlement and other zones and
- Long term vision and other features.

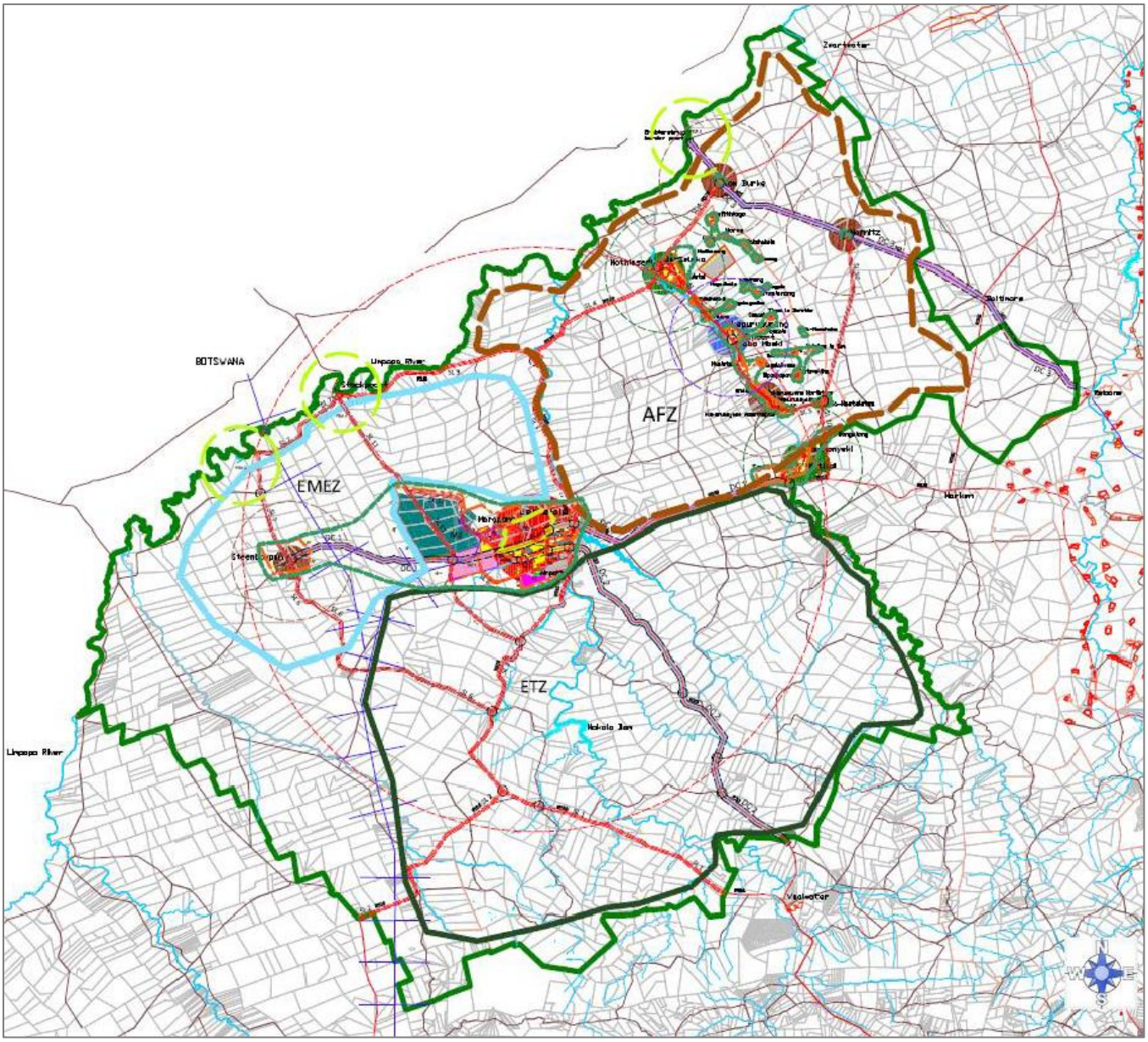


Figure 38: Lephalale LM SDF

Thabazimbi LM SDF

The Thabazimbi SDF is dated June 2008 and indicates the following (Waterberg DM, 213) (see **Figure 39**):

- Growth points;
- Settlements;
- Corridors;
- Nodes;
- Waterberg Biosphere;
- Mines; and
- High-risk river areas.

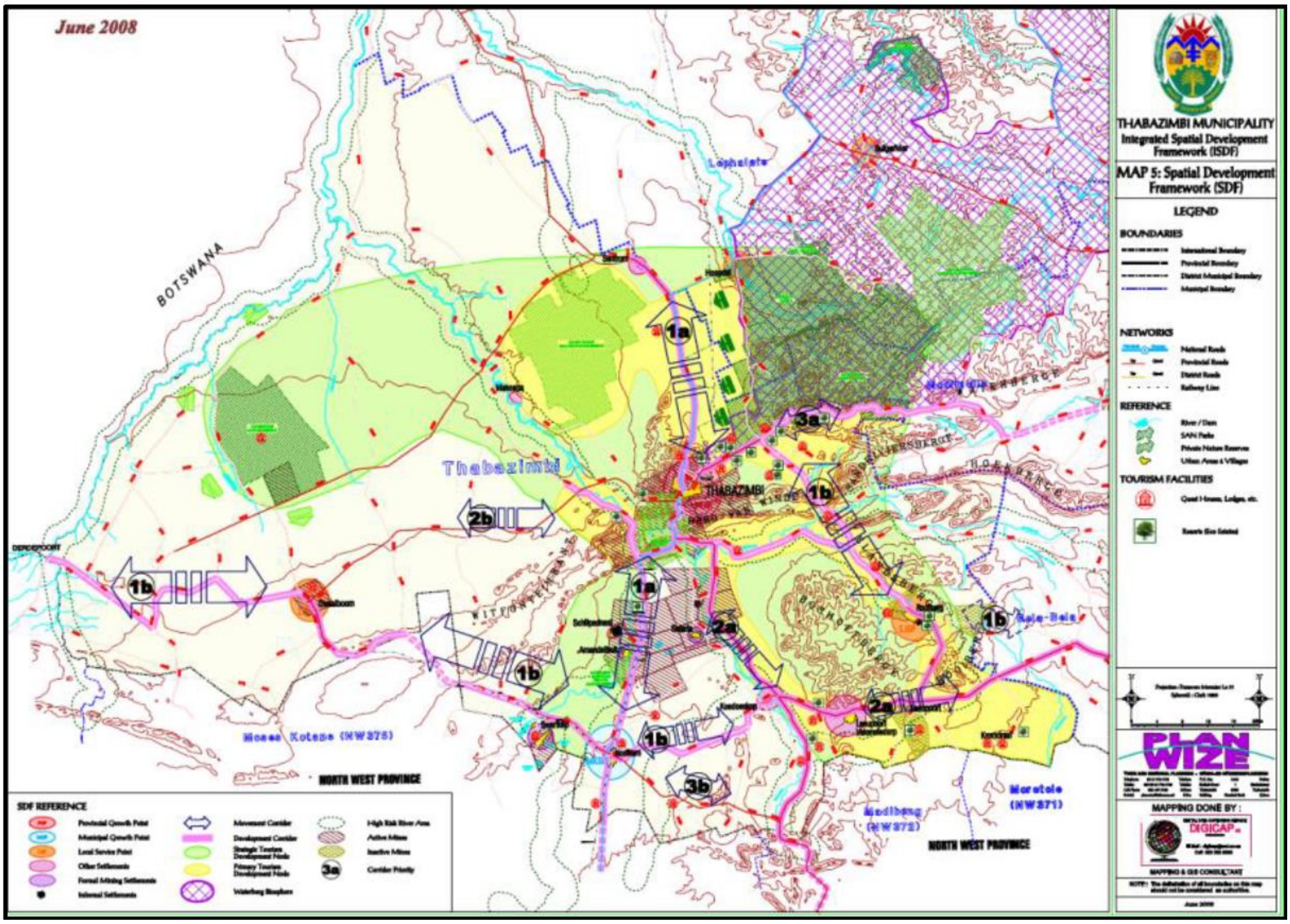


Figure 39: Thabazimbi LM SDF

11.16.3 <u>Environmental Management Framework</u>

An EMF was developed for the Waterberg District with the following objectives:

- Encourage sustainable development;
- Establish development priorities;
- Identify strategic guidance and development management proposals;
- Identify the status quo, development pressures and trends in the area;
- Determine opportunities and constraints;
- Identify geographical areas in terms of NEMA;
- Specify additional activities within identified geographical areas that will require an EIA based on the environmental attributes of such areas;
- Specify currently listed activities that will be excluded from EIA within certain identified geographical areas based on the environmental attributes of such areas; and
- Develop a decision support system for development in the area to ensure that environmental attributes, issues and priorities are taken into account.

In terms of the EMF the project falls within the following Environmental Management Zones (refer to **Figure 40**):

- Zone 4: Game and cattle farming (including hunting) areas with commercial focus;
- Zone 5: Mining and industrial development focus areas;
- Zone 6: Restricted mining focus areas in aesthetic and/or ecological resource areas; and
- Zone 11: Major infrastructure corridors.

It is noted that Zone 11 facilitates the routing of bulk infrastructure, such as the pipeline associated with MCWAP-2A and borrow pits required for the construction of the pipeline infrastructure. The EIA will further assess whether MCWAP-2A is incompatible with the desired state established for the remaining zones.

