



**ENVIRONMENTAL IMPACT ASSESSMENT AND WASTE
LICENSE APPLICATION FOR THE PROPOSED EXPANSION
OF SEBOKENG WASTE WATER TREATMENT WORKS**

DRAFT ENVIRONMENTAL SCOPING REPORT & PLAN OF STUDY

OCTOBER 2011

DEA REF NO: 12/9/11/L671/3

COMPILED BY:

Enviroolution Consulting (Pty) Ltd
PO Box 1898
Sunninghill
2157

Tel: (0861) 44 44 99

Fax: (0861) 626 222

E-mail: gesan@enviroolution.co.za

Website: www.enviroolution.co.za

PREPARED FOR:

Rand Water (Pty) Ltd

4311R Kromvlei Road
Johannesburg
2000

Tel: 011 682 0245

Fax: 011 900 2108

COPYRIGHT WARNING

With very few exceptions the copyright of all text and presented information is the exclusive property of Enviroolution Consulting (Pty) Ltd. It is a criminal offence to reproduce and/or use, without written consent, any information, technical procedure and/or technique contained in this document. Criminal and civil proceedings will be taken as a matter of strict routine against any person and/or institution infringing the copyright of Enviroolution Consulting (Pty) Ltd.

TABLE OF CONTENTS

		Page
1	INTRODUCTION	4
1.1	Prologue	4
1.2	Project Team	1
	1.2.1 Project Applicant	1
	1.2.2 Environmental Assessment Practitioner	1
	1.2.3 Authority	1
2	BACKGROUND TO THE PROJECT	1
2.1	Project Locality	1
2.2	Description of the Proposed Activities	1
2.3	Project Motivation	2
3	SCOPING PHASE METHODOLOGY	4
3.1	Introduction	4
3.2	Determination of the EIA Process	6
3.3	Registration of the Waste License Application	7
3.4	Public Participation Process	7
3.5	Scoping Report (SR)	7
3.6	Authority Review of SR	8
3.7	EIA Phase	8
	3.7.1 Public Participation Process (PPP) for EIA phase	8
	3.7.2 Specialist Studies	8
	3.7.3 Environmental Impact Report (EIR)	9
	3.7.4 Authorisation/Waste License	9
	3.7.5 Appeal Period	9
4	legislation and policy guidelines	10
4.1	Legislative Requirements	10
	4.1.1 National Environmental Management Act, 1998 (Act No. 28 of 1998)	10
	4.1.2 The National Environmental Management Air Quality Act 39 of 2004	10
	4.1.3 National Heritage Resources Act 25 of 1999	10
	4.1.4 National Water Act, 1998 (Act No. 36 of 1998)	11
	4.1.5 Integrated Environmental Management (IEM)	11
	4.1.6 Constitution of the Republic of South Africa (Act No. 108 of 1996)	12
5	STATUS QUO OF THE ENVIRONMENT	13
5.1	Introduction	13
5.2	Biophysical Environment	13
	5.2.1 Geology	13
	5.2.2 Soils	13
	5.2.3 Associated Water courses	13
	5.2.4 Wetland and Soil Conditions	14
	5.2.5 Drainage and Groundwater	15
	5.2.6 Vegetation	16
	5.2.7 Fauna	16
5.3	Human Environment	17

5.3.1	Socio-Economic Features	17
5.3.2	Heritage Features	17
5.4	Environmental Quality	17
5.4.1	Traffic Impacts	17
5.4.2	Human Health	17
5.4.3	Air Quality	18
5.5	Noise Environment	18
5.6	Visual and Aesthetic Features	18
6	PUBLIC PARTICIPATION PROCESS	20
6.1	Process followed to date	20
6.1.1	Newspaper advertisements	20
6.1.2	Site notices	20
6.1.3	Direct notification of identified I&APs	20
6.1.4	Hand - deliveries	20
6.1.5	Concerns raised by I&APs	21
6.1.6	Information Sharing Meeting (ISM)	21
6.2	Comments and Response Reports	22
7	PROJECT ALTERNATIVES	23
7.1	Technology options	23
7.1.1	Conventional Activated Sludge Process	23
7.1.2	Membrane Biological Reactor Process	24
7.1.3	Sequencing Batch Reactor Activated Sludge Process	25
7.1.4	Moving Bed Biological Reactor Process	25
7.2	No-go Option	25
7.3	Expansion of Sebokeng Works	26
8	Potential Environmental Impacts	27
8.1	Introduction	27
8.2	Assessment of Potential Impacts	27
8.3	Biophysical Impacts	27
8.3.1	Geology and Soils	27
8.3.2	Topography and Drainage	28
8.3.3	Ecological Systems	29
8.4	Socio-Economic Impacts	29
8.4.1	Economic Impacts	30
8.4.2	Impact on Land Use	30
8.4.3	Road and Traffic Impacts	30
8.4.4	Visual/Aesthetic Impacts	31
8.4.5	Noise Impacts	31
8.4.6	Pollution Impacts	32
8.4.7	Community Relationship - Influx of temporary construction workers	32
8.4.8	Interruption of Services	33
8.4.9	Waste License	33
8.4.10	Public Health and Safety	33
9	PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT	34
9.1	Key findings of the Scoping Phase	34
9.2	EIA Methodology	35
9.2.1	Assessment criteria	36
9.2.2	Impact table	39
9.3	Terms of Reference for Specialists	39

9.3.1	Geohydrological Assessment	39
9.3.2	Ecological Assessment (Flora)	39
9.3.3	Wetland Assessment	40
9.3.4	Air Quality Assessment	40
9.3.5	Aquatic Statement	40
9.3.6	Heritage Impact Assessment	41
9.4	Public Participation Process	41
9.5	Contents of the Environmental Impact Report	41
9.6	Draft Environmental Management Program	43
9.7	Project Timeframes	43
10	CONCLUSIONS OF THE SCOPING REPORT	44
11	WAY FORWARD	45
12	REFERENCES	46

FIGURES

Figure 1. Map showing the location of various waste water treatment facilities (including proposed infrastructure) within the Sebokeng Works

Figure 2: Diagram to indicate a description of the EIA process to be followed

Figure 3: Hydrology of the site reflects the presence of the Rietspruit and a tributary of the Rietspruit (CDSM, 1996)

Figure 4: Regional soil classification for the study site (DDPLG, 2002)

APPENDICES

APPENDIX A: Locality map; General Layout Plan and Examples of Preliminary Treatment Processes at Sebokeng Works

APPENDIX B: Correspondence with Authorities

APPENDIX C1: Interested and Affected Party Database

APPENDIX C2: Site Notices

APPENDIX C3: Newspaper Advertisement

APPENDIX C4: Background Information Document

ABBREVIATIONS

DEA	Department of Environmental Affairs
DSR	Draft Scoping Report
DWA	Department of Water Affairs
EIA	Environmental Impact Assessment
ELM	Emfuleni Local Municipality
EMP	Environmental Management Plan
FSR	Final Scoping Report
GDARD	Gauteng Department of Agriculture and Rural Development
I&APs	Interested & Affected Parties
MHI	Major Hazardous Installation
PoS	Plan of Study
PPP	Public Participation Process
WWTW	Waste Water Treatment Works

1 INTRODUCTION

1.1 Prologue

Envirovolution Consulting (Pty) Ltd (Envirovolution Consulting) has been appointed by Rand Water (Pty) Ltd on behalf of Emfuleni Municipality as an independent Environmental Practitioner to undertake the Environmental Impact Assessment (EIA) and the Waste License Application for the increase in capacity at Sebokeng Wastewater Treatment Works (hereafter “the Works”).

The above-mentioned project forms part of the Emfuleni Local Municipality (ELM) strategy to improve the quality of treated effluent to meet the recently amended effluent quality standards and is also an initiative to improve the efficiency of the Works. The Department of Water Affairs (DWA) requires that all wastewater treatment Works meet the “2010 standard¹” (<http://www.capetown.gov.za/water/wsdp2002/documents/.%5Cbulk%20wastewater%20infrastucture.pdf>), so that it is equipped to deal with effluent quantity and quality predicted for this period.

The Sebokeng WWTW is situated approximately 18 km north-west of Vereeniging. The Works is bordered by the N1 to the west, R28 to the north, R553 to the east and R54 to the south, at approximately 26°34'29.03"S and 27°49'2.64"E. (see Locality Map under **Appendix A**). The Works' catchment area includes areas of the Emfuleni Local Municipality and Johannesburg Metropolitan Municipality. The ELM catchment area includes Evaton, Evaton West, Palm Springs, Evaton North, Lakeside, Ironsyde, Eatonside, Sebokeng Hills, Beverley Hills, Boitumelo and Johandeo. The Johannesburg Metropolitan Municipality catchment area that drains to Sebokeng Works includes Poortje, Palm Springs, Lenasia and Orange Farm.

The wastewater arrives at the works via three (3) main sewer collectors, namely; two (2) from the north and one (1) from the south. The catchment area has so far mainly been developed for housing, hence, the origin of the wastewater is assumed to be domestic. The Sebokeng Works consists of screening, de-gritting, flow balancing, primary sedimentation, reactors, fermentation of raw sludge, final clarification, chlorination, waste sludge thickening and dewatering. The final discharge produced is discharged into the Rietspruit River.

Sebokeng Waste Water Works has been designed to treat 100 MI/day and is divided into three activated sludge process modules. These three modules have been designed as follows: Module 3 –30 MI/day; Module 4 – 35 MI/day and Module 5 – 35 MI/day, making up the 100 MI/day. The works currently receives more flows above its design capacity of 100 MI/day, with it being as much as 49% over at times.

The capacity of the Sebokeng Works will be increased from 100 MI/day to 200 MI/day through the construction of two new modules (50 M/day each) which include screening, de-gritting, primary sedimentation, reactors, fermentation of raw sludge, final clarification, chlorination, waste sludge thickening and dewatering.

¹ This is an effluent standard requirement that municipalities have to be capacitated to meet by 2010.
Sebokeng Works upgrade
Draft Scoping Report
October 2011

1.2 Project Team

1.2.1 Project Applicant

Name: **Emfuleni Local Municipality**
Contact Person: Mr. Cecil Schreuder
Physical Address: Cnr of Klasie Havenga and Frikkie Meyer Boulevard
Postal Address: P O Box 3, Vanderbijlpark, 1900
Telephone Number: (016) 986 8323
Fax Number: (086) 555 5387
E-mail: cecils@emfuleni.gov.za

1.2.2 Project Managers (Environment)

Name: **Rand Water (Pty) Ltd**
Contact Person: Ms. Mpati Nale
Physical Address: 4311R Kromvlei Road
Telephone Number: (011) 724 9350
Fax Number: (0861) 762-5250
E-mail: mnale@randwater.co.za

1.2.3 Environmental Assessment Practitioner

Name: Mr. K. Govender (Bsc. (Hons))
Physical Address: 45 Swartgoud Street; Shop 17A Winchester Green Shopping Centre, Winchester
Postal Address: PO Box 1898, Sunninghill, 2157
Telephone Number: 0861 44 44 99
Fax Number: (086) 626 222
E-mail: gesan@envirolution.co.za

1.2.4 Authority

Name: National Department Environmental Affairs
Contact Person: Mr. Lucas Mahlangu
Physical Address: Fedsure Building, 315 Pretorius Street, Pretoria
Postal Address: P O Box X447, Pretoria, 0001
Telephone Number: (012) 310 3536
Fax Number: (012) 310 3753
E-mail: lmahlangu@environment.gov.za

2 BACKGROUND TO THE PROJECT

2.1 Project Locality

The proposed upgrade in treatment capacity at the Sebokeng Waste Water Treatment Works is situated on adjacent to Sebokeng Township and west of Golden Highway (R533), Gauteng. The farm property is located on portion 67 (Portion of portion 10) of the farm Rietspruit 535 IQ, Gauteng. The approximate coordinates of the site are as follows: **Lat: 26.009522°**, **Long: 27.838789°**. The site falls within the jurisdiction of the Emfuleni Local Municipality (Refer to **Appendix A of the report**). The property is still registered under Administrator of Transvaal and is in the process of being registered/ transferred to ELM.

