DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

THE LICENSING OF A GENERAL WASTE DISPOSAL SITE FOR THE MUSINA LOCAL MUNICIPALITY

REFERENCE: 12/4/10/8 – B/8/V4

Prepared for the Musina Local Municipality

November 2015

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THE LICENSING OF A GENERAL WASTE DISPOSAL SITE FOR THE MUSINA LOCAL MUNICIPALITY

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- Musina Local Municipality
- Limpopo Department of Economic Development, Environment and Tourism
- KBK Engineers (Pty) Ltd
- EB Consulting (Pty) Ltd
- The South African National Roads Agency Soc Limited

Nature of Comments Required

- To be included in final EIA document.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

BID – Background Information Document

CBD – Central Business District

DEA – Department of Environmental Affairs

DEDET - Limpopo Department of Economic Development, Environment and Tourism

EAP – Environmental Assessment Practitioner

EIA – Environmental Impact Assessment

EMPr - Environmental Management Programme

GCL - Geosynthetic Clay Liner

MLM – Musina Local Municipality

NEMA – National Environmental Management Act

NEMWA – National Environmental Management Waste Act

SAHRA – South African Heritage Resources Agency

SANRAL – The South African National Roads Agency Soc Limited

EXECUTIVE SUMMARY

INTRODUCTION

This Environmental Impact Assessment Report for the proposed licensing of a general waste disposal site for the Musina Local Municipality has been compiled for submission to the Limpopo Department of Economic Development, Environment and Tourism for aauthorisation. This report presents additional information to that given in the final Scoping Report and presents the findings of the assessment in respect of issues and concerns raised during the scoping phase of the EIA.

The findings are presented in the following reports:

- The Environmental Impact Assessment Report (this report), with several appendices;
- Four specialist reports, containing the findings of the specialist studies.

PROJECT DESCRIPTION

The activity entails a new application for the licensing of the existing general waste disposal site for the Musina Local Municipality. The footprint of the existing waste disposal site will be extended as a result of the alignment of the proposed Musina Ring road project that will traverse the waste disposal site.

In June 2012, an EIA was conducted for the proposed Musina Ring road project for the South African National Roads Agency Soc Limited (SANRAL). The initial preliminary design for the Musina ring road deviated from the N1 at km 0.5 and followed a general south to north alignment, bearing approximately 1,8 km west of the town CBD. This alignment crossed, amongst other, the Mactransco siding and would have severely affected their coal loading business. An alternative alignment was, therefore, designed further west of the initial alignment and the two alternatives were evaluated and compared to each other based on a number of criterion. It was finally decided to proceed with the alternative alignment further west of the original planned alignment.

The alternative alignment for the proposed Musina ring road deviates from the N1 at km 0,5 and the alignment will run west of the Police dog unit, between the dog unit and the police transition camp. The alignment then runs approximately 400 m further west of the original alignment, avoiding the Mactranso development. From km 4,7 it follows the original alignment in the road reserve past the Nancefield community and rejoins the N1 at km 8.1. This preferred alignment was authorized by the DEA on 28 March 2013.

Among the current infrastructure that will be influenced by moving the alignment of the Musina ring road approximately 400 m further west of the original planned alignment for the ring road, is the existing Musina landfill site. The proposed alignment cuts through the north eastern corner of the landfill site. It is the intension to remove the waste from the road reserve where the ring road will traverse the landfill site and move the waste onto the remainder of the existing landfill site. A volume of approximately 75 000 m^3 of waste has to

be moved from the N1 alignment onto the remainder of the site. The existing area currently used for disposal will, therefore, be filled to capacity and will receive an interim cap of 400 mm soil.

This will result in the landfill airspace being completely utilised and the site will be extended to the south west of the existing disposal area to allow for a continuation of the waste disposal in Musina. The entire planned site, inclusive of the remainder of the existing disposal area that will receive and interim cap, as well as the area to be extended to the south east of the existing site, is included in this waste application process.

The existing portion of the landfill site will be permanently capped and closed as per the capping design submitted as part of the Preliminary Design document, once the entire landfill, current and future is to be closed and capped in future.

The general waste is sourced from the town of Musina and surrounding areas. The site is located on a Portion of land situated north of Harper road on Rem of the farm Messina No.4 –MT. The physical address the facility is Rem of the Farm Messina No. No.4 –MT (north of Harper road 772m after Maseri Avenue). The waste will consist of general solid waste and an amount of 40000m² per annum will be handled (±75 tons or 75000 kg per day).

SANRAL will appoint the contractor to construct the interim cap at the existing waste disposal site as well as for the construction of the first cell of the expansion of the waste disposal site. The further expansion of the waste disposal site will be handled and built by the MLM in future.