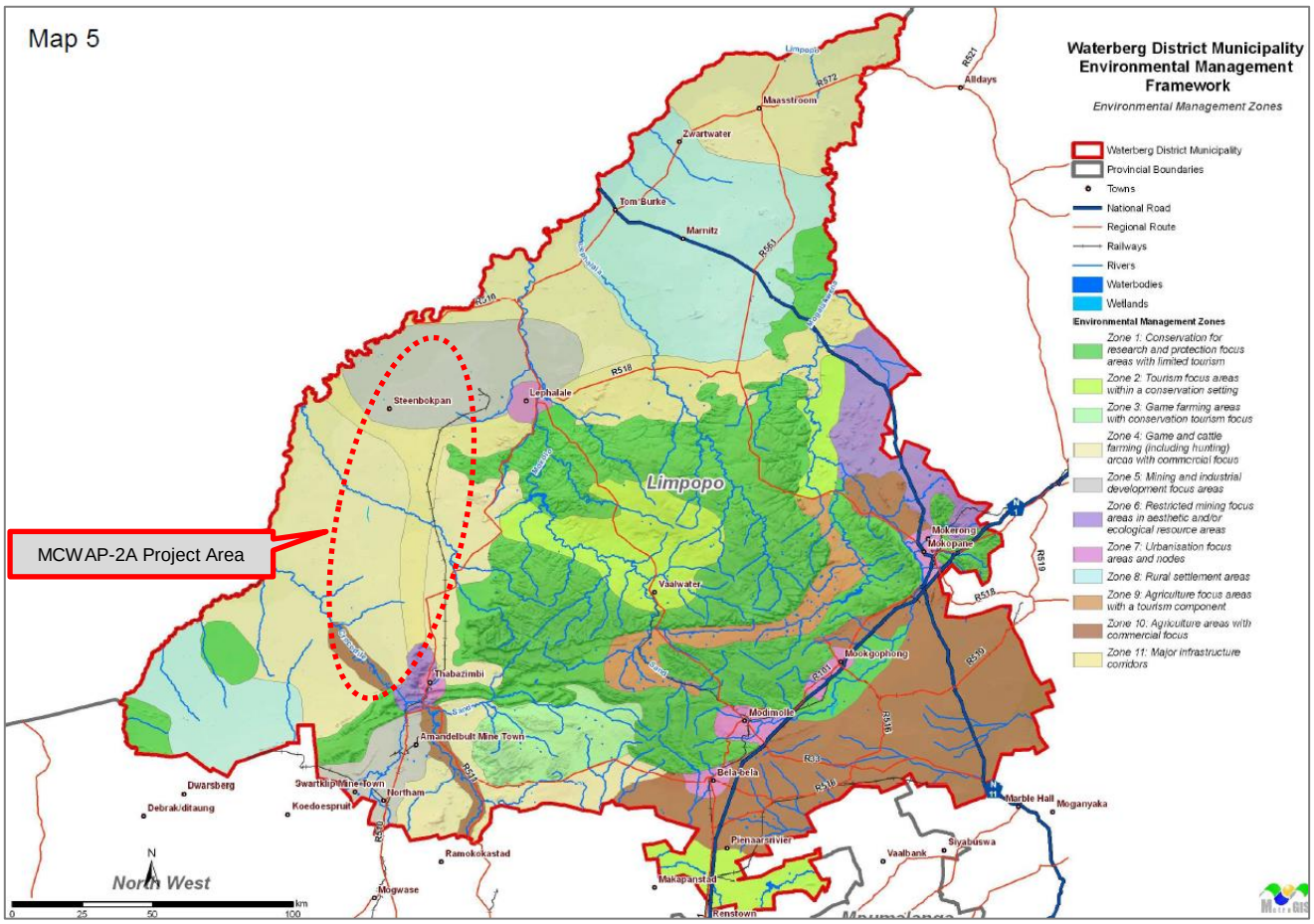


Figure 40: Waterberg DM EMF

Potential Impacts / Implications

- MCWAP-2A will enable developments associated with the Waterberg coalfields to proceed, with major planning implications for the areas affected. However, the MCWAP-2A infrastructure is not in direct conflict with the planning frameworks of the affected municipalities. MCWAP-2A is further acknowledged in the IDPs for the Thabazimbi LM and Lephalale LM; and

- Borrow areas and associated haul roads may temporarily affect the sense of place of the receiving environment. Mitigation measures will be investigated during the ensuing EIA phase.

Specialist Study Triggered / Additional Investigations

- Tourism-related impacts will be assessed in the EIA phase. In this regard, a Visual Impact Assessment was conducted as part of previous EIA for MCWAP-2, which assists in understanding the potential implications to the aesthetic quality of the project area.

11.17 Existing Structures and Infrastructure

Status Quo

The proposed 23 borrow areas may affect the following physical features located in the study area (amongst others):

- Power lines (transmission, distribution and reticulation);
- Railway line (Central Route) (including bridges);
- Public and private roads (including bridges);
- Telephone lines;
- Access roads to private farms;
- Infrastructure associated with agricultural practices, such as irrigation pipelines, workshops, sheds, livestock enclosures, etc.;
- Private dams and boreholes;
- Fencing erected on the boundaries of private farms;
- Game camps;
- Farm houses and dwellings of farm labourers; and
- Churches and schools.

Several proposed borrow pits affect cultivated land (with associated infrastructure), and are also located near dwellings and existing households.

Potential Impacts / Implications

- Comply with the specific requirements of the infrastructure custodians when working within servitudes or reserves;
- Disruptions to traffic on local road network during the mining phase. This is associated with road crossings, access/haul roads that fall along existing farm road alignments, and from general use of the roads by haul vehicles;
- Disruptions to services;
- Mining-related disturbances (e.g. noise from blasting and mining of borrow pit, use of generator and equipment on site, dust from borrow pit and haul roads);

- Farm portions become fragmented due to the temporary fencing required for the borrow pit and associated access/haul roads; and
- Disruptions of existing agricultural/commercial practices on the directly affected properties.

Specialist Study Triggered / Additional Investigations

- A detailed survey will be conducted to identify all physical features that are located within the final project footprint;
- Optimisation of borrow pit locations, layouts and access road routes to be considered in the design phase to avoid existing structures and buildings, as well as other sensitive features (where possible);
- All structures, buildings and cultivated fields that will be affected by the project will be identified and suitable compensation measures need to be established; and
- Mitigation measures to be identified during the EIA phase to safeguard or relocate existing structures and agricultural infrastructure on private farms or to compensate the land owners.

11.18 Transportation

Status Quo

Lephalale LM

Provincial roads in Lephalale, which serve as links between Thabazimbi, Vaalwater, Ellisras and Mokopane include:

- P84/1 (Vaalwater/Ellisras/Botswana);
- P19/2 (Ellisras/Marken) that links with (Mokopane); and
- P198/1 (Vaalwater/Ellisras).

The majority of the movement in the municipality occurs between the Mokerong-area and Lephalale where most of the business facilities are located, and along the road networks to Thabazimbi, Mokopane and Gauteng. A number of District Roads link with the Main roads, and there are also a number of internal formal and informal roads, which grant access to farms and settlements within Lephalale district. Lephalale is serviced with a north/south railway line, which transports coal to and from the Grootgeluk Mine. An airfield is also situated in Lephalale, known as the Ellisras Vliegveld/Aerodrome.

The major transportation network situated in the study region is shown in **Figure 41**.

Thabazimbi Local Municipality

Important routes in Thabazimbi municipal area:

- P16/2 (link with the P84/1 situated in the Lephalale Local Municipality);
- P110/1 (north-south route; access route to the North West Province - Brits/Madibeng);
- P20-1 (east-west route; main access to Bela-Bela);

- P20-2 (east-west route; access to Koedoeskop/Northam);
- D928 (access road to Rooiberg from Thabazimbi); and
- D1649 (access road to Dwaalboom).

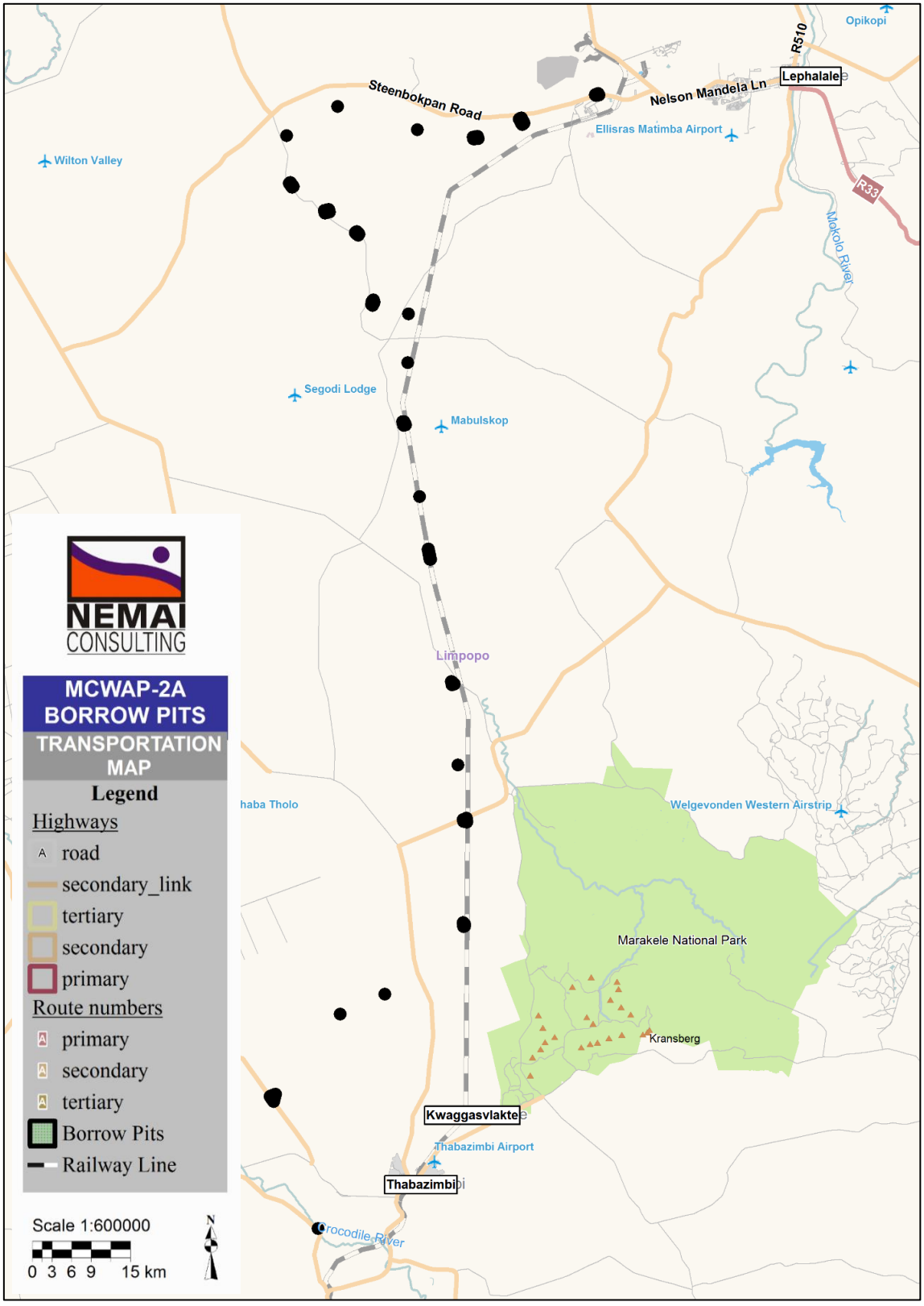


Figure 41: Major Transportation Network in Region

Potential Impacts / Implications

- It was planned that the borrow pits be placed at approximately 5 km intervals, as close as possible to the pipeline servitude in order to minimise the length of haul roads and impact on the receiving environment and directly affected property;
- Various public and private roads are affected and are planned to be utilized as access/haul roads;
- A number of borrow pits are located along the north/south railway line to Lephalale;
- During the mining phase there will be a significant increase in traffic on the local road networks, due to the delivery of excavated material, transportation of staff; and
- As part of the pre-mining and mining phase, measures will be implemented for the selective upgrade of the existing roads (if necessary) and to render these roads safe for other users (amongst others).