2.2 Description of the Proposed Activities

This proposed project entails the upgrading of the treatment capacity at the Sebokeng Works. The project will increase the capacity by 100ML/day in order to accommodate additional effluent that results from an increase in urban development around the Municipality and Johannesburg. The proposed location of the infrastructure associated with the upgrade is illustrated in the **Figure 1** below.

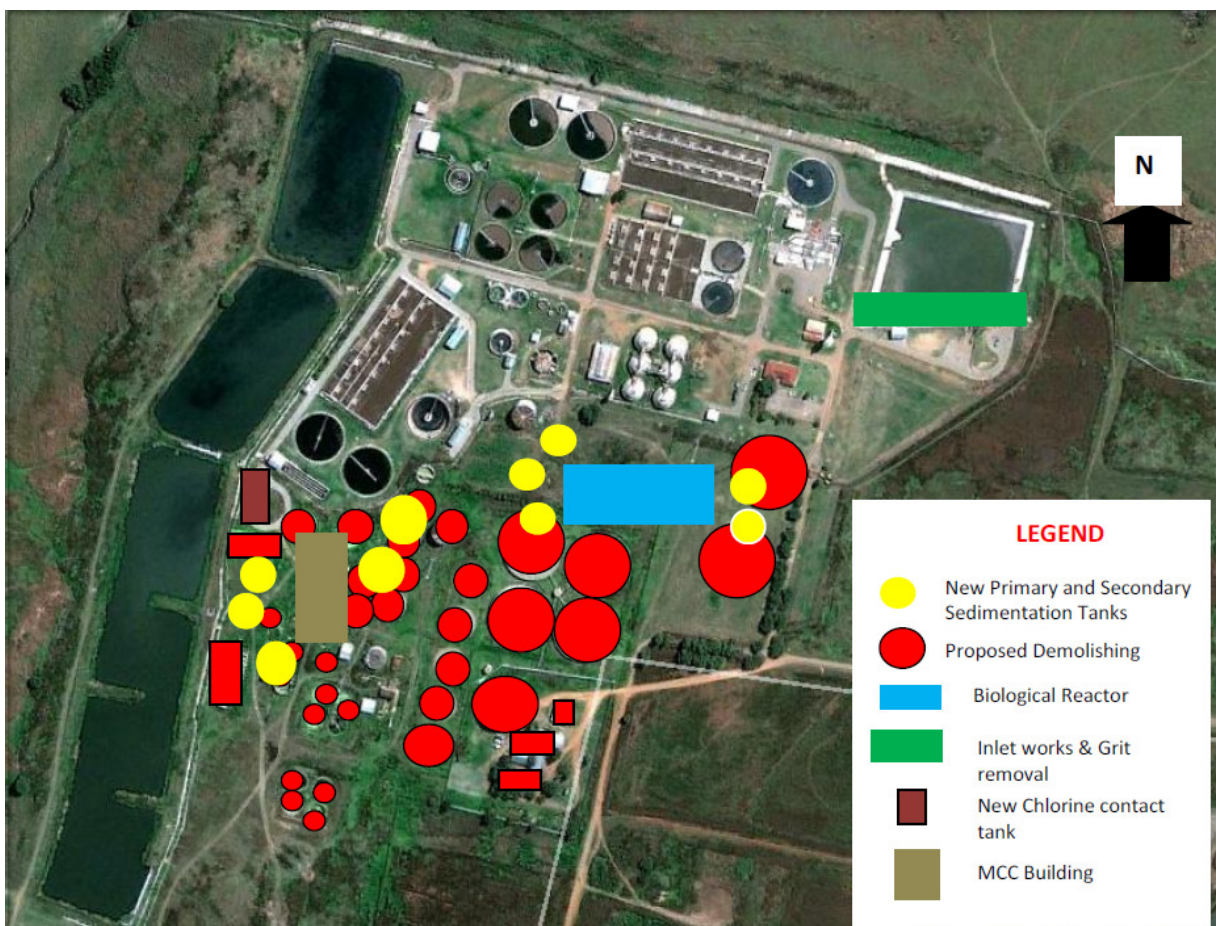


Figure1. Map showing the location of various waste water treatment facilities (including proposed infrastructure) within the Sebokeng Works

The existing infrastructure includes Inlet works, Emergency Ponds, Primary Settling Tanks (PSTs); Gravity Thickeners, Dissolve Air Floatation units (DAF), Anaerobic Digesters, Sludge Lagoons, Biological Reactors, Secondary Settling Tanks (SSTs), Disinfection, Maturation Ponds, a building that houses the administration offices and control room. Refer to **Appendix A** for the general plant layout of the Works. The Laboratory will be re-established as well.

It is proposed to upgrade the capacity of the Works to 200MI/day from 100MI/day, which will cover predictions for full development in the service area. Infrastructure associated to the proposed capacity increase will include the following:

- Upgrade of the inlet works and the Grit removal channel;
- Two New Primary Settling tanks;
- Three New Secondary Settling tanks;
- New Reactor Tanks (2 x 50MI/day);
- New chlorine contact tank; and
- Associated buildings;
- Sludge dewatering facilities; and
- Filter belt presses will be installed and No Drying beds will be constructed.

The general layout and the proposed preliminary treatment process of the proposed Works expansion is shown in **Appendix A**. The total number of each proposed infrastructure, overall dimensions and depth would be confirmed during the EIR Phase when the design drawings are finalised.

It should also be noted that the proposed project will also include the demolishing of obsolete sewage infrastructure of Module 1 and 2 where some of the proposed infrastructure will be constructed. The safety and environmental issues associated with the demolition will be identified and assessed in detail during the EIA phase.

2.3 Project Motivation

In semi-arid South Africa, water is extremely scarce and most rural and suburban communities do not have access to residential waterborne sanitation systems. Furthermore the worsening state of municipal wastewater treatment plants has led to numerous problems in terms of drinking water contamination by wastewater outfalls, and this continues to result in regular outbreaks of waterborne diseases such as cholera and typhoid fever. South Africa is in urgent need of new wastewater treatment plants, upgrades of existing installations and proper training of municipal technical and operating staff manning these wastewater treatment plants (http://www.globe-net.ca/market_reports/index.cfm?ID_Report=918).

It is envisaged that the increase in capacity of the Sebokeng Works will provide for more effective wastewater treatment in terms of treated effluent quality as well as present and future quantity. Other benefits that will come with the project include the following:

- Increased efficiency of the Waste Water Treatment Works through the use of new technologies;
- Employment opportunities during the construction phase;
- Energy efficiency through the use of new technologies;
- The reliability of the plant operation through additional infrastructure and back-up facilities;
- Improvement in the quality of effluent discharged into the system;

- The project will improve the reliability of the plant's operation and performance;
- Project will deploy robust and reliable treatment technologies to comply with regulatory requirements; and
- Existing environmental footprint will be reduced, such as odour impacts.
- Cater for further developments in the area

3 SCOPING PHASE METHODOLOGY

3.1 Introduction

The overarching environmental legislation for the management of the environment in South Africa is the National Environmental Management Act, 1998 (Act 107 of 1998 “NEMA”). Its preamble states that sustainable development requires the integration of social, economic and environmental factors in the planning, implementation and evaluation of environmental decisions to ensure that development serves present and future generations. NEMA was amended in 2004 (Act No. 8 of 2004) and a proposed second amendment bill was published for comment on 4 May 2007.

Chapter 5 of NEMA makes provisions for regulations to be formulated and published. In April 2006, new EIA Regulations were promulgated and became effective from 1 July 2006 to 30 July 2011. The purpose of these Regulations was to “regulate procedures and criteria as stated in Chapter 5 of the National Environmental Management Act for the submission, processing, consideration and decision of applications for environmental authorisation of activities and for matters pertaining thereto.”

On 18 June 2010 the Minister of Water and Environmental Affairs, published in Government Gazette 33306 Notice Number 543 the regulations pertaining to environmental impact assessments under sections 24(5), 24M and 44 of NEMA. These regulations and the Listing Notices mentioned have been affective from August 2010 and are summarised as follows:

➤ **Listing Notice 1:** List of Activities and Competent Authorities identified in terms of section 24(2) and 24D (Government Gazette 33306 Notice Number 544) - identified activities that would require environmental authorisation prior to the commencement of those activities and which will replace and repeal the former list of activities requiring basic assessment in GN R 386 of 21 April 2006.

➤ **Listing Notice 2:** List of Activities and Competent Authorities Identified in terms of section 24(2) and 24D (Government Gazette 33306 Notice Number 545) - identified activities that would require environmental authorisation prior to the commencement of those activities and which will replace and repeal the former list of activities requiring a scoping and environmental impact assessment report in GN R 387 of 21 April 2006.

➤ **Listing Notice 3:** List of Activities and Competent Authorities Identified in terms of section 24(2) and 24D (Government Gazette 33306 Notice Number 546) - relates to identified activities that would require environmental authorisation prior to the commencement of those activities in specific identified geographical areas only.

➤ Environmental Management Framework Regulations, 2010 (Government Gazette 33306 Notice Number 547).

The new NEMA 2010 EIA Regulations replaces the NEMA 2006 Regulations. The new EIA regulations had been aligned with the amended National Environmental Management Act (NEMA), promulgated in 2008.

Changes to the EIA regulations included references to new NEMA provisions, introduction of a standard authorisation in cases where competent authorities missed decision-making

timeframes, provision for norms and standards, landowner consent replaced with landowner notification, the exclusion of December 15 to January 2 for timeframes and public-private partnership purposes, and provisions relating to the inclusion of mining activities within the scope of the EIA regulations.

According to the Ministry, these new EIA regulations (August 2011) also sought to streamline the EIA process and enable integration with other processes such as water-use Licenses, emission-to-air Licenses and mining-related approvals.

The proposed upgrade of the Sebokeng Works will be undertaken within the ambit of the NEMA Regulations 2010 as the application was lodged with DEA after August 2010. Section 24 (F) of the National Environmental Management Amendment Act, 2004 (Act No. 8 of 2004 "NEMA Amendment Act") prohibits a listed activity from commencing prior to the authorisation thereof by the competent authority.

It must also be noted that the proposed upgrade of the Sebokeng Works will be based on the waste licensing process for listed activities under Category B of NEMWA (Act No 59 of 2008) as defined in the environmental impact assessment (EIA) regulations made under section 24(5), 24M and 44 of NEMA 2008 (No 107 of 1998) requiring Scoping and Environmental Impact Assessment. The following listed activities under Category B of NEMWA 2008 will therefore require authorisation under Category B:

(7) The treatment of effluent, wastewater or sewage with an annual throughput capacity of 15 000 cubic metres or more; and

(11) The construction of facilities for activities listed in Category B of this NEMWA (not in isolation to the associated activity)

The National Department of Environment Affairs (DEA) is the relevant decision-making authority and the activities are classified as hazardous and that Emfuleni Local Municipality is an organ of state and Rand Water is a government parastatal. The Waste License needs to be granted by the DEA for approval and conditions prior to commencement of any construction activities. Gauteng Department of Agriculture and Rural Development (GDARD) will be a commenting authority on this application as the activity falls with the Gauteng Province.