Specialist Study Triggered / Additional Investigations

- Any disruptions to the transportation network must be mitigated, and will be discussed in the EIA Report.
- Traffic management measures will be includes in the EMPr.
- Dust suppression measures along haul roads to be included in the EMPr.

11.19 Waste Disposal Facilities

Status Quo

Lephalale LM has one permitted waste disposal facility. The life expectancy of the landfill is 5 years without waste minimization programmes but with such programmes the life expectancy can go as far as more than ten years (Lephalale LM, 2015). The Municipality has appointed a service provider to conduct the feasibility studies for the development of new landfill site.

According to the IDP (Thabazimbi LM, 2015), there are 3 formal waste disposal sites (Northam, Donkerspoort and Leeupoort) and 1 informal site (Rooiberg) in Thabazimbi LM.

Potential Impacts / Implications

- The project will directly or incidentally generate various types of solid waste during the site clearing and mining phase, such as:
  - Waste generated from site preparations (e.g. overburden material);
  - Domestic waste;
  - Surplus and used building material; and
  - Hazardous waste (e.g. chemicals, oils, soil contaminated by spillages, diesel rags).
- Wastewater will be produced during mining activities; and

- Excess spoil material (soil and rock) will be generated as part of the bulk earthworks associated with the mining phase of the project. Spoil material and overburden will be stored and used at the borrow areas as part of the post-mining phase (closure and rehabilitation).

Specialist Study Triggered / Additional Investigations

- During the mining of the borrow pit, a waste management area will be established at the site offices/stores where waste generate on site will be collected, sorted, weighed and placed in skips and recycling containers for removal to service providers and appropriate registered landfill sites (hazardous and general sites, as required); and
- Further provisions for waste and wastewater management will be attended to in the EMPr.

11.20 Aesthetic Qualities

Status Quo

The visual character of the landscape is typical of the bushveld. Private game farms are prevalent in the project area, which afford a high-level of aesthetic appeal to the region. The visual quality of the area is further enhanced by watercourses, undisturbed vegetation and the Vlieëpoort ridge to the south of the study area. The aesthetic quality of certain areas surrounding the proposed borrow areas is partly degraded due to the existence of infrastructure such as roads, railway lines and transmission lines (see examples in **Figure 42**).

Figure 42: Roads, Railway lines and Transmission Lines in the study area

Potential Impacts / Implications

Potential visual impacts during the pre-mining phase, include:

- Clearing of vegetation;
- Mining-related activities;
- Light pollution;
- Inadequate waste management and housekeeping; and
- Inadequate reinstatement, rehabilitation and closure of entire borrow area.

Potential visual impacts during the mining phase, include:

- High visibility of permanent infrastructure, overburden stockpiles, spoil sites;
- Temporary loss of “sense of place”;
- Section of cleared vegetation along access road;
- Light pollution and dust creation from mining activities and haul roads; and
- Inadequate reinstatement, rehabilitation and closure of entire borrow area.

Specialist Study Triggered / Additional Investigations

A Visual Impact Assessment was conducted as part of previous EIA for MCWAP-2 and assessed the impacts to the aesthetics as a result of the proposed project infrastructure, and recommended mitigation measures. This assessment also considered the sensitive receptors (e.g. residences) that could potentially be influenced by any visual impacts.

The EMPr will include measures to manage visual impacts and to rehabilitate areas affected by mining activities that fall outside of the development footprint.

11.21 Tourism

Status Quo

Tourism is a key economic sector within the study area. An abundance of tourism activities are available including hunting, game viewing, bird watching, fishing, horse riding, hiking, etc. There has been a large-scale shift from cattle farming to ecotourism-based land use, hunting and exotic game-farming in the region, with numerous lodges, chalets and other forms of bush-accommodation also available. The Waterberg Mountain Range, which stretches from Thabazimbi to Mokopane, is a popular tourist attraction in the region. Thabazimbi is renowned for the numerous hunting opportunities afforded to tourists. Key tourist attractions in proximity to the study area include (amongst others):

- The Marakele National Park lies to the east of the study area;
- Thaba Tholo, which is renowned for breeding threatened and endangered game species like Roan Antelope, Sable Antelope, Tsessebe and disease-free Buffalo, is situated to the west of the pipeline route;

- The Ben Alberts Nature Reserve lies immediately southeast of BP SS1; and
- Borrow areas fall alongside or within Private game reserves.

Potential Impacts / Implications

Potential impacts to tourism in the study area during the mining phase include:

- Visual impacts from the excavations at borrow areas and mining equipment along main roads, especially along the existing R510 road, which leads to the Marakele National Park;
- Use of surrounding formal and informal road networks by haul vehicles, which are also used by visitors to the reserves and guesthouses/lodges in the area; and
- Impacts to game farming (e.g. Fragmentation caused by temporary fencing off of access roads and borrow areas, vegetation clearing, noise from equipment on site, dust generated during transport of material and mining of borrow areas and light pollution).

The other impacts to tourism are similar to those listed in **Section 11.20** in terms of visual impacts caused during the mining phases of the project.

Specialist Study Triggered / Additional Investigations

A Socio-Economic Impact Assessment earmarked for the EIA phase will need to consider the impacts of the borrow areas and associated access/haul roads on local tourism in the area, with a specific focus on the various local game farms/bush lodges. Adequate compensation will also be required for the directly affected parties, as relevant.

A Wildlife Impact Assessment is to be undertaken as part of the EIA, taking into consideration the types of game kept on the farms and the requisite mitigation measures for the borrow areas that fall in close proximity, or within the game farms.

12 PUBLIC PARTICIPATION

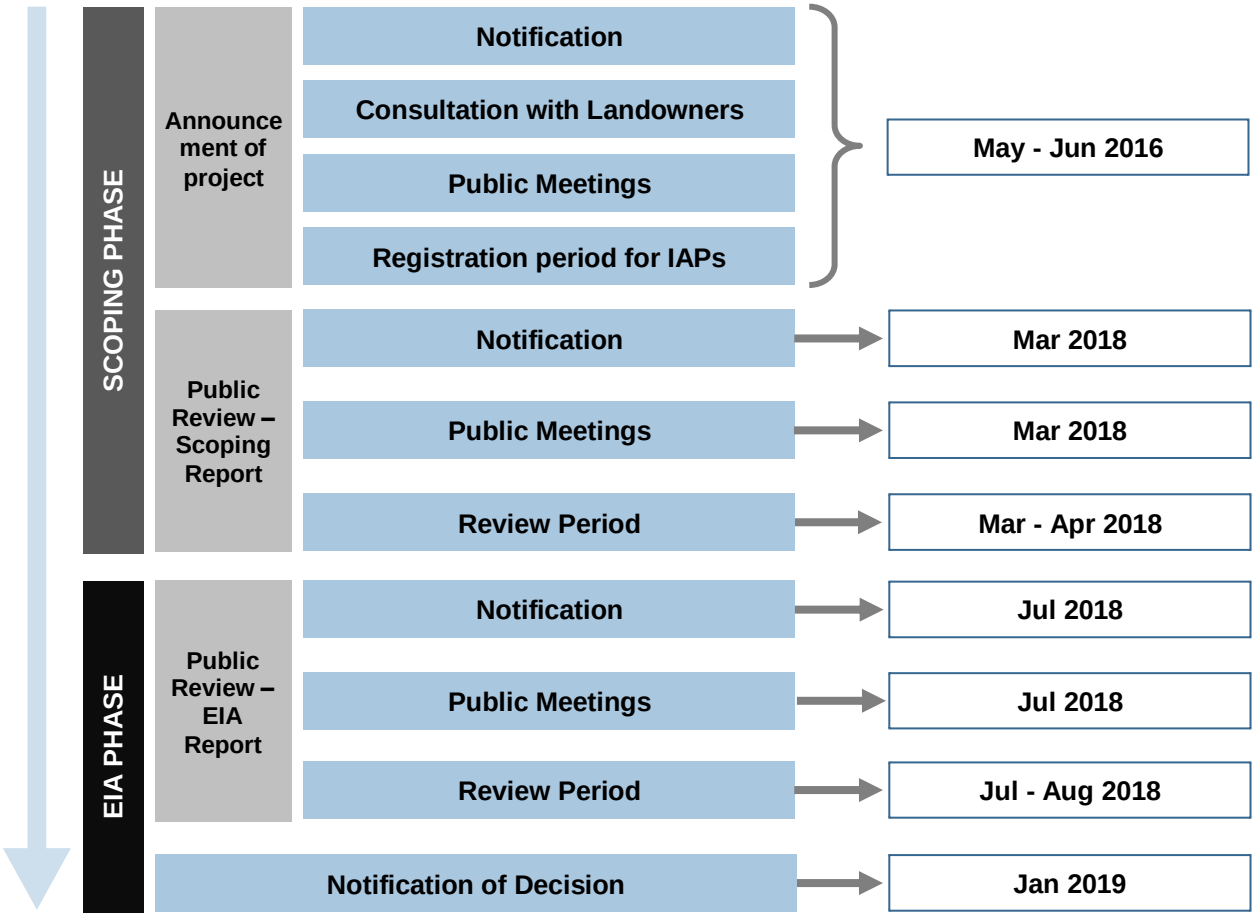
12.1 General

The purpose of public participation includes:

1. Providing IAPs with an opportunity to obtain information about the project;
2. Allowing IAPs to express their views, issues and concerns with regard to the project;
3. Granting IAPs an opportunity to recommend measures to avoid or reduce adverse impacts and enhance positive impacts associated with the project; and
4. Enabling DWS, TCTA and the project team to incorporate the needs, concerns and recommendations of IAPs into the project, where feasible.