The following GDARD Guidelines were also considered in the compilation of this report:

- Red Data Plant Policy for Environmental Impact Evaluations;
- Development Guidelines for Ridges; and
- Requirements for Biodiversity Assessments

The EIA procedure required by the aforementioned regulations and published guideline documents have been followed in this project. **Figure 2** below provides an indication of the process to be followed in this EIA.

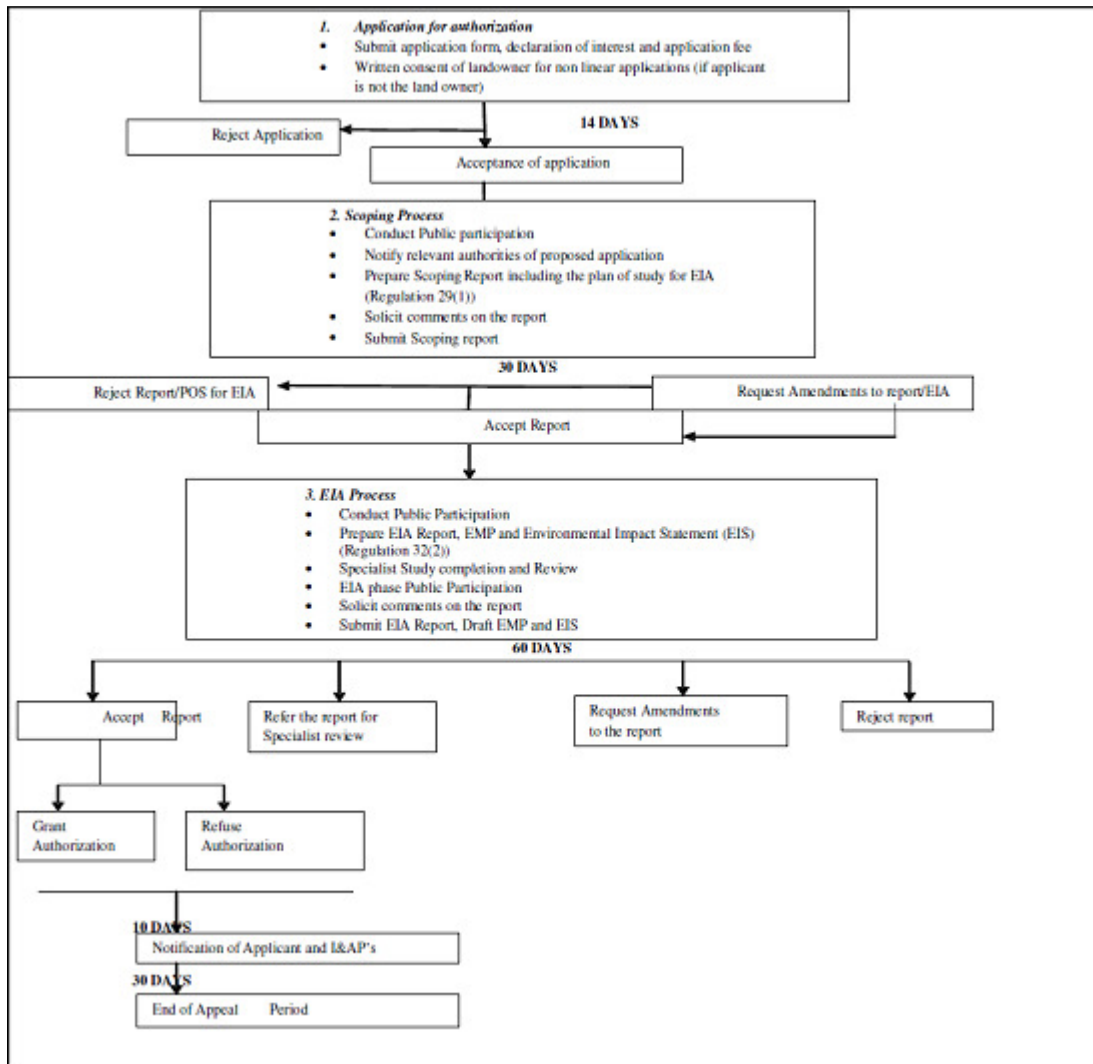


Figure 2: Diagram to indicate a description of the EIA process to be followed

3.2 Determination of the EIA Process

The NEMA regulations 2010 identify three separate administrative processes for EIAs, depending on the nature of the activity. A Basic Assessment process (Listing Notice 1) is identified for those activities that have less of a possible detrimental impact to the environment. A Scoping and EIA process (Listing Notice 2) is necessary for those activities, which are identified as having more of a possible detrimental impact on the environment, whereas Listing Notice 3 relates to identified activities that would require environmental authorisation prior to the commencement of those activities in specific identified geographical areas only.

The Scoping and EIA process is required for this project as the proposed upgrade and must in terms of NEMWA, 2008, undergo this process.

3.3 Registration of the Waste License Application

A Waste License application form (**Appendix B**) was completed by Envirolution Consulting and submitted to DEA on the 22 July 2011. The form was submitted together with a Declaration of Interest. No prescribed application fee was applicable at the time of submission of the application. DEA responded to the application in a letter dated the 25 July 2011 in which it indicated that the application was accepted and had been issued with acceptance with the following reference number (DEA REF NO: 12/9/11/L671/3) (**Appendix B**). DEA also advised that the proposed development must comply with the requirements of Regulations 67 of GN No.R 543 with regard to the period allowed for complying with the requirements of the regulations, and Regulation 56 and 57 of GN No. R.543 with regard to the allowance of a commenting period for interested and affected parties on all reports submitted. It is for such reasons that Scoping and EIA are being undertaken for the proposed development.

3.4 Public Participation Process

A Public Participation Process (PPP) consistent with Chapter 6 of Government Notice R. 543 was undertaken for the proposed development. This included identification of Interested and Affected Parties (I&APs) and the compilation of an I&AP database (**Appendix C1**), the placement of site notices at visible and accessible locations close to the site, (**Appendix C2**) and a newspaper advertisement in the local newspaper (**Appendix C3**). Background Information Documents (BIDs) and hand deliveries (**Appendix C4**) have been distributed to the adjacent land owners on an on-going basis from 05 August – to today via e-mail. Notification letters were distributed to I&APs during the PPP period. The public commenting period for this SR will be 30 days. Please see **Section 6** of this report for a detailed description of the PPP undertaken to date. The purpose of the public review period is to identify any additional environmental issues and concerns for inclusion in the SR that the environmental practitioners and specialists may not have identified.

In addition, Envirolution Consulting was invited to make a presentation regarding the proposed expansion of Sebokeng and Rietspruit WWTW projects at a Rietspruit Forum meeting held on the **10th August 2011**. Details of the Information Sharing Meeting are discussed on **Section 6** of this report.

3.5 Scoping Report (SR)

This report represents the SR for the project and documents the findings of the Scoping Phase. The report also documents the issues identified through the site visits, consultation with DEA and the Public Participation Process (PPP) as well as through the professional input of the relevant specialists identified, the project engineers and the Envirolution Consulting team.

All public comment on the SR have been captured in an updated Issues and Response Table (**Section 6**), that will be submitted to DEA. GDARD will also receive a copy as the proposed development falls within Gauteng and GDARD becomes a provincial commenting authority on this development. All I&APs registered on the I&AP database will be informed of the availability of the SR that is submitted to DEA so that they can see how their comments have

been addressed. I & APs will be given another opportunity to submit their comments during the EIR phase of the project.

Specialist studies relevant to the proposed project have been identified and specialist investigations will only be conducted during the EIA Phase, pending the approval of the Plan of Study for EIA by DEA. Following the acceptance of the SR and Plan of Study for EIA, the specialist's will then undertake their studies during the EIA phase of the application.

3.6 Authority Review of SR

DEA as the competent authority for the listed activity, must within 30 days of receipt of the report, in writing, accept the report and Plan of Study for EIA if no amendments are required or shortcomings identified therein. Upon acceptance of the report, the Environmental Assessment Practitioner (EAP) may then proceed with the tasks contemplated in the Plan of Study for EIA.

The authority can also reject the SR for not following legislative procedure if any of the required EIA steps were not undertaken. In terms of regulation 30 (3) of GN R. 543, the SR may be amended and resubmitted by the EAP should it be rejected. On receipt of the amended SR and Plan of Study for EIA, the competent authority will then reconsider the application. Should the SR be rejected, the amended SR will then be made available for public review and comment prior to submission to DEA.

The authority may also advise the EAP of matters that may hinder the success of the EIA application or matters that may prejudice the success of the application.

3.7 EIA Phase

The EIA Phase commences after the competent authority accepts the SR and advises the EAP in terms of Regulation 31(1) (a) of GN R. 543 to proceed with the tasks contemplated in the Plan of Study for EIA.

3.7.1 Public Participation Process (PPP) for EIA phase

A PPP must be followed and documented and included in the Environmental Impact Report (EIR). The PPP must be undertaken in accordance with the Plan of Study for EIA. The database of I&APs compiled in the Scoping Phase will be updated throughout the EIA Phase. A summary of comments received from, and a summary of issues raised by the registered I&APs, the date of their receipt and responses of the EAP to those comments will be provided in an updated Comments and Response Report. All copies of any representations, objections and comments received will also be submitted to the competent authority together with the EIR.

3.7.2 Specialist Studies

The specialist studies indicated in the Plan of Study for EIA (refer to **Section 9**) will be undertaken during this Phase. These specialist studies will be documented and recommendations formulated by the specialists for the proposed development. The full impact of construction activities will be described in the EIR after the integration of the specialist study

findings has occurred. Assumptions made and the specialist will explicitly state any uncertainties and gaps in knowledge. An indication will be provided by the specialist of the methodology used in determining the significance of potential environmental impacts. Envirolution Consulting will ensure that the methodology is consistent across all specialist studies.

3.7.3 Environmental Impact Report (EIR)

The EIR will contain all information that is necessary for the competent authority to consider the application and to reach a decision. It will detail the process followed during the EIA Phase including details of the PPP and an assessment of each identified potentially significant impact. An Environmental Management Program (EMPr) for the mitigation of impacts will be provided within the EIR. The EMP will attempt to mitigate the construction related impacts of the proposed upgrades.

3.7.4 Authorisation/Waste License

An environmental authorisation/Waste License is issued in terms of Regulation 36 of Government Notice R. 543 in the name of the applicant. If the activity is authorised, this authorisation will be a single environmental authorisation covering all activities for which authorisation was granted. It should be noted that an environmental authorisation may provide that the authorised activity may not commence before specified conditions are complied with. The authorisation may also include any other condition that the competent authority considers necessary for the protection of the environment.

3.7.5 Appeal Period

After a decision has been reached by DEA, Regulation 58 of Government Notice R. 543 makes provision for any affected person to appeal against the decision. Within 10 days of being notified of the decision by the competent authority, the appellant must lodge a notice of intention to appeal the decision with the Ministry. The appeal itself must be submitted to DEA within 30 days of the lodging of the notice of intention to appeal. An appeal panel may be appointed at the discretion of the delegated organ of state to handle the case and it would then submit its recommendations to that organ of state for a final decision on the appeal to be reached. Envirolution Consulting will communicate the decision of DEA and the manner in which appeals should be submitted to the Minister and to all I&APs as soon as reasonably possible after the DEA decision has been received.

4 LEGISLATION AND POLICY GUIDELINES

4.1 Legislative Requirements

The proposed upgrade of the Sebokeng Works capacity includes a number of activities that are listed in both Government Notice (GN) R 543 Listing notice 2. As such, the proponent is obliged to conduct a full EIA (scoping and impact assessment) for the proposed activity, in accordance with the procedures stipulated in GNR 543. Visit (http://www.dwaf.gov.za/dir_wqm/docs/SewageSludgeMar06vol2.pdf) for documents to use within the report.

4.1.1 National Environmental Management Act, 1998 (Act No. 28 of 1998)

In terms of the National Environmental Management Act, 1998 (Act No. 28 of 1998) (NEMA), the activity is identified in Government Notice No. 543, Regulation 26, the proposed development will require the submission of a Scoping and Environmental Impact Report (EIR) to the relevant authorities as part of the environmental authorization process.

It must also be noted that the proposed upgrade of the Sebokeng Works will be based on the waste licensing process for listed activities under Category B of NEMWA (Act No 59 of 2008) as defined in the environmental impact assessment (EIA) regulations made under section 24(5), 24M and 44 of NEMA 2008 (No 107 of 1998) requiring Scoping and Environmental Impact Assessment. The following listed activities under Category B of NEMWA 2008 will therefore require authorisation under Category B:

(7) The treatment of effluent, wastewater or sewage with an annual throughput capacity of 15 000 cubic metres or more; and

(11) The construction of facilities for activities listed in Category B of this NEMWA (not in isolation to the associated activity)

4.1.2 The National Environmental Management Air Quality Act 39 of 2004

The National Environmental Management Air Quality Act 39 of 2004 provides for the setting of national norms and standards for regulating air quality monitoring, management and control and describes specific air quality measures so as to protect the environment and human health or well-being by: preventing pollution and ecological degradation; and. Promoting sustainable development through reasonable resource use. It also includes reference to the control of offensive odours whereby reasonable step to prevent the emission of any offensive odours caused by activities on a premises are required.

4.1.3 National Heritage Resources Act 25 of 1999

The National Heritage Resources Act 25 of 1999 was introduced to ensure protection of South Africa's important heritage features. As such the Act covers 4 billion years of history. The act covers the following areas of heritage value:

- Archaeology
- Palaeontology

- Meteorites.

The following activities are considered of relevance to the proposed project:

- any development or activity which will change the character of a site – exceeding 5 000 m² in extent; or involving three or more existing erven;

Tools used to conserve and manage these resources are the formal regulated EIA processes as well as permits issued by the South African Heritage and Resources Agency (SAHRA) to restrict and/or regulate development within a heritage environment. SAHRA requires that a person who intends to undertake any of these activities notify them at the very earliest stages of initiating such a development. SAHRA should then, in turn, notify the relevant person whether a Heritage Impact Assessment Report should be submitted.

4.1.4 National Water Act, 1998 (Act No. 36 of 1998)

The National Water Act aims to manage the national water resources to achieve sustainable use of water for the benefit of all water users. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, and managed in ways, which take into account:

- Meeting the basic human needs of present and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating social and economic development;
- Providing for the growing demand for water use;
- Protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations;
- Promoting dam safety; and
- Managing floods and droughts.

No water bodies are situated on the proposed development site. It is important to note that no buildings may be erected within the 1:100 year floodline. The local authority may permit the erection of buildings on such portions/sites if there is sufficient evidence that the said portion will no longer be subject to flooding.

4.1.5 Integrated Environmental Management (IEM)

The general approach to this study has been guided by the principles of Integrated Environmental Management (IEM). In accordance with the IEM Guidelines (Department of Environmental Affairs and Tourism (DEAT), 1992), an open, transparent approach, which encourages accountable decision-making, has been adopted. IEM is a procedure for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development (DEAT, 1992). The IEM guidelines intend encouraging a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels.

4.1.6 Constitution of the Republic of South Africa (Act No. 108 of 1996)

The Constitution of the Republic of South Africa (Act No. 108 of 1996) has major implications for environmental management. The main effects are the protection of environmental and property rights, the drastic change brought about by the sections dealing with administrative law such as access to information, just administrative action and broadening of the locus stand of litigants. These aspects provide general and overarching support and are of major assistance in the effective implementation of the environmental management principles and structures of the Environmental Conservation Act and NEMA. Section 24 in the Bill of Rights of the Constitution specifically states:

"Everyone has the right -

- To an environment that is not harmful to their health or well-being; and
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -
- Prevent pollution and ecological degradation;
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

Other relevant acts that may be significant and associated with the proposed development include:

- National Environment Management: Air Quality Act (Act No. 39 of 2004);
- The Occupational Health and Safety Act of 1993;
- National Environmental Management: Biodiversity Act 2004 (Act No. 10, 2004);
- The National Heritage Resources Act (Act No. 25 of 1999);
- Hazardous Substances Act 15 of 1973
- The Municipal Systems Act, 2000 (Act No. 32 of 2000);
- The Municipal Structures Act, 1998 (Act No. 117 of 1998).
- Water Services Act, 1997 (Act No.108 of 1997)

5 STATUS QUO OF THE ENVIRONMENT

5.1 Introduction

The environmental setting of the site is described in this section while the environmental issues, that were identified to be of significance in the proposed development, are outlined in **Section 8**. This chapter also provides a summary description of the overall character and sensitivity of the project area and surrounding environment. Most of the environment surrounding the site has been impacted and disturbed by human activities.

5.2 Biophysical Environment

5.2.1 Geology

According to the West Rand Geological Map 2525 1:250 000 the Sebokeng Works is underlain by andesitic lavas of the Hekpoort formation, Pretoria Group, Transvaal sequence. Stiff lava and soft rock lava covers most of the site.

5.2.2 Soils

It was found that the area investigated is suitable for the proposed development. However, the founding conditions are to be verified once the details of the site layout for Module 6 are finalised. The groundwater level in some areas was found to be shallow. The report has hence recommended that dewatering of excavation will be required for excavations deeper than the groundwater table level.

5.2.3 Associated Water courses

The study site is located in the Upper Vaal Water Management Area (WMA), which lies in the eastern interior of South Africa and is considered a pivotal water management area within South Africa due to its association with the economic hub of the country. The major rivers of the management area are the Wilge, Liebenbergsvlei & Vaal rivers. More specifically, the study area is located adjacent to the perennial Rietspruit below the confluence of the Rietspruit and another river and upstream of the confluence of the Rietspruit with the Leeuspruit, and within Quaternary Catchment C22H. Thereafter, the Rietspruit confluences with the Klein-Rietspruit before finally joining with the Vaal River at Loch Vaal.

Based on the gradient of the Rietspruit associated with the study area, the longitudinal zone associated with the study area is identified as being that of a lowland river. Channels of lowland rivers are often confined, but fully developed meandering pattern within a distinct floodplain develops in unconfined reaches where there is an increase in silt content in bed and banks. According to Nel *et al.* (2004), the heterogeneity signature of the reach of the Rietspruit associated study area is Highveld 2, with the conservation status of the signature regarded as being Critically Endangered.

Based on current outputs of the National Freshwater Ecosystem Priority Areas project, neither the catchment in which the present study area is not located nor the wetlands associated with the study area are considered a national priority in terms of freshwater ecosystem conservation efforts. Nevertheless, the watercourses associated with the site are considered

important for ecological processes such as groundwater dynamics, hydrological processes, nutrient cycling and wildlife dispersal according to the Gauteng C-Plan.

5.2.4 Wetland and Soil Conditions

Wetland (or riparian) conditions on site are expected to occur in areas adjacent to the Rietspruit along the eastern boundary of the site and tributaries of the Rietspruit extending into the site in the northern and southern sections (CDSM, 1996).



Figure 3: Hydrology of the site reflects the presence of the Rietspruit and a tributary of the Rietspruit (CDSM, 1996)

A regional soil classification for the site highlights the expected presence of clay-rich soils potentially associated with wetland conditions in approximately the same areas as are currently occupied by the Rietspruit and its tributaries (Figure 3) (DDPLG, 2002). Rensburg soils (indicated in dark green in the figure below) are typically dark, base-rich and chemically fertile clay soils found in low-lying positions in landscapes with basic parent material and are often associated with temporary and seasonal wetland conditions (Fey, 2005, DWAF, 2005).

It was found that the area investigated is suitable for the proposed development. However, the founding conditions are to be verified once the details of the site layout for Module 6 are finalised. The groundwater level in some areas was found to be shallow. The report has hence recommended that dewatering of excavation will be required for excavations deeper than the groundwater table level.

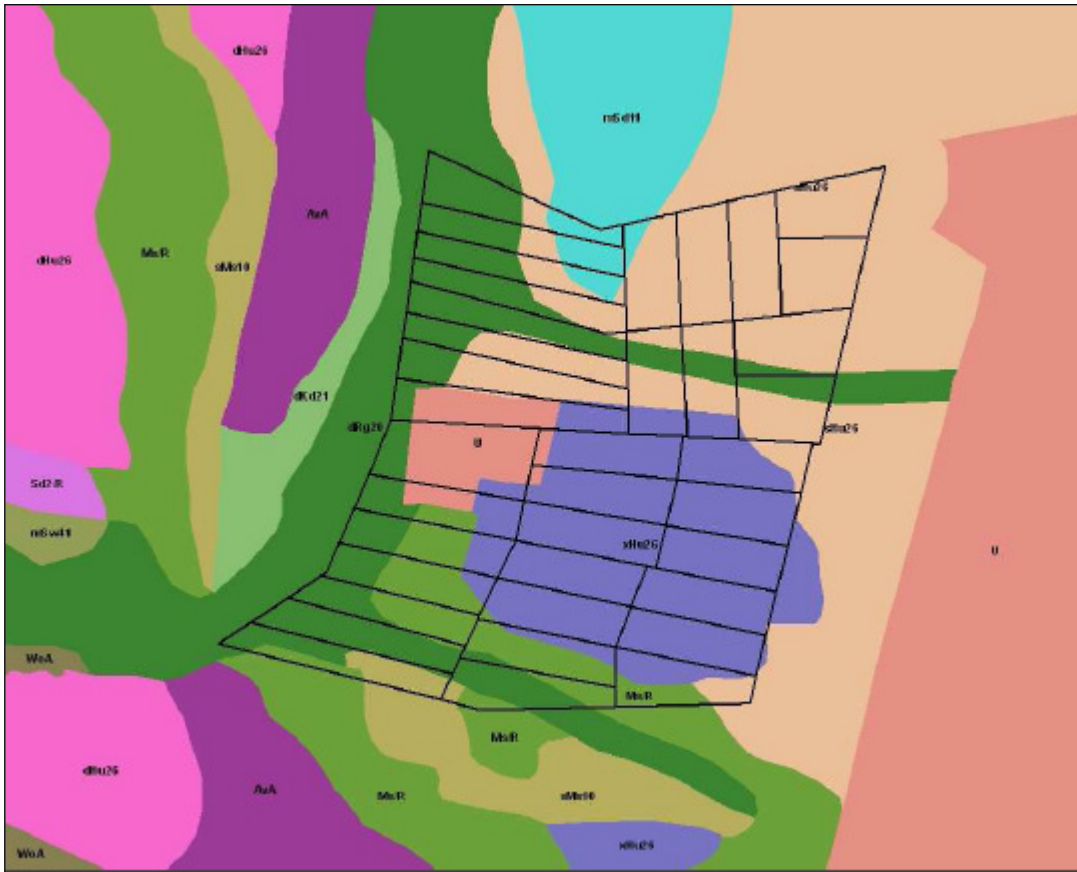


Figure 4: Regional soil classification for the study site (DDPLG, 2002)

Regional hydrology and soil data highlight three areas as potentially sensitive from a wetland and riparian ecological point of view; the eastern boundary of the site, a horizontal strip across the northern and southern sections of the site. These areas will be ground-truthed in detail during the EIA phase and vegetation and soil characteristics analyzed for compliance with wetland conditions.