The public participation process that was followed for the proposed MCWAP-2A is governed by NEMA and GN No. R 982 of 04 December 2014 (as amended). **Figure 43** below outlines the

public participation process for the Scoping phase (current) and EIA phase (pending). Note that the dates may change due to the dynamic nature of the EIA Process.



Note: *Dates may change during the course of the EIA process*

Figure 43: Public Participation Process

12.2 Pre-Application Consultation

A Pre-application Consultation Meeting was convened with DMR on 07 December 2017 (refer to **Appendix E** for correspondence). The outcomes of the meeting are discussed in **Section 6.3**.

12.3 Database of IAPs

A database of IAPs, which includes authorities, different spheres of government (national, provincial and local), parastatals, ward councillors, stakeholders, landowners, interest groups and members of the general public, was prepared for the project and is contained in **Appendix H**.

This database will be maintained and updated as necessary during the course of the EIA.

12.4 Landowner Notification

Details of the properties that are directly affected and adjacent to the proposed development (including maps) are contained in **Appendix B**. Proof of notification will be provided in **Appendix K** in the Final Scoping Report. According to Regulation 39(1) of GN No. R 982 of 4 December 2014 (as amended), if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land. This requirement does not apply *inter alia* for linear developments (e.g. pipelines, power lines, roads) or if it is a SIP as contemplated in the Infrastructure Development Act, 2014. MCWAP-2A project components qualify under SIP 1, and landowner consent is thus not required.

12.5 Project Announcement

The tasks listed in the sub-sections to follow were undertaken during the project announcement phase of MCWAP-2A.

12.5.1 Background Information Document

A Background Information Document (BID) and Reply Form (refer to **Appendix I**) were provided to each of the IAPs contained in the database. The BID provided the following information in a succinct format:

- Project background and overview;
- EIA Process; and
- Details of the public participation process and where more information could be obtained.

The BID included a Reply Form, which granted the opportunity to register as an IAP and to raise queries or concerns regarding the project. Queries and concerns received from IAPs for the entire MCWAP-2A project to date, are contained in the Comments and Responses Report (CRR) in **Appendix L**.

12.5.2 Onsite notices

Onsite notices, which also served to announce the MWCAP-2A project including the borrow pits, were placed at strategic points within the project area (listed in **Table 39**) in May 2016. Onsite notices were primarily placed in proximity to the project components, based on the availability of public access.

Table 39: Locations of onsite notices

No.	Description	Coordinates
1.	Mooivalei Road (D1649)	24°37'18.21"S; 27°18'45.99"E
2.	Mooivalei Road (D1649)	24°35'51.98"S; 27°19'43.04"E
3.	Mooivalei Road (D1649)	24°35'21.32"S; 27°18'59.68"E
4.	Mooivalei Road (D1649)	24°34'39.82"S; 27°18'30.91"E

No.	Description	Coordinates
5.	Paarl (3677)	24°31'38.35"S; 27°16'29.10"E
6.	Leeubosch (R510)	24°25'30.09"S; 27°24'24.21"E
7.	Tarantaalpan (R510)	24°24'24.78"S; 27°24'2.54"E
8.	Tarantaalpan (R510)	24°22'10.78"S; 27°23'48.08"E
9.	Honingvley (R510)	24°18'53.64"S; 27°23'13.76"E
10.	Witklip (R510)	24°17'28.15"S; 27°26'58.49"E
11.	Steenbokpan Road	24°10'50.43"S; 27°26'35.24"E
12.	Steenbokpan Road	24° 5'51.23"S; 27°24'21.01"E
13.	Steenbokpan Road	23°58'26.99"S; 27°23'15.37"E
14.	Steenbokpan Road	23°53'39.09"S; 27°24'13.66"E
15.	Steenbokpan Road	23°52'24.00"S; 27°23'24.82"E
16.	Steenbokpan Road	23°51'31.38"S; 27°23'58.64"E
17.	Steenbokpan Road	23°50'6.65"S; 27°25'4.04"E
18.	Steenbokpan Road	23°48'12.71"S; 27°20'18.09"E
19.	Theunispan	23°43'18.06"S; 27°16'40.88"E
20.	Steenbokpan Winkel	23°42'37.67"S; 27°16'26.06"E
21.	Agri-SA Ellisras	23°40'19.68"S; 27°44'29.83"E
22.	Thabazimbi Library	24°35'49.00"S; 27°24'25.77"E
23.	Thabazimbi Municipal Offices	24°35′20.75”S; 27°24′34.64”E
24.	Koedoeskop Shop & Post office	24°53'0.44"S; 27°31'32.77"E
25.	Sentrum Agricultural Union Auctioning Kraals	24°15'35.65"S; 27°19'37.24"E

Details of the locations of the onsite notices and accompanying photographs are contained in **Appendix I**.

12.5.3 Newspaper Advertisements

Advertisements were placed in the following newspapers in May 2016 as notification of the project (refer to copies of the newspaper advertisements contained in **Appendix I**):

- The Star;
- The Daily Sun;
- Die Kwêvoël;
- Beeld; and
- Mogol Pos.

12.5.4 Comments Received during the Announcement Phase

Comments received during the EIA announcement phase of the entire MCWAP-2A project, are included in the CRR in **Appendix L**.

12.5.5 Public Meetings

The details of the public meetings held during the EIA announcement phase are provided in

Table 40 (see photographs in **Figures 44 - 46**). The minutes of these meetings are contained in **Appendix J1**.

Table 40: Details of Public Meetings - EIA Announcement Phase

Date	25 May 2016	26 May 2016	26 May 2016
Area	Thabazimbi	Lephalale	Steenbokpan
Time	09h00 – 13h00	08h30 – 12h30	14h00 - 18h00
Venue	Kumba Bioscope Hall	Mogol Conference Hall	Thusong Community Centre

The purpose of this meeting included the following:

- To introduce the project to the public;
- To provide an overview of the EIA Process;
- To provide a platform for project-related discussions; and
- To obtain input into the Scoping Phase.

Figure 44: Picture of public meeting held on 25 May 2016 (Thabazimbi)

Figure 45: Picture of public meeting held on 26 May 2016 (Lephalale)

Figure 46: Pictures of public meeting held on 26 May 2016 (Steenbokpan)

12.5.6 Environmental Authorities' Meeting

Authorities are regarded as government departments with jurisdiction pertaining to the activities associated with the proposed project or the receiving environment. An Environmental Authorities Meeting was held on 25 May 2016 (see photograph in **Figure 47**). The minutes of this meeting are contained in **Appendix J2**.

Figure 47: Picture of authorities' meeting held on 25 May 2016 (Thabazimbi)

12.5.7 Focus Group Meetings

The need to convene dedicated focus group meetings with the three affected irrigation groups was identified during the EIA announcement phase. These meetings, which form part of a broader Public Involvement Programme, were held in January 2018 (see details of meetings in **Table 50**). The minutes of these meetings are contained in **Appendix J3**.

Table 50: Details of Focus Group Meetings with Irrigators

Group	Hartbeespoort Irrigation Board	Crocodile-West Irrigation Board	Makoppa Irrigation Group
Date	24 January 2018	24 January 2018	25 January 2018
Time	09h00 – 12h00	14h00 – 17h00	09h00 – 12h00
Venue	DWS Hartbeespoort Area Office	Koedoeskop Agricultural Union Hall	Kumba Bioscope Hall, Thabazimbi

12.6 Review of Draft Scoping Report

12.6.1 Notification of Review of Draft Scoping Report

In accordance with Regulation 43(1) of GN No. R 982 of 4 December 2014 (as amended), registered IAPs are granted an opportunity to review and comment on the Draft Scoping Report.

The following notifications were provided with regards to the review of the Draft Scoping Report:

- Landowners, authorities and registered IAPs were notified via email and SMS;
- Notices were placed in the following newspapers (copies of the newspaper advertisements to be contained in the Final Scoping Report) -
  - The Star;
  - The Daily Sun;
  - Die Kwêvoël;
  - Beeld; and
  - Mogol Pos.
- Onsite notices were placed at the same points listed in **Table 39**, and additionally on site of all the proposed borrow pits.

Proof of notification will be available in the Final Scoping Report.

12.6.2 Accessing the Draft Scoping Report

The review period for the Draft Scoping Report will take place from **06 March until 11 April 2018**. Copies of the document were placed at the locations provided in **Table 41**.

Table 41: Locations for review of Draft Scoping Report

Copy	Location	Address	Tel. No.
1.	Lephalale Public Library	Lephalale Civic Centre, c/o Joe Slovo & Dou Water St, Lephalale	014 762 1453
2.	Thabazimbi Public Library	4th Ave, next to Police station in Thabazimbi	014 777 1525
3.	National Library of South Africa	Cnr Johannes Ramokhoase and Thabo Sehume Street	012 358 8954
4.	Steenbokpan Winkel	Steenbokpan	014 766 0167

Copies of the Draft Scoping Report were provided to the following regulatory and commenting authorities:

- DMR;
- DEA;
- LDEDET;
- DWS Limpopo Regional Office;
- DAFF;
- LIHRA;
- Department of Public Works, Roads and Infrastructure;
- Waterberg DM;
- Thabazimbi LM; and
- Lephalale LM.

The Draft Scoping Report can also be downloaded from the following website - http://www.nemai.co.za/environmental.html.