5.2.5 Drainage and Groundwater

No natural occurring springs were identified during the geohydrological investigation undertaken in March 2010. Seven boreholes within the greater project area were identified. According to the hydrogeological investigation report compiled by Mzansi Africa Civils, 2010, Ground water was intersected at the contact surface of the weathered zone and more competent rock. The following observations were made during the geohydrological investigation:

- Aquifers underlying the site are shallow perched aquifer and a deeper intergranular and fractured aquifer;
- Groundwater seepage were recorded between 3 and 8 m bgl and the main water strike varied between 23 and 27m bgl;
- Ground water yields were mainly classified as low yielding, ranging between 1.5 and 2.5 L/s;
- Rest ground water levels vary between 0.88m bgl and 2.5 bgl; and
- Groundwater flow is generally in west direction and mimics the topography

According to the report, the depth to ground water level measured in all newly installed boreholes is higher than the water strike. Ground water levels were about 14 to 26m above the water strike, indicating confines/semi confined conditions (i.e. siltstone acting as confining layer). More details regarding the geohydrological information in the study area will be provided during the EIA phase.

5.2.6 Vegetation

The site is within the Soweto Highveld Grassland vegetation type (Mucina et al., 2006), classified as endangered in the scientific literature (Driver et al. 2005; Mucina et al., 2006) and listed as Vulnerable in the Draft National List of Threatened Ecosystems (GN1477 of 2009), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004). Any natural vegetation therefore has high conservation value. Landcover information (Fairbanks et al. 2000) and aerial imagery indicate that there is no natural grassland in the area surrounding the site.

There are five plant species of conservation concern that could occur in the general area, two listed as Near Threatened, three listed as Declining and one listed as Rare. The fact that there is no natural vegetation remaining around the site indicates that these species are unlikely to be found on site.

A site visit by the EAP indicated that the site is 40 percent natural veld in good condition, about 10 % landscaped vegetation and the remaining 50 % will be bare soil. No rare or endangered species appeared to be present on site during the site visit. There is however grasslands in the entire area in which the Sebokeng Works are situated. The entire portion of the Sebokeng Works is dominated by these grasslands.

5.2.7 Fauna

Apart from birds resting on sedimentation dams and in vegetation surrounding the site, no animals were observed during the site visits.



Ibises were observed to be feeding within the Sebokeng Works

Due to the urban nature of the area, it is highly unlikely that any significant fauna would inhabit the project area. It is expected that the diversity of terrestrial faunal species within the study area will be poor due to the level of habitat disturbance and human activity in the immediate area.

5.3 Human Environment

5.3.1 Socio-Economic Features

Sebokeng is amongst the previously-disadvantaged, sprawling residential areas located in the Emfuleni Local Municipality (Sedibeng District Municipality), which is serviced by Metsi-a-Lekoa, the water and sanitation business unit of the same municipality. These areas support a population of 420,000 and consist of approximately 65,000 freestanding housing units in the Vaal Triangle near Vereeniging.

5.3.2 Heritage Features

A SAHRA accredited Archaeologist will be appointed during the EIA phase to conduct a preliminary heritage impact assessment. Currently there are no known social or cultural features of heritage value within the proximity of the site, which could potentially be affected by the proposed infrastructure.

Although unlikely due to how long the Works been in existence for, unknown features or artefacts of heritage value may however be exposed during excavation and should thus be appropriately dealt with in environmental planning for construction activities.

5.4 Environmental Quality

5.4.1 Traffic Impacts

Access to the works is limited and the only road is a dirt road, which increases dust pollution in the area as well as the volume of vehicular traffic.

5.4.2 Human Health

For obvious reasons, adequate and effective treatment of sewage wastewater is essential to prevent spread of disease in urban communities. The proposed increase in treatment capacity allows Emfuleni Municipality to effectively provide for appropriate treatment facilities for current and future demands within all the municipal areas.

Technologies implemented and applied at the Sebokeng Works is old technology, thus the proposed increase in the capacity will address issues related to the operation of the Works. Through rigorous implementation of management plans and adherence to stipulated standards, it is unlikely that health hazards will emanate from the site.

The Sebokeng Works are also regularly inspected by the Health Department and monitored for Exemption compliance by Department of Water Affairs.

5.4.3 Air Quality

The Sebokeng Wastewater treatment works is located within the wider Vaal Triangle Industrial area and from an ambient air quality point of view, the Vaal Triangle region airshed was declared a priority area in May 2006 by the Minister of Environmental Affairs and Tourism, known as the Vaal Triangle Airshed Priority Area (VTAPA) in terms of the National Environmental Management: Air Quality Act (NEM:AQA), No 39 of 2004, and was the first priority area in South Africa and was declared due to a concern of elevated pollutant concentrations within the area.

The Vaal Triangle encompasses a mixture of commercial, agricultural, and residential land use activities, all within close proximity to one another. Industrial activities within this region include coal-fired power stations, chemical factories, petrochemical plants, metallurgical plants, multiple small industries and household fuel burning in the form of coal, wood and paraffin results in releases of various toxic constituents into the atmosphere. These activities have counted for the poor ambient air quality of this region.

The Sebokeng Monitoring Station is currently recording SO₂, NO, NO₂, NO_x, CO, O₃, PM₁₀, PM_{2.5}, BTEX, Lead, and in 2010. A Review of the DEA Vaal Priority Airshed Priority Area Monitoring Network Monthly Activity Reports 2008 – 2010, shows that exceedance of the new National standards for SO₂, NO₂ and PM₁₀ generally fluctuate from month to month. However the general observation is that the main pollutant of concern in this region is Particulate Matter (PM₁₀ and PM_{2.5}).

Although, the ambient air quality within the study area is generally considered to be poor, it is without dispute that wastewater works contribute to emissions including H₂S, Benzene, Ethyl benzene, Toluene and Xylene, Odours, and Greenhouse Gases into the atmospheric and the Sebokeng works is certainly no exception. Proposed demolition of part of the existing old works (Module 1 and 2), construction and upgrade of the works to include a new additional capacity of 100 mega litres per day, is likely to increase the rate of emissions of all associated pollutants. An Air Quality Impact Assessment will therefore need to be conducted as part of Environmental Impact Assessment to determine the significance of impact of the potential impacts of the increased rate of emissions on the identified surrounding potential receptors, and on the environment.

5.5 Noise Environment

Traffic on the nearby roads and residential areas introduce most noise in the area. However traffic might also add to the background noise levels. Operations at the Sebokeng Works are not particularly noisy.

5.6 Visual and Aesthetic Features

The Sebokeng Works have been in existence for over 50 years. The developments in the surrounding areas are new and thus can safely be said that the Sebokeng Works form part of the visual character of the area.

The Sebokeng Works is not hidden from the surrounding area (located to the west of the site) and can thus be viewed from the Golden highway and the closest residential areas. No visual impact assessment is anticipated as part of this EIA.

6 PUBLIC PARTICIPATION PROCESS

Public participation is the involvement of all parties who potentially have an interest in a development or project, or may be affected by it. The principal objective of public participation in an Environmental Impact Assessment (EIA) process, in particular this Scoping, is to inform and enrich decision-making.

6.1 Process followed to date

The following process was undertaken to facilitate the public participation for the proposed project, which commenced on **Thursday, 05 August 2011**.

6.1.1 Newspaper advertisements

An advertisement, notifying the public of the EIA process and requesting Interested and Affected Parties (I&APs) to register with, and submit their comments to Envirolution Consulting (Pty) Ltd was placed in the **Sebokeng Vision, Wednesday, 04 August 2011**. A copy of the advertisement is included in **Appendix C1**.

6.1.2 Site notices

Three notices were erected on site and at visible and accessible locations close to the site on **Friday, 05 August 2011** to inform surrounding communities and immediately adjacent landowners of the proposed development. Photographic evidence of the site notices is included in **Appendix C2**.

6.1.3 Direct notification of identified I&APs

Identified I&APs, including key stakeholders representing the following sectors, were directly informed of the proposed development by e-mail and fax on Monday, **08 August 2011**. For the purposes of this the following authorities were consulted:

- Provincial Authorities
- Local Authorities
- Service providers
- Ward Councillor
- Residence Association; and
- Non-governmental organizations

Please refer to **Appendix C3** for the information letter and Background Information Document that was distributed to the I&APs identified as well as a list of identified and contacted I&APs, including directly adjacent landowners.

6.1.4 Hand - deliveries

Hand-deliveries were made to adjacent landowners within 100 meters of the proposed development on **Friday, 05 August 2011**, to notify and inform them of the proposed project.

6.1.5 Concerns raised by I&APs

The relevant local authorities and other stakeholders were informed of the proposed project via notification letters distributed on **Monday, 08 August 2011**. Registration sheets were attached to the notification letters for the local stakeholders to register as Interested and Affected Party's (I&AP's) and to lodge their comments. Comments received are summarised and included in Issues Response Table (See **Table 6.1**). No significant comments were received to date.

6.1.6 Information Sharing Meeting (ISM)

Envirolution Consulting was invited to make a presentation regarding the proposed expansion of Sebokeng and Rietspruit WWTW projects at a Rietspruit Forum meeting held on the **10th August 2011**. The presentation made by Envirolution was part of the Public Participation process informing attendees of the meeting about the EIA process of the proposed projects and providing them with the opportunity to raise issues, concerns and suggestions. (See Attendance Register in **Appendix C4**).

It is hoped that the findings of the Environmental Impact Assessment (EIA) will be presented at the next Rietspruit Forum meeting to be held in November 2011.

6.2 Comments and Response Reports

Comments and issues of concern raised by I&APs are listed, along with the I&AP's name and means of communication in the Comment and Response Report.

NAME	COMMENTS	RESPONSES	DATE	METHOD USED TO COMMENT
1 COMMENTS RELATING TO SURFACE WATER, GROUNDWATER AND/OR SEWER				
Mr D.C Rambuda: Department of Water Affairs	<p>In principle the Department is not against the approval of the proposed Sebokeng Waste Water Treatment Works expansion project, provided that the following issues are addressed.</p> <ul style="list-style-type: none"> •The Department is well aware of the challenges for both Rietspruit and Sebokeng Waste Water Care Works and its negative impact on the final discharge into the receiving environment. •Maturation ponds are lined with clay which has the potential impact of seeping into the ground, therefore proper lining should be considered. 	<p><i>The comments are noted and the mitigation for the maturation pond will be included in the Draft EMPr that will be compiled for this project during the EIA phase.</i></p>	07.September 2011	Fax

It is expected that additional comments from I&APs will be submitted during the review of this draft scoping report.

7 PROJECT ALTERNATIVES

Consideration of alternatives is a key element of the EIA process, and is a requirement of the scoping process as defined in the EIA regulations (DEA, 2010). The goal of evaluating alternatives is to find the most effective way of meeting the need and purpose of the project, either through enhancing the environmental benefits of the proposed activity, or through reducing or avoiding potentially significant negative impacts.

Key criteria for consideration when identifying alternatives are that they should be “practicable”, “feasible”, “relevant”, “reasonable” and “viable” “affordable” The general approach to EIA alternatives is that a range of alternatives should be considered together with the No-go alternative. Assessment of alternatives should include a comprehensive comparison of all potential impacts, both direct and indirect and cumulative, on the environment, (DEAT, 2004).

In terms of NEMA, the proponent is required to demonstrate that alternatives have been described and investigated in sufficient detail during the EIA process. The feasible alternatives identified for the proposed upgrade of the Sebokeng Works were limited to various process alternatives. These alternatives are summarised as follows:

7.1 Technology options

A key issue associated with the upgrade of the Sebokeng Works is that it will be designed and constructed to ensure the least environmental and economic impact. The project design engineers have thus provided the following information regarding the four technology alternatives that were considered for this project:

7.1.1 Conventional Activated Sludge Process

The conventional activated sludge process is well understood in the world and forms the baseline of the technology used in the treatment of wastewater. The conventional activated sludge systems are based on the principle that wastewater is admitted to that part of the plant which offers the best process conditions (Kruger, 2009). Consequently, different parts of the plant will have different conditions allowing for the total treatment. For the Sebokeng Works, The process entails the following elements:

- Inlet works (Screens (5 mm) and Degritters;
- Primary settling tanks (depending on the organic loading of the works);
- Biological reactor;
- Secondary settling tanks;
- Disinfection; and
- Sludge treatment and disposal
-

Advantages and Disadvantages regarding this process are tabulated as follows:

Advantages	Disadvantages
Process is well understood.	All biological processes are prone to poisoning by chemical substances.
Industry standard for wastewater treatment.	Dependent on energy supply.
Biological nutrient removal is achievable, i.e. the South African Standards can be achieved.	Requires relative large area.
Huge body of knowledge and experience in South Africa and the world.	Peak flows exceeding the design flows can cause a loss of biomass, and hence a deterioration of the quality of the treated effluent.
Simulation models are readily available.	Requires relative large structures
Fairly stable process.	
Depending on the quality of the wastewater being treated, the solids can be used in certain beneficial applications.	
Robust equipment	

7.1.2 Membrane Biological Reactor Process

The Membrane Biological Reactor (MBR) Activated Sludge Process is a new development in the field of wastewater treatment. According to Francis *et al* : 2004 , an MBR is a combination of the activated sludge process, a wastewater treatment process characterized by a suspended growth of biomass, with a micro- or ultra-filtration membrane system that rejects particles. The membrane system replaces the traditional gravity sedimentation unit (clarifier) in the activated sludge process. The turbidity and suspended solids concentration of the effluent is far lower than in conventional treatment.

In South Africa, the process is relative new and the first MBR Plant has been constructed at the Zandvliet WWTW in the Western Cape. This plant is not yet fully operational, and teething problems are being encountered. A second plant is being constructed in the Western Cape, and this plant is to be commissioned in the coming 4 months. The plant has a capacity of about 15 ML/d. For the purposes of the Sebokeng Works, the process will entail the following elements:

- Inlet works (Screens - 500 µm);
- Degritters;
- Primary settling tanks (depending on the organic loading of the works);
- Membrane Biological reactor;
- Disinfection; and
- Sludge treatment and disposal.

Technical details about this waste treatment process will be provided and evaluated during the EIA phase. Some advantages and disadvantages are listed in the table below.

Advantages	Disadvantages
Quality of the water produced is of a very high standard.	All biological processes are prone to poisoning by chemical substances.
The process should be used if direct water reclamation is being required.	Dependent on energy supply.
Biological nutrient removal is achievable, i.e. the South African Standards can be achieved.	Limit on peak flows that can be treated due to limitation of the membranes

Simulation models are readily available.	Blockage of membranes by sludge and precipitates
Fairly stable process.	Membranes are imported
Depending on the quality of the wastewater being treated, the solids can be used in certain beneficial applications.	New process and not widely used in South Africa
	Relative high risk process
	Capacity of works still limited for which the MBR Process is being applied

7.1.3 Sequencing Batch Reactor Activated Sludge Process

The Sequencing Batch Reactor (SBR) Activated Sludge Process, as its names states, is a batch process, while the processes described above are continuous flow processes. In the SBR, all processes take place in one reactor, which obviates the requirement of a secondary settling tank. Operationally, when the first reactor is full, the inflow to the works has to be directed to the second reactor. The sizing of the reactors has to be such to ensure that the full flow received at the works can be treated. SBR's are operated by automated computer control systems, and the decanting equipment can be fairly complicated. The process entails the following elements:

- Inlet works Screens (5 mm), Degritters;
- Primary settling tanks (depending on the organic loading of the works);
- Biological reactor minimum 2 to 3;
- Disinfection;
- Sludge treatment and disposal.
-

7.1.4 Moving Bed Biological Reactor Process

The Moving Bed Biological Reactor Process is a fairly new process. It is an activated sludge process incorporating plastic media on which the biomass grows. The design information is not available in the public domain and hence it is not possible to evaluate the process from a theoretical point of view. The nutrient removal is rather seen as a "black box", and the clients are in the hands of the owners of the technology. A distinct advantage of the process is the fact that the biomass is protected by the media, and hence the process can accommodate relative high flows.

7.2 No-go Option

The No-go option implies that the Project does not proceed, and will thus comprise of the Works continuing to be operational with the current capacities. As this capacity has been identified as insufficient to meet the needs of the Works, this is not a feasible option. If the current operation is left to continue as it is, this would serve to reduce the quality standards of the Works and risk contamination of groundwater and disturbance to the natural functioning of local ecosystems.

7.3 Expansion of Sebokeng Works

This will mean proceeding with the proposed development, that is 100 Mℓ/day additional treatment capacity at Sebokeng Works, total capacity of 200 Mℓ/day. The current project implies that 100 Mℓ/day additional capacity at Sebokeng WWTW, total capacity will result in the Works operating at 200 Mℓ/day.

Any other feasible alternatives identified during the remainder of the Scoping Phase may also be considered for assessment in the EIA process.

8 POTENTIAL ENVIRONMENTAL IMPACTS

8.1 Introduction

An important element of scoping is to evaluate the issues that were raised during the PPP and technical processes and ensure that those identified as key issues are included within the scope of the EIA process. In addition, scoping allows for the identification of the anticipated impacts, particularly those that will require detailed specialist investigations. These results of the PPP and issues identified will form the basis for the Terms of Reference for specialist studies and a full assessment of the impacts in the Environmental Impact Phase.

This section of the report aims to predict the potential impacts likely to occur from the undertaking of the proposed activities. This allows for the mitigation of the impacts and their associated costs and timeframes being included in the project planning. The following environmental issues relating to the proposed increase in treatment capacity of the Sebokeng Works have been identified as being important and were investigated in the Scoping Phase. These issues will be further investigated in the EIA Phase of the project.

8.2 Assessment of Potential Impacts

The assessment findings are described in the sections below. In this SR, mitigation measures will refer to the precautionary measures which can be implemented in the planning stage in order to avoid, reduce or remedy the impacts of activities from the proposed project.

Impacts with a *low* significance are considered to have little influence on the decision to proceed with the proposed upgrades as mitigation would further reduce their significance. Impacts with a *moderate* significance will influence the decision unless it can be effectively mitigated to a *low* significance. Impact with a *high* significance despite mitigation, would influence the decision to proceed with the proposed development.

In accordance with Regulation 31 (l) of Government Notice R. 543, Envirolution Consulting will further assess the significance of impacts according to nature, probability, duration, extent and intensity during the EIA Phase.

8.3 Biophysical Impacts

8.3.1 Geology and Soils

The geological impacts will consist of excavation of soil to provide for the upgrade. The proposed site spans a relatively small area that is a disturbed and degraded by the current Waste Water activities. Excavated soil should be easily worked and replaced into the trench, sequentially. Impacts on any geological structures below the alluvium will be determined when a more detailed geotechnical investigation is undertaken.

The platforms on which the new infrastructure associated with the increase in capacity of the Works will be demolished to accommodate the new infrastructure. In some areas where there is currently no infrastructure, only minor earth grading may be required for site preparation during the 'Foundation Excavation' stage of construction. This may facilitate minor erosion

and sedimentation. The terrain at the proposed the Works site is however not particularly steep and no soil erosion problems were observed at the existing the Works.

Construction activities in areas surrounding the site could potentially result in soils being compacted due to the construction traffic. However, contractors will in all likelihood make use of existing paved access roads to the site.

Construction activities in areas surrounding the site could potentially result in soils being compacted due to the construction traffic. However, contractors will in all likelihood make use of existing tarred access roads to the site.

The proposed upgrade may lead to erosion, siltation and sedimentation is considered to be of moderate significance without mitigation. The impact of the project activities that may lead to erosion and sedimentation is considered to be of *low* significance without mitigation.

Implementing appropriate mitigation measures during construction as well as post construction rehabilitation can however reduce the impact.

8.3.2 Topography and Drainage

The proposed upgrading will be limited to the study boundary. The existing surface will be excavated and there will be movement of construction vehicles and construction workers. The proposed upgrade may involve demolishing activities, grass vegetation clearance and may result in exposed surfaces, which may increase the erosion risk. Vegetated areas reduce the velocity of stormwater and increase infiltration of the water intercepted. Erosion ultimately results in the sedimentation of drainage lines, causing flooding and related drainage problems.

The storage and use of fuel and other chemicals on site during the construction phase must be adequately managed to prevent surface water pollution through spillage or leakage. Litter accumulating during this phase can result in eutrophication in a watercourse, which has a detrimental effect and may pose a threat to the fauna. An aquatic ecological study will be undertaken in the EIA phase to determine the possible impacts of the proposed infrastructure on the aquatic environment.

The clearing of natural vegetation for the proposed upgrade could result in an increase in alien vegetation as natural vegetation outgrows alien species in the area. Accumulation of alien species could result in poor soil texture and pollution of watercourses. However, due to the fact that the drainage features along the site will be maintained, impact in this regard can thus be considered of *low* significance. These drainage features must be maintained during operational phase to prevent undue surface damage and erosion.

Increased stormwater run-off as a result of the proposed upgrade may result in:

- Loss of topsoil and blockage of stormwater channels;
- Loss of natural vegetation;
- Erosion and sedimentation;
- Flooding; and
- Pollution and contamination

8.3.3 Ecological Systems

The Sebokeng site is surrounded by grasslands, bluegum plantations trees, shrubs residential developments and agricultural activity. Litter and waste arising during construction could potentially be introduced into the ecological environment, such as the Rietspruit River, which could impact on the ecological soundness of the area. Of particular concern would be soil and water contamination that could result from poor management of use or disposal of hazardous substances such as fuel and oil during construction and operation of the Sebokeng Works.

A potential threat to water quality may also arise from the risk of soil erosion caused by poor management of materials stockpiles, remnants from demolishing activities during the construction phase. The impacts of the project activities on ecological systems are considered to be of *moderate* to *low* significance without mitigation.

Good environmental management practices must be followed to prevent potential contamination of soil and water resources.

(a) Flora

The status of the flora within the Sebokeng Works boundary site has already been markedly transformed. This is due to the presence of other sewage infrastructure, human and their associated activities.

No natural flora is likely to be affected by the normal construction activities, which will be restricted to the Sebokeng site. Areas cleared for new infrastructure might be invaded by alien vegetation. The impact of the development on the fauna and flora of the area is considered insignificant.

The potential impact on the flora in the area is considered to be of *low* significance without mitigation for normal construction activities.

(b) Fauna

The area is not known to support any threatened fauna. The disturbed nature of the area results in very few natural occurring habitats and thus no animal species were observed during the site visit. However, the site appears to provide a suitable habitat for *Threskiornis aethiopicusIbis* or the Sacred Ibis as a number of them were observed at the site.

Mammals, reptiles and bird species may be impacted during construction, particularly birds, such as *ibises*, that have been observed to rest and feed at the site. Most species are however likely to move away from the construction site and it is unlikely that they would suffer any long-term effect.

8.4 Socio-Economic Impacts

Currently, crime is a major socio-economic problem in South Africa. Typically an increase in the density of people in the area results in an increase in the probability of petty and serious crimes. However, the crime levels differ from area to area especially depending on the nature of the surrounding neighbourhood. Thus statistics indicates that the crime levels in urban areas are relatively higher than in the rural areas. Since the proposed upgrade is located

within the semi urban settlement, it is therefore anticipated that the crime levels are relatively high.

8.4.1 Economic Impacts

The proposed Sebokeng upgrade forms part of the planning process, specifically for provision of adequate sewage treatment capacity, which will enable the Emfuleni Municipality to commit to these developments. The proposed project is thus of strategic importance and developments would be stifled without provision of adequate sewage wastewater treatment capacity.