12.6.3 Public Meeting to Present the Draft Scoping Report

The details of the public meetings scheduled to present the Draft Scoping Report are provided in **Table 42**. The minutes of these meetings will be included in the Final Scoping Report.

Table 42: Details of Public Meetings – Draft Scoping Phase

Date	13 March 2018	14 March 2018	15 March 2018	
Area	Hartbeespoort Dam	Thabazimbi	Lephalale	Steenbokpan
Time	9:00 – 12:00	9:00 – 12:30	9:00 – 12:30	14:00 – 17:00
Venue	Hartbeespoort NG Kerk	Kumba Bioscope Hall, Thabazimbi	Mogol Conference Room	Thusong Community Centre

12.6.4 Focus Group Meeting to Present the Draft Scoping Report

A specific focus group meeting will be held with the Mooivalei Farmers, in order to present the findings of the draft Scoping Report, and to capture their main concerns. The minutes of the focus group meeting will be provided in the Final Scoping Report.

12.6.5 Comments Received on the Draft Scoping Report

All comments and correspondence received from authorities and IAPs during the review period of the Draft Scoping Report, will be incorporated into the CRR and will be included in the Final Scoping Report. The Comments Sheets provided in **Appendix N** can be used for capturing comments.

12.7 Issues raised by IAPs

The Scoping phase serves to identify and prioritise issues for further assessment during the EIA phase. Accordingly, the comments received from authorities and IAPs during public participation as part of Scoping will be afforded due consideration and further investigation during the pending EIA stage. The CRR in **Appendix L** contains all comments received during the announcement phase of the MCWAP-2A project. It summarises the comments and concerns raised and the project team's response to these matters. The CRR will constantly be updated, and will include all the comments received during the review period of the Draft Scoping Report.

13 POTENTIALLY SIGNIFICANT ENVIRONMENTAL ISSUES

In accordance with the purpose of the Scoping exercise as part of the overall environmental assessment, this section aims to identify potentially significant environmental issues for further consideration and prioritisation during the EIA stage. This allows for a more efficient and focused impact assessment in the ensuing EIA phase, where the analysis is largely limited to significant issues and reasonable alternatives.

13.1 Approach

13.1.1 Predicting Significant Environmental Issues

The potential environmental issues associated with the proposed borrow areas, were identified during the Scoping phase through an appraisal of the following:

- Project-related components and infrastructure;
- Activities associated with the project life-cycle;
- Resources required for the pre-mining and mining phases;
- Nature and profile of the receiving environment and potential sensitive environmental features and attributes (see **Section 10**), which included a desktop evaluation (via literature review, specialist input, GIS, topographical maps and aerial photography) and site investigations;
- Review of technical information, including the Feasibility Study;
- Understanding of direct and indirect effects of the project as a whole;
- Input received during public participation from authorities, IAPs and stakeholders; and
- Legal and policy context (see **Section 5**).

Apart from explaining the receiving environment, **Section 10** provides a discussion of the possible impacts during the pre-mining and mining phases of the proposed borrow pits. The significant environmental issues were distilled from this information and are summarised in **Section 13.2**. Cumulative impacts are briefly explained in **Section 13.3**.

13.1.2 Mitigation of Impacts

During the EIA stage a detailed assessment will be conducted to evaluate all potential impacts (paying particular attention to the significant issues listed in the Scoping Report), with input from the project team, requisite specialist studies and IAPs and through the application of the impact assessment methodology contained in **Section 13.4**.

Suitable mitigation measures will be identified to manage the environmental impacts according to the following hierarchy:

1. Initial efforts will strive to **prevent** the occurrence of the impact;
2. If this is not possible, mitigation will include measures that reduce or **minimise** the significance of the impact to an acceptable level;
3. **Remediation** and **rehabilitation** will take place if measures cannot suitably prevent or reduce the impacts, or to address the residual impacts; and
4. As a last measure, **compensation** will be employed as a form of mitigating the impacts associated with a project.

The mitigation measures will be incorporated into the EMPr, which will form part of the EIA Report. This deliverable, together with the Environmental Authorisation, can act as a standalone document that can be used to *inter alia* monitor against compliance of the project with its pre-determined objectives, targets and management actions.

13.2 Summary of Potentially Significant Environmental Issues

Pertinent environmental issues, which will receive specific attention during the EIA phase through a detailed quantitative assessment and relevant specialist studies (where deemed necessary), are listed in the tables to follow.

Table 43: Potentially Significant Environmental Issues for prioritisation during the EIA phase

Environmental Factor	Pre-Mining & Mining Phases Potential Issues / Impacts	Investigations * / EIA Provisions
Land Use	• Loss of land used for agriculture and game farming within borrow area. • Fragmentation of farm/farm portions due to access and haul road fencing. • Disturbances on game farms.	• Agricultural Impact Assessment; • Terrestrial Ecological Study; • Visual Impact Assessment (previous EIA for MCWAP-2); • Socio-economic Impact Assessment; • Heritage Impact Assessment; • Wildlife Impact Assessment; and • EMPr.
Climate	• Possible emission of greenhouse gases during the pre-mining and mining phases of borrow pit, due to delivery and haul vehicles/equipment. • Stormwater management.	• EMPr.

Environmental Factor	Pre-Mining & Mining Phases Potential Issues / Impacts	Investigations * / EIA Provisions
Geology	• Blasting related impacts. • Sourcing of construction aggregate and associated impacts (e.g. borrow pits, haul roads). • Disposal of overburden/spoil material. • Unsuitable geological conditions. • Removal of required material within borrow area.	• Geotechnical Study • EMPr
Geohydrology	• Potential disturbance of the aquifer from blasting. • Potential contamination of groundwater during the site clearing and mining stage. • Use of boreholes and groundwater on site. • Possible influence to groundwater flow as a result of excavations at borrow pits. • Contamination of groundwater from poor stormwater management, spills and leaks of hazardous chemical substances (HCS) during operation of borrow area, insufficient bunding of HCS, oil and petrol spills from stagnant vehicles on site.	• Monitoring of groundwater levels during pre-mining and mining phases, as required. • Geotechnical Study; and • EMPr
Soil	• Soil erosion (e.g. steep terrain and instream works). • Soil contamination through poor mining practices and inadequate management of HCS (e.g. fuel, oil).	• Agricultural Impact Assessment; • Geotechnical Study; and • EMPr
Hydrology	• Alteration of flow regime at BP SS1 and road crossings. • Impeding/diverting flow of the affected river at BP SS1 and road crossings.	• Aquatic Impact Assessment; and • EMPr.
Water Quality	• Sedimentation from instream works. • Water quality impacts due to spillages and poor construction practices. • Runoff from access/haul road in close proximity to affected watercourse.	• Water Quality Monitoring Programme • Aquatic Impact Assessment • EMPr
River Morphology	• BP SS1 in the Crocodile River (West) and the access/haul road may lead to the alteration of the morphology of the watercourse (e.g. destabilisation of bed and banks of watercourses).	• Aquatic Impact Assessment • EMPr
Riparian Habitat	• Encroachment of mining activities into riparian zones. • Loss of riparian and instream vegetation within borrow area BP SS1, as well as road crossings.	• Aquatic Impact Assessment • EMPr
Wetlands and Pans	• Destabilisation of wetlands due to inadequate reinstatement and rehabilitation. • Impacts to wetlands downstream of BP SS1.	• Aquatic Impact Assessment • EMPr
Water Use	• Impact of the instream mining area within the Crocodile River (West) to existing abstraction by downstream users of BP SS1.	• EMPr
Aquatic Ecology	• Instream works will cause a change in the river morphology, thus changing the nature of the river which will impact direct and surrounding aquatic ecology in the river.	• Aquatic Impact Assessment • EMPr
Sediment Regime	• Management of sediment and silt from the instream works within the Crocodile River (West) at BP SS1.	• EMPr
Terrestrial Ecology - Flora	• Encroachment into CBAs and ESAs, which are important in terms of biodiversity, ecosystem functionality and ecological processes. • Vegetation will be permanently lost in borrow areas that are to be cleared. The potential loss of significant flora species may occur. • Clearing of vegetation for construction of haul roads and for the use of the borrow pit may result in the proliferation of exotic vegetation, which could spread beyond the borrow pit domain. • Soil erosion on steep gradients and from runoff from access/haul roads;	• Terrestrial Ecological Impact Assessment • Search, Rescue and Relocation Management Plan • EMPr

Environmental Factor	Pre-Mining & Mining Phases Potential Issues / Impacts	Investigations * / EIA Provisions
	• Contamination of soil.	
Terrestrial Ecology - Fauna	• Ecosystem disruption may occur where clearing and fencing of project footprint is undertaken to allow for the construction of the project infrastructure. • Fauna could be adversely affected through mining-related activities (noise, dust, light pollution, illegal poaching, and habitat loss). This is especially relevant to sensitive game species (including exotic game). • Fencing of the borrow area, and access roads will minimise animal movement on the affected properties. This is particularly significant on smaller game farms.	• Terrestrial Ecological Impact Assessment • Wildlife Impact Assessment • EMPr
Socio-economic Environment	• Temporary loss of commercial and agricultural land (including structures and cultivated areas) through clearance of mining areas. • Temporary loss of agricultural production. • Risk to game and livestock as a result of mining related hazards. • Loss of income in eco-tourism sector (hunting and game farming) due to visual impact, noise and dust. • Potential damage to property (e.g. gates, fences, structures). • Temporary use of local road network by delivery and haul vehicles. • Safety and security. • Impact to visual quality and sense of place of direct and adjacent property owners. • Nuisance from dust and noise. • Light pollution. • Influx of people seeking employment and associated impacts (e.g. foreign workforce, cultural conflicts, squatting, demographic changes, anti-social behaviour, and incidence of HIV/AIDS). • Reduction in property value. • If the overall MCWAP projected development materialises, the population and specifically the urban population of the study area will grow substantially.	• Socio-economic Impact Assessment • EMPr
Agriculture	• Temporary loss of cultivated land within the borrow pit domain. • Temporary loss of grazing land within borrow pit domain. • Disruptions to farming operations as a result of construction-related use of existing access roads. • Loss of fertile soil through land clearance and poor management of stockpiles/spoil sites	• Agricultural Impact Assessment • Socio-economic Impact Assessment • EMPr
Historical and Cultural Features	Risk of heritage and cultural resources being damaged / destroyed through mining activities.	• Heritage Impact Assessment • EMPr
Existing Structures & Infrastructure	• Risk of damaging existing services, infrastructure and structures during site establishment and clearance or stripping of vegetation. • Disruptions to traffic on local road network. This is associated with road crossings, where the borrow area follows an existing road, and as a result of general use of the roads by construction/haul vehicles. • Fenced off restrictions on directly affected farms/farm portions.	• Socio-economic Impact Assessment • Relocation of affected infrastructure (if necessary) • Satisfy requirements of infrastructure owners • EMPr
Transportation	• Increase in traffic on the local road networks. • Develop temporary access and haul roads. • Risks to existing road users.	• Traffic Impact Assessment • EMPr

Environmental Factor	Pre-Mining & Mining Phases Potential Issues / Impacts	Investigations * / EIA Provisions
Solid Waste	• Waste generated from site preparations (e.g. plant material). • Domestic waste. • Surplus and used building material. • Hazardous waste (e.g. chemicals, oils, soil contaminated by spillages, diesel rags). • Wastewater (sanitation facilities, washing of plant, operations at the batching plant, etc.). • Disposal of excess spoil material (soil and rock) generated as part of the bulk earthworks.	• EMPr
Aesthetics	• Visual quality and sense of place to be adversely affected by mining activities. • Noise and dust generated from blasting affecting households/infrastructure in close proximity to borrow areas. • Provision of light at infrastructure may cause light pollution. • Inadequate reinstatement and rehabilitation of borrow pit footprint.	• Visual Impact Assessment (previous EIA for MCWAP-2) • EMPr

* *Investigations refer to technical studies that have been completed (further details to be included in the EIA Report, or future studies to be undertaken).*

13.3 Cumulative Impacts

A cumulative impact, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities. Cumulative impacts can be identified by combining the potential environmental implications of MCWAP-2A with the impacts of projects and activities that have occurred in the past, are currently occurring, or are proposed in the future within the project area. The following potential cumulative impacts will be considered as part of the EIA:

- Increasing the footprints of existing linear developments (e.g. roads, power lines, railway line). However, the alignment of the proposed borrow areas to the MCWAP pipeline servitude may be preferred, as it limits the fragmentation of the affected land and distance required for haul roads;
- The pre-mining (site clearing and stripping) and mining (excavation of material from borrow area) phase may cause traffic-related impacts in terms of the local road network, which will be associated with heavy vehicle traffic for the delivery of material, transportation of construction workers and general construction-related traffic. This may compound traffic impacts if other large scale projects are planned during the same period;
- Land clearing activities, blasting and mining activities, and mining-related disturbances could lead to the cumulative loss of bushveld vegetation as well as the proliferation of exotic vegetation;
- There will be an increase in the dust levels during the site clearing and mining phase, as a result of earthworks, use of haul roads and other gravel roads, stockpiles, material screening, etc.;

- The Terrestrial Ecological Impact Assessment will need to identify species of conservation significance that could be adversely affected by the project activities. This study will need to consider the existing local impacts to the biodiversity and the incremental loss of conservation-worthy species, within the context of the provincial conservation goals and targets;
- Mining activities on steep slopes that are already disturbed can contribute towards erosion, if proper reinstatement and rehabilitation is not undertaken; and
- Instream works at BP SS1, will alter the water quality and sediment regime of water flowing to downstream sections of the Crocodile River (West), thus affecting existing agricultural practices, abstraction infrastructure, and aquatic biodiversity. The mining activities will the depths of the river bed, and alter the silt fraction in the surface water. Change in water levels and sediment regime could alter the characteristics of wetlands found downstream of the borrow area. Aquatic and wetland baseline and impact assessment study to provide suitable mitigation measures.

13.4 Methodology so Assess the Identified Impacts

The EIA quantitative impact assessment will further focus on the direct and indirect impacts associated with the project. All impacts will be analysed with regard to their nature, extent, magnitude, duration, probability and significance. The following definitions and criteria apply:

Nature (/Status)
The project could have a positive, negative or neutral impact on the environment.

Extent
- Local - extend to the site and its immediate surroundings.
- Regional - impact on the region but within the province.
- National - impact on an interprovincial scale.
- International - impact outside of South Africa.

Magnitude
Degree to which impact may cause irreplaceable loss of resources.
- Low - natural and social functions and processes are not affected or minimally affected.
- Medium - affected environment is notably altered; natural and social functions and processes continue albeit in a modified way.
- High - natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.

Duration
- Short term - 0-5 years.
- Medium term - 5-11 years.
- Long term - impact ceases after the operational life cycle of the activity either because of natural processes or by human intervention.
- Permanent - mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Probability
- Almost certain - the event is expected to occur in most circumstances.
- Likely - the event will probably occur in most circumstances.
- Moderate - the event should occur at some time.

- Unlikely - the event could occur at some time.
- Rare/Remote - the event may occur only in exceptional circumstances.

Significance
Provides an overall impression of an impact's importance, and the degree to which it can be mitigated. The range for significance ratings is as follows-
0 – Impact will not affect the environment. No mitigation necessary.
1 – No impact after mitigation.
2 – Residual impact after mitigation.
3 – Impact cannot be mitigated.

14 PLAN OF STUDY FOR EIA

14.1 General

This Plan of Study, which explains the approach to be adopted to conduct the EIA for the proposed borrow pits was prepared in accordance with Appendix 2 of GN No. R 982 of 4 December 2014 (as amended).

14.2 Potentially Significant Environmental Issues identified during Scoping Phase

The Scoping exercise aimed to identify and qualitatively predict potentially significant environmental issues for further consideration and prioritisation.

During the EIA stage a detailed quantitative impact assessment will be conducted via contributions from the project team and requisite specialist studies, and through the application of the impact assessment methodology contained in **Section 13.4**. Suitable mitigation measures will be identified to manage (i.e. prevent, reduce, rehabilitate and/or compensate) the environmental impacts, and will be incorporated into an EMPr.

Pertinent environmental issues identified during Scoping, which will receive specific attention during the EIA phase are listed in **Table 51** (pre-mining and mining phases).

14.3 Feasible Alternatives to be assessed during EIA Phase

There are no feasible alternatives for the borrow pits, therefore the EIA phase will not include a comparative analysis of feasible alternatives that emanate from the Scoping exercise.

14.4 Specialist Studies

14.4.1 Overview

According to Münster (2005), a 'trigger' is "*a particular characteristic of either the receiving environment or the proposed project which indicates that there is likely to be an issue and/or potentially significant impact associated with that proposed development that may require*

specialist input". The requisite specialist studies 'triggered' by the findings of the Scoping process, aimed at addressing the key issues and compliance with legal obligations, include:

1. Aquatic Impact Assessment;
2. Terrestrial Ecological Impact Assessment;
3. Heritage Impact Assessment;
4. Agricultural Impact Assessment;
5. Social Impact Assessment;
6. Socio-Economic Impact Assessment; and
7. Wildlife Impact Assessment.

In addition, the findings from the following specialist studies that were undertaken as part of the previous EIA for MCWAP-2 will also be considered as part of the above studies and included in the EIA Report (as relevant):

- Ecological Study – Terrestrial;
- Ecological Study – Aquatic;
- Traffic Impact Assessment;
- Heritage Impact Assessment;
- Socio-Economic Study;
- Visual Impact Assessment;
- Social Impact Assessment;
- Noise Study; and
- Geotechnical Investigations.

The Terms of Reference (ToR), both general and specific to the project components within MCWAP-2A project, for the abovementioned specialist studies follow in the sub-sections below. Amongst others, the *Guideline for determining the scope of specialist involvement in EIA processes* (Münster, 2005) was used in compiling the general Terms of Reference for the specialist studies. The following guidelines were also employed to prepare the specific ToR for the respective specialists (where appropriate):

- Guideline for involving biodiversity specialists in EIA processes (Brownlie, 2005);
- Guideline for involving heritage specialists in EIA processes (Winter & Baumann, 2005); and
- Guideline for involving social assessment specialists in EIA processes (Barbour, 2007).

In addition to the above guidelines, the relevant specialists need to satisfy specific requirements stipulated by the following mandated environmental authorities (amongst others):

- DMR;
- DEA;
- LDEDET;

- DWS;
- DAFF; and
- LIHRA.

For the inclusion of the findings of the specialist studies into the EIA report, the following guideline will be used: *Guideline for the review of specialist input in EIA processes* (Keatimilwe & Ashton, 2005). Key considerations will include:

- Ensuring that the specialists have adequately addressed IAPs' issues and specific requirements prescribed by environmental authorities;
- Ensuring that the specialists' input is relevant, appropriate and unambiguous; and
- Verifying that information regarding the receiving ecological, social and economic environment has been accurately reflected and considered.

14.4.2 Terms of Reference – General

The following general ToR apply to all the EIA specialist studies to be undertaken for the proposed MCWAP-2A project, including the borrow pits and associated access/haul roads:

1. Address all triggers for the specialist studies contained in the subsequent specific ToR.
2. Consider the findings of all specialist studies undertaken as part of the previous EIA for MCWAP-2, where relevant.
3. Address issues raised by IAPs, as contained in the Comments and Response Report, and conduct an assessment of all potentially significant impacts. Additional issues that have not been identified during Scoping should also be highlighted to the EAP for further investigations.
4. Ensure that the requirements of the environmental authorities that have specific jurisdiction over the various disciplines and environmental features are satisfied.
5. Approach to include desktop study and site visits, as deemed necessary, to understand the affected environment and to adequately investigate and evaluate salient issues. Indigenous knowledge (i.e. targeted consultation) should also be regarded as a potential information resource.
6. Assess the impacts (direct, indirect and cumulative) in terms of their significance (using suitable evaluation criteria) and suggest suitable mitigation measures. In accordance with the mitigation hierarchy, negative impacts should be avoided, minimised, rehabilitated (or reinstated) or compensated for (i.e. offsets), whereas positive impacts should be enhanced. A risk-averse and cautious approach should be adopted under conditions of uncertainty.
7. Consider time boundaries, including short to long-term implications of impacts for project life-cycle (i.e. pre-mining, mining and post mining phases).
8. Consider spatial boundaries, including:
    a. Broad context of the proposed project (i.e. beyond the boundaries of the specific site);

b. Off-site impacts; and
c. Local, regional, national or global context.