This phase (upgrade) will result in a demand for equipment, building material and labour. Equipment and building material would in all probability be sourced locally. The use of local labour for the preparation of and construction activities on the site would result in much needed job opportunities within the area. Secondary service provision such as food supply, toilet hire, equipment maintenance etc. would also stimulate the local economy during the construction phase.

The project will thus have an overall positive economic impact for the receiving area, which can be considered as of high significance. Since the proposed development is limited within the Sebokeng Works boundary, none of the neighbouring properties will be directly affected.

8.4.2 Impact on Land Use

The proposed development supports existing land use by making use of an existing sewage wastewater currently owned by Emfuleni Local Municipality (Administrator of Transvaal). It also fits in with anticipated development plans for the area. The confinement of the proposed upgrade within the boundaries of an existing sewage works limits the impact on land use and zoning. The Sebokeng Works are currently zoned for Wastewater Services.

The installation of the infrastructure is planned for long term use. The Works will not hamper existing surrounding land use and is unlikely to hamper any potential expansion of the surrounding areas.

8.4.3 Road and Traffic Impacts

Since the development will be undertaken only on site and outside road reserves the activity could result in negligible traffic impacts during the construction phase. It is estimated that the upgrade of the Works will require approximately 18- 36 months and no traffic congestion even during peak hours, along the Golden Highway which takes construction vehicles to site. Sebokeng area located in close proximity to the Works does not experience huge traffic volumes even during peak hours.

Without proper care, construction activities could potentially cause damage to local road infrastructure. Spillage of wet concrete on roads, (particularly if concrete mixing is undertaken outside the Works boundaries) (batching plant to be considered) could damage roads and must be prevented. Pro-active planning with reference to the undertaking of the construction activities outside peak hours will mitigate against the potential traffic congestion that could result since most traffic is encountered in the early mornings and late afternoons (peak hours).

The movement of construction vehicles, vehicles delivering construction material and the workforce to and from the site during the construction phase can result in an increase in traffic congestion. This would especially be the case if such movement takes place during peak hours through the existing adjacent townships. It is therefore recommended that those vehicles should access the site outside off peak hours (i.e. 09h00 and 15h30) in order to minimise the impact.

In addition to this, construction contributes to the generation of noise. It is unlikely however that this noise will be at a level higher than the existing ambient noise resulting from busy arterial roads, such as the N1, R553 and other main roads. Not much traffic will be generated during the operational phase of the Sebokeng Works.

8.4.4 Visual/Aesthetic Impacts

Impacts on the aesthetic environment are mostly limited to the construction phase of the project and pertain to pollution and environmental scarring. The proposed activity will be confined to the area around the Works, and the construction camp must be located in areas, which are already disturbed. In this regard, the emphasis should be on developing an adequate waste management and rehabilitation programme in order to limit the effect of the project on the aesthetic environment.

Visual and aesthetic impacts will also result from the construction activities such as excavation, stockpiling of construction material, waste and rubble handling of materials. Poor planning and management of the construction site, camp and activities may potentially result in such impact to be negative. Negative impacts may potentially include litter, inappropriate keeping and disposal of rubble and waste and untidy keeping of construction material and equipment. The construction activities are however anticipated to be of relatively short duration.

Once in place, the Works will have an aesthetic/visual impact very similar to that of the existing operations. This is even more so as the proposed units will be similar to many of the existing ones on site. This impact can only be mitigated through careful selection of the design features. Upgrading of infrastructure within the existing Works probably has a lesser visual impact than if additional sewage treatment capacity was to be constructed elsewhere as construction activities will be subject to the required environmental legislative requirements.

Parties most impacted by the visual/aesthetic features of the Works are those residing nearby and overlooking the area from a distance; and motorist travelling along roads overlooking the site. There are already existing visual impacts from some of the existing sewage infrastructure within the Sebokeng Works. Trees or berm that will be planted on eastern and southern borders will reduce the visual impacts.

8.4.5 Noise Impacts

Construction activities could lead to a significant increase in the levels of noise pollution. Typical construction noise can be expected, but will be temporary in nature. Employees located within the Works will also be exposed to these impacts and should therefore be warned of the dangers associated with the construction activity.

Ambient noise levels are expected to rise during the construction phase of the upgrade. Construction activities that emit noise include vehicle trafficking, plant materials, generator noise, noise from pressure hammers, construction worker voices etc.

People closest to the construction activities, i.e. at the neighbouring properties owners residing closer to the Works, will be most affected by the higher noise levels due to these activities. Emfuleni Local Municipality however anticipates that the construction period will last for at least 36 -60 months. A phased -in approach in construction of the two 50 Ml/day modules will be considered. Residential areas are reasonably far from the site and would not be highly affected by the construction noise.

8.4.6 Pollution Impacts

Introduction of additional sewage infrastructure and the associated construction activities could lead to a significant increase in the levels of dust pollution, as well as the waste generation and littering. In addition, liquid and solid waste, including sewage, will be produced on site and at the construction camp. The potential also exists that liquid substance e.g. used oil, solvents, etc be disposed in natural drainage lines. This could have a significant negative impact on the surrounding air quality levels to and landowners living adjacent to the site.

The transportation of materials such as sand, cement and the movement of vehicles and machinery especially during the autumn months could contribute to high levels of dust pollution due to high wind speeds. The unlawful burning of wastes accumulating on the site during the construction phase can add to the air pollution in the area and should be regulated. Dust mitigation measures will be required to prevent dust levels from exceeding South African Air Quality Guidelines.

The overarching objective of pollution and waste management during the construction phase of the project should be based on the principle of reduction and where possible be avoided. Pollution related to impacts during this phase will be temporary in nature and these impacts are considered to be of low significance if mitigation measures are implemented effectively.

Once in place odours emitted from the plant will most probably be much the same or even reduced as what is associated with the current operation as Sludge drying beds will be eliminated. Odours emitted from wastewater treatment works are a function of the effluents discharged to the facility, the process unit selection, plant and equipment specification, operation and maintenance of the facility. Accordingly, all these aspects need to be considered during upgrade design and specification and once implemented the efficient operation of the facility. Envirovolution Consulting will appoint an air quality specialist to assess the impact the proposed activities will have on air quality and to accordingly provide management and mitigation measures where necessary.

8.4.7 Community Relationship - Influx of temporary construction workers

It is unavoidable that there will be an influx of temporary construction workers for the entire construction period. This could potentially lead to disputes with local communities.

8.4.8 Interruption of Services

Emfuleni Local Municipality is not anticipating any interruptions of wastewater treatment services during construction. It must be noted that lockout/strikes were encountered during a previous upgrade and it cannot be confirmed for the proposed project. The impact as a result of potential service disruption is however considered to be of a *low* significance level or *negligible* without mitigation.

8.4.9 Waste License

The Sebokeng Works discharge permit is in accordance with the DWA permit which has since expired. The Scoping and EIA that is currently being undertaken by Envirolution is part of lodging a Waste License Application with DEA. It must be noted that DWA has been included in the PPP and did not submit any objections to the proposed upgrade.

8.4.10 Public Health and Safety

Due to the construction activities being largely restricted to the Sebokeng Works, the risk to public safety during construction is considered to be insignificant.

The demolishing of old sewage infrastructure, generation and use of large quantities of hazardous gasses (methane) has the potential to pose a health and safety risk to employees and nearby public members. As a result of this Emfuleni Local Municipality must evaluate this risk for the proposed upgraded installation through the commissioning of a Major Hazardous Installation (MHI) risk assessment in compliance with the Major Hazardous Installation Regulations, which form part of the Occupational Health and Safety Act. This assessment must be undertaken by a suitably qualified specialist who will establish the significance of the risk and make recommendations as to the relevant design specifications and procedures.

In addition, potential inadequate treatment of the wastewater and potential release of hazardous waste, such as hazardous sludge could impact on human health. Emfuleni Local Municipality must ensure that monitoring and control aspects are adequately covered in the design of the proposed upgrade. They will also need to continue with effective operation, strict control and monitoring once the proposed upgrade has been commissioned. Currently all hazardous sludge is captured on site and transported and disposed off to a registered hazardous landfill site. Emfuleni Local Municipality must ensure that strict control and safe disposal of hazardous sludge continues.

9 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

The proposed upgrades require an EIA in accordance with the NEMA EIA Regulations, 2006 and NEMWA (Act No 59 of 2008) as defined in the environmental impact assessment (EIA) regulations made under section 24(5), 24M and 44 of NEMA 2008 (No 107 of 1998) requiring Scoping and Environmental Impact Assessment. The EIA follows the preparation of a Scoping Report; the purpose of which was to identify the range of environmental impacts that may be associated with the proposed upgrade, alternatives, and the focus of the EIA. This section presents the proposed approach to the EIA for the proposed upgrade and has been structured as per Section 28(1)(n) of the EIA Regulations, 2010.

The specific objectives of the EIA Phase shall be to:

- Continue to consult with and inform all relevant stakeholders and Interested and Affected Parties (I&APs);
- Compare the various project alternatives;
- Investigate salient environmental issues and their related impacts through specialist studies; and
- Assess the identified impacts and recommend appropriate mitigation measures for the route determination.

9.1 Key findings of the Scoping Phase

A number of potential positive and negative impacts of the project were identified during the Scoping Phase.

Table 9.1 summarises the environmental issues relating to the construction of the proposed upgrade that have been identified as being important and were investigated in the Scoping Study.

Impacted Environment		Significance	
		Without Mitigation	With Mitigation
Biophysical	Geology and soils	Moderate	Low
	Topography & Drainage	Moderate	Low
	Ecological systems	Moderate	Low
	Flora	Moderate	Low
	Fauna	Moderate	Low
Environmental Quality	Air quality	Moderate	Low
	Public Health & Safety	Moderate	Low
	Land use	Moderate	Low
	Visual	Low	Low
	Noise	Low	Low
Socio Economic	Interruptions of Services	Low	Low
	Heritage	Low	Low
	Roads and Traffic	Moderate	Low
	Influx of workers	Moderate	Low

The identification of the impacts is based on the results and conclusions of the Scoping Report and following aspects:

- The legislative requirements;
- The nature of the proposed activity;
- The nature of the receiving environment ; and
- Issues and concerns raised during the PPP.

A number of specialist studies are proposed in the Impact Assessment Phase in order to investigate the potential environmental impacts associated with the proposed development. It is proposed that the following specialist studies will be conducted during the Impact Assessment Phase.

- Risk of soil and/or groundwater pollution – Hydrogeology;
- Risk of changes to water quality and impacts on aquatic flora and fauna;
- Alteration of drainage systems;
- Public nuisance – odours – Air Quality Assessment; and
- Stormwater issues to be addressed by upgrade

9.2 EIA Methodology

Activities within the framework of the proposed development, and their respective construction and operational phases, give rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into phases from which impacting activities can be identified, namely:

a) Status Quo

The site as it currently stands taking cognisance of the disturbance and the impacts regimes operating.

b) Pre-construction phase

All activities on site up to the start of the construction, not including the transport of materials, but including the initial site preparations. This also includes the impacts, which would be associated with the planning.

c) Construction phase

All the construction and construction related activities on site, until the contractor leaves the site.

b) Operational phase

All activities, including the operation and maintenance of the proposed development.

The activities arising from each of the relevant phases have been included in the tables. The assessment endeavours to identify activities, which require certain environmental management actions to mitigate the impacts arising from them. The criteria against which the activities were assessed are given in the next section.