9. The provision of a statement of impact significance for each issue, which specifies whether or not a pre-determined threshold of significance (i.e. changes in effects to the environment which would change a significance rating) has been exceeded, and whether or not the impact presents a potential fatal flaw or not. This statement of significance should be provided for anticipated project impacts both before and after application of impact management actions.
10. Recommend a monitoring programme to implement mitigation measures and measure performance. List indicators to be used during monitoring.
11. Advise if additional specialists are required to investigate specific components and the scope and extent of the information required from such studies.
12. Engage with other specialists whose studies may have bearing on your specific investigation.
13. Present findings and participate at public meetings, as necessary.
14. Information provided to the EAP needs to be signed off.
15. Review and sign off on EIA Report prior to submission to DMR to ensure that specialist information has been interpreted and integrated correctly into the report.
16. Sign a declaration stating independence.
17. The appointed specialists must take into account the policy framework and legislation relevant to their particular studies.
18. All specialist reports must adhere to Appendix 6 of GN No. R 982 of 4 December 2014 (as amended).

14.4.3 Terms of Reference – Specific

14.4.3.1 Aquatic Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- Potential impacts during pre-mining phase:
  - Impacts to flow and river morphology during the instream works associated with the pre-mining and mining phase of the borrow pit.
  - Sedimentation from instream works.
  - Water quality impacts due to spillages and poor construction practices.
  - Encroachment of mining activities into riparian zones / wetlands.
  - Loss of riparian and instream vegetation within borrow pit domain.
  - Crossing of watercourse by access and haul roads
  - Disruptions to aquatic biota community due to water contamination, temporary alteration of flow and disturbance to habitat during instream works.
- Potential impacts during mining phase:

- Alteration of flow regime by associated mining activities and access and haul roads.
- Destabilisation of river structure due to inadequate reinstatement and rehabilitation.
- Disturbances of riparian vegetation may lead to erosion and encroachment of exotic vegetation.
- Impacts to wetlands downstream of BP SS1 (surface-groundwater interactions).
- Morphological modification of river by instream works/mining activities.
- The BP SS1 and associated access/haul road will act as instream barriers that will prevent the migration of aquatic biota.
- Management of sediment from mining operations in BP SS1.

Approach

- ❖ Undertake desktop study (literature review, topographical maps and aerial photographs) and baseline aquatic survey and describe affected aquatic environments/watercourses within the project footprint.
- ❖ Determine ecological status of the receiving aquatic environment, including the identification of endangered or protected species.
- ❖ Delineate riparian habitat and all wetlands in accordance with the guideline: *A practical field procedure for identification and delineation of wetlands and riparian areas* (DWAF, 2005) (or any prevailing guidelines prescribed by DWS). This includes assessing terrain, soil form, soil wetness and vegetation unit indicators to delineate permanent, seasonal and temporary zones of the wetlands. Allocate conservation buffers from the outer edge of the temporary zones of the wetlands (provincial-specific).
- ❖ Provide a concise description of the importance of the affected aquatic environments/watercourses in terms of pattern and process, ecosystem goods and services, as appropriate.
- ❖ Assess impacts of proposed project to aquatic environments/watercourses.
- ❖ Provide suitable mitigation measures to protect the aquatic ecosystems during project life-cycle.
- ❖ Recommend monitoring program and indicators for project life-cycle, where findings from survey would serve as baseline data.

Nominated Specialist

Organisation:	Enviross
Name:	Mathew James Ross
Qualifications:	PhD – Aquatic Health

No. of years' experience:	10
Affiliation (if applicable):	❖ Professional Natural Scientist South African Society for Aquatic Scientists (SASAqS)

14.4.3.2 Terrestrial Ecological Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- ❖ Encroachment of project infrastructure into CBAs and ESAs.
- ❖ The potential loss of significant flora and fauna species, as well as ecosystem disruption, as a result of mining activities.
- ❖ Proliferation of exotic vegetation, which could spread beyond the borrow pit domain.
- ❖ Fauna could be adversely affected through mining-related activities (noise, dust, light pollution, illegal poaching, and habitat loss). This is especially relevant to sensitive game species (including exotic game).
- ❖ The construction of access/haul road and the fencing off of the borrow pit and access/haul road will minimise animal movement.
- ❖ Possible disturbance to the bat cave that is situated in the Mooivalei area during mining phase.

Approach

- ❖ Undertake baseline survey and describe affected environment within the project footprint from a biodiversity perspective.
- ❖ Take into consideration the provincial conservation goals and targets.
- ❖ Assess the current ecological status and the conservation priority within the project footprint and adjacent area (as deemed necessary). Provide a concise description of the importance of the affected area to biodiversity in terms of pattern and process, ecosystem goods and services, as appropriate.
- ❖ Identify protected and conservation-worthy species. Prepare a biodiversity sensitivity map with the use of GIS, based on the findings of the study.
- ❖ Assess impacts to fauna and flora, associated with the project. Consider cause-effect-impact pathways for assessing impacts to biodiversity related to the project.
- ❖ Comply with specific requirements and guidelines of DMR, DEA and LDEDET.
- ❖ Consider the Limpopo Conservation Plan and other relevant policies, strategies, plans and programmes.

Nominated Specialist (to be reviewed by an external specialist)

Organisation:	Nemai Consulting
Name:	Avhafarei Phamphe

Qualifications:	MSc – Botany
No. of years' experience:	10
Affiliation (if applicable):	❖ Professional Natural Scientist-Ecological Science (Reg number: 400349/12) with South African Council for Natural Scientific Professions (SACNASP) ❖ Professional member of South African Institute of Ecologists and Environmental Scientists (SAIEES) ❖ Professional member of South African Association of Botanists (SAAB)

14.4.3.3 Heritage Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- ❖ Potential occurrence of heritage resources, graves and structures older than 60 years within project footprint.

Approach

- ❖ Undertake a Heritage Impact Assessment in accordance with the National Heritage Resources Act (Act No. 25 of 1999).
- ❖ The identification and mapping of all heritage resources in the project footprint, as defined in Section 2 of the National Heritage Resources Act (Act No. 25 of 1999), including archaeological and palaeontological sites on or close (within 100 m) of the proposed developments.
- ❖ Undertake a desktop palaeontological assessment (evaluate site in terms of SAHRIS).
- ❖ The assessment of the significance of such resources in terms of the heritage assessment criteria as set out in the regulations.
- ❖ An assessment of the impact of development on such heritage resources.
- ❖ An evaluation of the impacts of the development on heritage resources.
- ❖ Prepare a heritage sensitivity map (GIS-based), based on the findings of the study.
- ❖ Identify heritage resources to be monitored.
- ❖ Comply with specific requirements and guidelines of LIHRA and SAHRA.

Nominated Specialist

Name:	Jean Beater (lead specialist)
Qualifications:	MA (Heritage Studies)
No. of years' experience:	21
Affiliation (if applicable):	❖ Member: HIA Adjudication Committee for the Gauteng Provincial Heritage Resources Authority ❖ Affiliate member - Association of Southern African

	Professional Archaeologists – member No. 349

14.4.3.4 Agricultural Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- Potential impacts during pre-mining phase:
  - Temporary loss of cultivated land and grazing land within the borrow area, by vegetation clearance, construction of new access/haul roads and fencing off of borrow area.
  - Disruptions to farming operations as a result of the use of existing access roads and borrow area falling on cultivated land.
  - Temporary loss of fertile soil through land clearance/stripping.
- Potential impacts during mining phase:
  - Potential impacts to water users (and associated agro-economic impact from reduced crop and food production) downstream of BP SS1;
  - Temporary loss of cultivated land due to excavation during mining phase;
  - Poor rehabilitation and destabilisation of borrow pit

Approach

- Determine agricultural potential within project footprint.
- Determine impacts of project from an agricultural perspective.
- Suggest suitable mitigation measures to address the identified impacts.
- Comply with specific requirements and guidelines of the Department of Agriculture and Rural Development.

Nominated Specialist

Name:	Dr Andries Gouws
Qualifications:	PhD Integrated Land Use Modelling
No. of years' experience:	29
Affiliation (if applicable):	❖ Council of Natural Sciences.No:400036/93, Category: Agricultural sciences. ❖ Member of the Soil Science Society of South Africa

14.4.3.5 Socio-Economic Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- Potential impacts during pre-mining phase:
  - Temporary loss of land (including structures and cultivated areas) through borrow pit project infrastructure.
  - Temporary loss of agricultural production.

- Risk to game and livestock as a result of site clearing related hazards.
- Temporary loss of income in eco-tourism sector (hunting and game farming).
- Potential damage to property (e.g. gates, fences, structures).
- Restrictions caused by fencing off of borrow area and associated access/haul roads;
- Impact to visual quality and sense of place.
- Reduction in property value.

❖ Potential impacts during mining phase:

- Impact to visual quality and sense of place due to mining activities.
- Cumulative impacts to properties that are already affected by existing linear infrastructure,
- Impacts to water users downstream of BP SS1.
- Impacts to smaller properties, where the entire borrow area may affect the critical mass required to continue with the current land use.

Approach

❖ Determine the specific local socio-economic, land utilisation and acquisition implications of the project.
❖ Collect baseline data on the current socio-economic environment.
❖ Assess socio-economic impacts (positive and negative) of the project, and quantify the economic impacts.
❖ Undertake a thorough review of the following:

- Minutes of public meetings and individual meetings; and
- Comments and Responses Report.

❖ Suggest suitable mitigation measures to address the identified impacts.
❖ Make recommendations on preferred options from a socio-economic perspective.