9.2.1 Assessment criteria

The assessment of the impacts has been conducted according to a synthesis of criteria required by the Integrated Environmental Management procedure.

a) Nature of impact

This is an appraisal of the type of effect the proposed activity would have on the affected environmental component. The description should include what is being affected, and how.

b) Extent

The physical and spatial size of the impact. This is classified as:

i) Site

The impact could affect the whole, or a measurable portion of the above-mentioned properties.

ii) Local

The impacted area extends only as far as the activity, e.g. a footprint.

iii) Regional

The impact could affect the area including the neighbouring farms the transport routes and the adjoining towns.

c) Duration

The lifetime of the impact; this is measured in the context of the lifetime of the proposed base.

i) Short term

The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the phases.

ii) Medium term

The impact will last up to the end of the phases, where after it will be entirely negated.

iii) Long term

The impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter.

iv) Permanent

The only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient

d) Intensity

Is the impact destructive or benign? Does it destroy the impacted environment, alter its functioning, or slightly alter it? These are rated as:

i) Low

The impact alters the affected environment in such a way that the natural processes or functions are not affected.

ii) Medium

The affected environment is altered, but function and process continue, albeit in a modified way.

iii) High

Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project.

e) Probability

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:

i) Improbable

The possibility of the impact occurring is very low, due either to the circumstances, design or experience.

ii) Probable

There is a possibility that the impact will occur to the extent that provisions must be made therefore.

iii) Highly probable

It is most likely that the impacts will occur at some or other stage of the development. Plans must be drawn up before the undertaking of the activity.

iv) Definite

The impact will take place regardless of any prevention plans, and there can only be relied on mitigatory actions or contingency plans to contain the effect.

f) Determination of significance

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.

The classes are rated as follows:

i) No significance

The impact is not substantial and does not require any mitigatory action.

ii) Low

The impact is of little importance, but may require limited mitigation.

iii) Medium

The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.

iv) High

The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

In order to maintain consistency, all potential impacts to the environment will be listed in a table similar to the example shown below. The assessment criteria used in the table will be applied to all of the impacts and a brief descriptive review of the impacts and their significance provided in the text of the report. The overall significance of impacts will be determined by considering consequence and probability as prescribed in the **Table** overleaf.

9.2.2 Impact table

Development Phase	Impact: Pollution						
	Nature	Extent	Duration	Intensity	Probability	Significance	
						WM	WOM
Pre-construction	Pro-active planning	Site	Medium	Positive high	Probable	Low	Medium-
Construction	Increased: Water pollution	Regional	Medium	Low	Probable	Low	Medium
	Air pollution	Site	Medium	Low	Probable	Low	Medium
	Noise pollution	Site	Medium	Low	Probable	Low	Medium
	Visual pollution	Site	Medium	Low	Probable	Low	Medium
Operation	Noise	Regional	Long	Medium High	Probable	Low	Medium High

WM = With mitigation WOM = Without mitigation

9.3 Terms of Reference for Specialists

9.3.1 Geohydrological Assessment

The Scope of work will include the following key deliverables:

- Desktop assessment and investigation of the potential impacts of the proposed infrastructure on the geology and the surrounding water courses;
- Assessment of the potential impacts on the quality groundwater underlying the site;
- Assessment of potential for contamination from the proposed development that may impact on the quality of groundwater resources;
- Provide comment on the consequences of a potential change in groundwater quality; and
- Recommend appropriate mitigation measures to ameliorate the potential negative impact of the proposed infrastructure on the groundwater.

9.3.2 Ecological Assessment (Flora)

Detailed investigation into the status of the vegetation, including general floristic diversity; general status of vegetation; status of primary vegetation; habitat suitability for Red Data flora species; potential presence of Red Data flora species will be provided by the Biodiversity specialists. The scope of work will also include:

- Impacts that might result from the proposed development;
- Identify potential existence and impacts on the floral and faunal species;
- Provide mitigatory measures for the species identified; and
- Recommend other ecological studies based on the findings of the biodiversity study.

9.3.3 Wetland Assessment

The scope of work will include the following tasks:

- Identify the presence or absence of wetland as prescribed by the DWAF (2005) delineation guideline;
- Identify the outer edge of the wetland temporary zone,
- Classify the wetland areas according to the system proposed in the national wetlands inventory if relevant,
- Discuss wetland buffer zones;
- Indicate possible impacts on the wetland areas; and
- Recommend mitigation measures in order to limit the impact of the proposed development on the wetland areas.

9.3.4 Air Quality Assessment

The specialist air quality (assessment) is required to assess the impact the proposed Sebokeng Works will have on air quality and to provide management and mitigation measures where necessary: The Scope of work for the Air quality Assessment will include the following key deliverables:

- Desktop assessment and investigation of the potential impacts of the proposed infrastructure on the current odour levels and air quality;
- Assessment of the existing air quality levels and the predicted changes due to the upgrade of existing structures ;
- Assess the potential long term impacts of increasing odour levels to the neighbouring communities;
- Recommend long term monitoring programs for the monitoring of air quality; and
- Recommend appropriate mitigation measures to ameliorate the potential negative impact of the proposed infrastructure on the air quality on sites.

9.3.5 Aquatic Statement

The aquatic specialist study will focus on water quality aspects related to the upgrade of the Sebokeng Works in the Rietspruit and surrounding water courses, including groundwater contamination. The Scope of work will include the following key deliverables:

- Review the available information on surface water quality;
- Desktop assessment and preliminary investigation of the potential impacts of the proposed infrastructure on the aquatic environment;
- Assess and describe the present status and biodiversity of the surrounding aquatic ecosystem associated with the proposed development site;

- Assessment the potential impacts of the proposed infrastructures and associated activities on the quality of surrounding water courses;
- Identify any existing and potential future water quality problems, and recommend strategies for improvement;
- Determine the current and future operational impact on the aquatic environment; and
- Recommend appropriate mitigation measures to ameliorate the potential negative impact of the proposed infrastructure on the aquatic environment.

9.3.6 Heritage Impact Assessment

The heritage impact study will include:

- Desktop study during the project initiation phase;
- Site visit;
- Analysis of potential impacts;
- Development of recommended management actions; and
- Report compilation.

9.4 Public Participation Process

The public participation process for the EIA Phase will be based on the requirements of Section 54–57 of EIA Regulations, 2010.

A public commenting period will be held during the EIA Phase once the draft EIR is complete. The Draft EIR will contain an Issues/Response Report listing all issues raised, together with an indication of how they were addressed. This is aimed at allowing I&APs an opportunity to verify that the issues they raised during scoping phase have been addressed. The public and the I&APs that are registered for the project will be informed of the availability of the EIR for comment. The EIR will be placed in public places and at the Envirolution Consulting office. Should comments received during this period warrant an information-sharing meeting, and then this will be scheduled and held accordingly.

9.5 Contents of the Environmental Impact Report

The EIR shall comprise a minimum of the following sections:

- Table of Contents
- List of Tables
- List of Figures
- List of Appendices
- List of Abbreviations

Chapter 1: Introduction

This chapter will summarise the findings of the Scoping Phase including the project description and key issues identified during stakeholder and public consultation.

Chapter 2: Summary of Planning and Legislative Context

This chapter will address the following:

- Description of the study approach used: the information base, assumptions, limitations etc;
- The environmental planning and design aspects of the project. The relevant parts of the Scoping Report dealing with the planning context applicable to the development and the design options which were considered in order to ensure that the proposed project is technically feasible without significantly impacting on the bio-physical and socio-economic environment; and
- A summary of the legislative context relevant to the proposed development will be provided. Cognisance of applicable policies and guidelines, which may influence the proposed development, will be demonstrated.

Chapter 3: Summary of Public Participation

A summary of the entire public participation programme, which was implemented throughout the study, will be provided. The manner in which stakeholders and I&APs were consulted and comments elicited will be explained. An updated Comment and Response Report addressing any comments received will form part of the EIR.

Chapter 4: Summary of Specialist Studies and Description of the Environment

Description of the key elements of the socio-economic and bio-physical environment.

The findings of the Heritage Impact Assessment, aquatic ecological specialist study, terrestrial ecological study, Air Quality Impact Assessment, will be incorporated into this section, together with any relevant concerns raised during the stakeholder/public consultation period.

Chapter 5: Assessment Methodology, Impact description and Impact Assessment

Description of the possible impacts of the route determination and using the criteria provided above. The methodology, which was used to identify and assess the impacts associated with the development, will be explained in a manner, which is easily understood.

The assessment will highlight the potential development consequences if no measures are applied to mitigate the impacts.

Chapter 6: Recommended Mitigation Strategy

Description of management actions and mitigation measures that could be implemented to reduce potential negative impacts.

Description of the potential impacts of the route determination after the implementation of management actions and mitigation measures using the criteria provided above.

Chapter 7: Discussion

A discussion will be included in the report in order to provide a synthesis of the most relevant information contained in the various sections of the report. Emphasis will be placed on the most important conclusions derived from the impact assessment and the potential to apply effective mitigation.

Reference will be made to the measurable mitigation objectives and the monitoring criteria will, wherever possible, also be measurable.

Chapter 8: Environmental Impact Statement

A summary of the most important findings of the EIA will be provided in the form of an Environmental Impact Statement.

Chapter 9: Summary of Recommendations

Chapter 10: References

Chapter 11: Appendices

9.6 Draft Environmental Management Program

Based on the findings of the specialist studies, the assessment of alternatives and the assessment of impacts, an Environmental Management Program will be compiled in accordance with Regulation 33 of Government Notice R. 543. The EMPr will form an appendix to the EIR and will provide practical management measures to be introduced in order to ensure that impacts as a result of the proposed upgrades are minimised and prevented where possible.

9.7 Project Timeframes

The EIA Phase shall commence as soon as the acceptance of the Scoping Report and Plan of Study for EIA has been obtained from DEA. The EIA Phase is likely to be complete within 3 months of the commencement thereof.

10 CONCLUSIONS OF THE SCOPING REPORT

This report details the findings of a Scoping Study undertaken as part of the EIA process for the “on-site” activities for the proposed sewage infrastructure upgrade. The Scoping Study included a technical investigation and a public participation component to identify key issues associated with the project. The alternatives that were identified during the scoping phase will be evaluated during the EIA phase. These issues will need further assessment in the environmental impact assessment.

The following key conclusions are drawn from the scoping study:

- The proposed Sebokeng Works upgrade are strategically required to meet the demands of anticipated future increase in sewage wastewater quantities that would result from expected developments in Emfuleni Municipality;
- The increase in capacity of the Sebokeng will provide for more effective waste treatment in terms of treated effluent quality and present and future quantity;
- I&APs raised no objections to the proposed upgrade of the Sebokeng Works;
- The proposed development is not in an environmentally sensitive area from a biophysical and socio-economic perspective as the developments occurs in an already disturbed area; and
- Implementation adequate mitigation measures would reduce all potential impacts to a low significance.

11 WAY FORWARD

- This report serves as the Scoping Report for the proposed upgrade of the Sebokeng Works. Comments from I&APs on the Scoping Report will be incorporated into this report. This report has been prepared for submission to DEA for their consideration.

12 REFERENCES

1. David Hoare Consulting, August, **Preliminary Ecological input for the proposed upgrade of Sebokeng Works**, Pretoria
2. DEAT,2010, National Environmental Management, **Environmental Impact Assessment Regulations**, Department of Environmental Affairs and Tourism, Pretoria
3. Francis A. DiGiano, et al; **Membrane Biological Reactor Process**, Internet
4. Krüger/ Veolia **Water Solutions and technology**;
<http://www.kruger.dk/lib/krugeras/brochurer/796BrHxLLwaKu92q47EwvHtS.pdf>
5. Limosella Consulting, May 2010, **Preliminary Wetland Assessment Report for the proposed upgrade of Sebokeng Works**, Pretoria
6. Mzansi Africa Civils in collaboration with ERM., April 2010, **Hydrogeological Investigation Report for Sebokeng Works**, Ferndale, Johannesburg.