Nominated Specialist

Organisation:	Nemai Consulting
Name:	Ciaran Chidley
Qualifications:	BA (Economics); BSc Eng (Civil); MBA
No. of years' experience:	12
Affiliation (if applicable):	N/A

14.4.3.6 Social Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- Potential impacts during the pre-mining phase:
  - Use of local road network.
  - Safety and security risks.
  - Nuisance from dust and noise.
  - Light pollution.
  - Influx of people seeking employment and associated impacts (e.g. foreign workforce, cultural conflicts, squatting, demographic changes, anti-social behaviour, and incidence of HIV/AIDS).
- Potential impacts during the mining phase:
  - Use of local road network for mining activities.
  - Provision of light at mining areas may cause light pollution.
  - The mining activities and associated mining equipment may cause noise/air pollution.
  - Borrow pits may affect visual aesthetics.

Approach

- Describe communities to be affected by the project. Consider demographic profile, social drivers, social context and network, development plans. A combination of a technocratic and participatory approach is suggested (at discretion of specialist).
- Collect baseline data on the current social environment and historical social trends.
- Identify and collect data on impact assessment variables and social change processes related to the project.
- Undertake a thorough review of the following:
  - Minutes of the landowner meetings.
  - Minutes of public meetings and individual meetings;
  - Database of IAPs; and
  - Comments and Responses Report.
- Undertake additional consultation with affected individuals and communities, as deemed necessary.
- Assess the significance of social impacts associated with the project.

Nominated Specialist

Organisation:	Dr. Neville Bews & Associates
Name:	Neville Bews
Qualifications:	❖ BA (Hons) (Unisa) ❖ Henley Post-Graduate certificate in Management (United Kingdom) ❖ MA (cum laude) (RAU) ❖ D. Litt et Phil (RAU)
No. of years experience:	12

Affiliation (if applicable):	International Association of Impact Assessors South Africa IAIAsa

14.4.3.7 Wildlife Impact Assessment

Summary of Key Issues & Triggers Identified During Scoping

- Potential impacts during pre-mining and mining phase:
  - Sensitive game species (including exotic game) could be adversely affected through mining-related activities (noise, dust, light pollution, illegal poaching, and habitat loss).
  - Temporary relocation of game, if required, with associated arrangements to minimise impacts to affected game.

Approach

- Wildlife Management Plan to be developed, taking into consideration the types of game kept on the farms and the requisite mitigation measures (based on best practices).

Nominated Specialist

Name:	NABRO Ecological Analysts
Qualifications:	Ben Orban
No. of years experience:	MSc - Wildlife Management
Affiliation (if applicable):	24
	Professional Natural Scientist

14.5 Public Participation – EIA Phase

14.5.1 Updating of IAP Database

The IAP database will be updated as and when necessary during the execution of the EIA.

14.5.2 Review of Draft EIA Report

A 30-day period will be provided to IAPs to review the Draft EIA Report, and copies of the document will be lodged for public review at the following venues:

Table 44: Locations for review of Draft EIA Report

Copy	Location	Address	Tel. No.
1	Lephalale Local Municipal office	Lephalale Civic Centre, corner of Joe Slovo and Dou Water Street, Lephalale	014 763 2193
2	Lephalale Public Library		014 762 1453
3	Lephalale Dept of Agriculture	Cnr Chris Hani Street and Grote Geluk Street	014 763 2137
4	Agri Lephalale Office	6A Jacobus Street	014 763 1888

5	Lephalale District Agricultural Union	NTK Landmerk Gebou, Louis Botha Avenue	014 763 3263
6	Mokolo Irrigation Board	Ellisras Hardeware Gebou, Office No. 4, Stroh Street	014 763 3095
7	Steenbokpan Winkel	Steenbokpan	014 766 0167
8	TAU SA	Obaro, Warmbadweg, Thabazimbi	072 549 8579
9	Crocodile River (West) Irrigation Board	Koedoeskop	014 785 0610
10	Makoppa Irrigation Board	G. Fritz, Farm Fairfield, Makoppa	083 469 3777
11	Thabazimbi Local Municipal office	7 Rietbok Street, Thabazimbi	014 777 1525
12	Thabazimbi Public Library	4th Avenue, next to Police station in Thabazimbi	014 777 1525
13	Thabazimbi Dept of Agriculture	Van der Bijl Street 10, Thabazimbi	014 777 1559
14	National Library of South Africa	Cnr Johannes Ramokhoase(Proes) Street and Thabo Sehume (Andries)	012 358 8954

Copies of the Draft EIA Report will be provided to the regulatory and commenting authorities listed in **Section 12.6.2**. The Draft EIA Report will also be placed on the following website - http://www.nemai.co.za/environmental.html.

All parties on the IAPs database will be notified via email, fax or post of the opportunity to review the Draft EIA Report at the abovementioned locations, the review period and the process for submitting comments on the report. The public will also be notified in this regard via advertisements in the following newspapers:

- The Star;
- The Daily Sun;
- Die Kwêvoël;
- Beeld; and
- Mogol Pos.

All comments received from IAPs and the responses thereto will be included in the Final EIA Report, which will be submitted to DMR.

14.5.3 Public Meeting

Public meetings will be held during the review period for the Draft EIA Report. The aims of these meetings will be as follows:

- To present the project details;
- To explain the EIA process;
- To present the findings of the specialist studies;
- To address key issues raised during the Scoping Phase;
- To elaborate on the potentially significant environmental impacts (qualitative and quantitative), and the proposed mitigation of these impacts; and
- To allow for queries and concerns to be raised, and for the project team to respond.

14.5.4 Comments and Responses Report

A Comments and Responses Report will be compiled and included in the EIA Report, which will record the date that issues were raised, a summary of each issue, and the response of the team to address the issue.

In addition, any unattended comments from the Scoping Phase or where the status of the previous responses has changed, will also be addressed in the Comments and Responses Report for the EIA phase.

14.5.5 Notification of DMR Decision

All IAPs will be notified via email, fax or post after having received written notice from DMR on the final decision on the application. Advertisements will also be placed in the newspapers listed in **Section 14.5.2**. These notifications will include the appeal procedure to the decision.

14.6 EIA Report

The EIA Report will contain the information that is necessary for DMR to consider and come to a decision on the application. As a minimum, the EIA Report will contain the information stipulated in Appendix 3 of GN No. R 982 of 4 December 2014 (as amended).

The following critical components of the EIA Report are highlighted:

- A description of the policy and legislative context;
- A detailed description of the proposed development (full scope of activities);
- A detailed description of the proposed development site, which will include a plan that locates the proposed activities applied for as well as the associated structures and infrastructure;
- A description of the environment that may be affected by the activity and the manner in which physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed development;
- The methodology of the stakeholder engagement process;
- The Comments and Responses Report and IAPs Database will be provided as an appendix to the EIA Report;
- A description of the need and desirability of the proposed development and the identified potential alternatives to the proposed activity;
- A summary of the methodology used in determining the significance of potential impacts;
- A description and comparative assessment of the project alternatives;
- A summary of the findings of the specialist studies;
- A detailed assessment of all identified potential impacts;
- A list of the assumptions, uncertainties and gaps in knowledge;
- An environmental impact statement;
- Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;

- A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
- An opinion by the consultant as to whether the development is suitable for approval within the proposed site;
- An EMPr that complies with Appendix 4 of GN No. R 982 of 4 December 2014 (as amended);
- Copies of all specialist reports appended to the EIA report; and
- Any further information that will assist in decision making by the authorities.

14.7 Authority Consultation

The EIA will only commence if DMR accepts the Scoping Report and the Plan of Study for the EIA. If relevant, the necessary revisions will be made to the aforementioned documents if requested by this Department.

An authorities meeting will be scheduled during the EIA public participation process to present salient findings. In addition, copies of the Draft EIA Report will be provided to the following key regulatory and commenting authorities:

- DMR
- DEA;
- LDEDET;
- DWS Limpopo Regional Office;
- DAFF;
- LIHRA;
- Department of Public Works, Roads and Infrastructure;
- Waterberg DM;
- Thabazimbi LM; and
- Lephalale LM.

The Final EIA Report will be submitted to DMR. Any requested amendments will be discussed with the Department to ensure that their queries are adequately and timeously attended to.
For the remainder of the Scoping process and EIA the interaction with DMR will be as follows:

- Submission of the Final Scoping Report;
- Meet with designated DMR Environmental Officer to explain the project and arrange a site visit (if required by DMR);
- Address comments on Scoping Report;
- Arrange an authorities meeting during the EIA stage;
- Submit EIA Report;
- Address comments on EIA Report;
- Obtain a decision; and

- Notify IAPs of the appeal process through DMR's appeals unit.

14.8 EIA Timeframes

The table to follow presents the proposed timeframes for the EIA process. *Note that these dates are subject to change*.

Table 45: EIA Timeframes (dates may changes during the course of the EIA)

EIA Milestone	Start	Finish
Submit Application Form and Draft Scoping Report to DMR	05/03/18	05/03/18
Review of Draft Scoping Report by authorities & IAPs	06/03/18	11/04/18
DMR Review and Decision	20/04/18	04/06/18
Review of Draft EIA Report by authorities & IAPs	30/07/18	30/08/18
Submit Final EIA Report & EMPr to DMR	14/09/18	17/09/18
DMR Review and Decision	18/08/18	23/01/19

15 CONCLUSION

The scope of an environmental assessment is defined by the range of issues and alternatives it considers, the nature of the receiving environment, and the approach towards the assessment.

Key outcomes of the Scoping phase for the proposed MCWAP-2A borrow pits are as follows:

- Stakeholders were effectively identified and were afforded adequate opportunity to participate in the scoping process;
- Potentially significant issues pertaining specifically to the pre-mining, mining and post-mining phases of the project were identified;
- Sensitive elements of the environment that may be affected by the project were identified;
- A Plan of Study was developed to explain the approach to executing the EIA phase, which also includes the Terms of Reference for the identified specialist studies; and
- The scoping exercise set the priorities for the ensuing EIA phase.

No fatal flaws were identified in terms of the proposed activities and the receiving environment that would prevent the environmental assessment from proceeding beyond the Scoping phase. It is the opinion of the EIA team that Scoping was executed in an objective manner and that the process and report conform to the requirements of Regulation 21 and Appendix 2 of GN No. R 982 of 4 December 2014 (as amended), respectively. It is also believed that the Plan of Study for EIA is comprehensive and will be adequate to address the significant issues identified during Scoping and to ultimately allow for informed decision-making.

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APPENDICES