An application form was submitted for licensing of the site at the Limpopo Department of Economic Development, Environment and Tourism (DEDET) in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). The listed activities identified in terms of the National Environmental Management: Waste Act (NEMWA), 2008 and the EIA Regulations, 2014 are:

- 29 November 2013, No. 37083, Category B (8): The disposal of general waste to land covering an area in excess of 200 m^2 and with a total capacity exceeding 25000 tons.
- 29 November 2013, No. 37083, Category A (2): The sorting, shredding, grinding crushing, screening or bailing of general waste at a facility that has an operational area in excess of 1000 m^2.

The listed activities identified in terms of the EIA Regulations, 2014 for this project is:

- R. 983, 4 December 2014, Item 27: The clearance of an area of 1 ha or more but less than 20 ha of indigenous vegetation.

ALTERNATIVES CONSIDERED

Alternative 1

Alternative 1 is situated approximately 500 north east of the existing Musina landfill site with an approximate area of 6 Ha available for the development of a landfill. The site was

identified and earmarked by the MLM in the past for the development of a new landfill site. The site is fairly close to the existing landfill and will, therefore, be familiar to the residents. Negatives of this site are that it is close to the old Harper mine's underground working as well as the Musina fault. Being on the side of a hill will also make the site visible from certain areas of Musina Town. This site location may also impact negatively on the southern portion of Nancefield when considering that the prevailing wind direction is from the east.

Alternative 2

Alternative 2 is the preferred alternative and encompasses the extension of the existing landfill towards the south west of the existing Musina landfill site. Approximately 6 Ha is available for the development of an extension to the landfill site. This development should have the least impact on the environment since the existing portion of the landfill will receive an interim cap, a piggy back liner be placed on the south western slope and the landfill extended towards south west of the existing site. Leachate and monitoring systems will then be on one area as opposed to if a new landfill is developed elsewhere. From a visibility point of view the landfill is well shielded from residential areas and is only visible from a farm house south west of the site.

Alternative 3

Alternative 3 is situated approximately 1,8 km south west of the existing Musina landfill site on a vacant piece of land. The municipality originally earmarked an area directly adjacent to the south west of this site for development of a landfill. There is, however a residential area bordering this site on the south western side and there is also a number of large baobab trees on this property. In consultation with the MLM it was decided to move to the area north east of this area identified by the MLM. This area also has a number of smaller baobab trees and has approximately 21 Ha available for landfilling. The site is fairly densely vegetated and a number of large baobabs are also visible in this area. Access will be from the extension of Harper road.

Alternative 4

Alternative 4 is situated approximately 3,8 km south west of the existing Musina landfill site on a vacant piece of land adjacent to a sport facility (which is shown as a baobab tree reserve). This area is however densely populated with baobab trees with a number of large trees visible. Access to site will be from the Harper road extension. There is a gravel access road for a lodge running from south east to north west. The lodge owners may also object to a landfill be placed next to their access road. The closest residential area is approximately 550 m east of the site. The site is also fairly flat sloping gently towards the north.

No-Go Alternative

Should the licencing of the site not be approved, the Musina ring road will not be able to be built on the current alignment approved by the DEA on 28 March 2013. The status quo will remain with the traffic travelling through the Musina CBD. The road through the Musina CBD

is already heavily congested during peak hour traffic. A capacity and geometric upgrade will, therefore, be required to improve capacity and traffic flow through the CBD. This option is however not favoured due to the following reasons:

- Upgrade and widening of the travel ways will be severely restricted due to existing road reserve width constraints. Widening of the road through the CBD would therefore involve the loss of street parking over certain sections of the CBD. The loss of street parking in the CBD will have a severe effect on business and trade in the CBD;
- This option will also not reduce air pollution and noise pollution in the CBD. It is anticipated that it will increase with the predicted increase in traffic volumes on the N1-29;
- This option will also not significantly improve traffic and pedestrian safety in the CBD;
- This will only be an interim solution with traffic volumes set to increase to such an extent over the next 10 years that the road through the CBD will again become congested;
- High volumes of heavy vehicle traffic will remain in the CBD reducing the quality of Musina's living environment.

As preferred option the proposed Musina ring road will provide an alternative route to through traffic, especially heavy vehicles currently using the existing N1 through the CBD of Musina. It will reduce the average daily truck traffic through the CBD of Musina. It will also provide improved traveling conditions and reduced traveling time.

Also, should the licencing of the site not be approved, the existing Musina general waste disposal site will remain illegal in terms of the legislation. It is proposed that the existing area currently used for disposal will be filled to capacity and receive an interim cap to allow for the Musina ring road project to continue. Should the expansion of the site to the south east not be approved, this will result in the landfill airspace being completely utilised and there will be no other area for a continuation of waste disposal in Musina.

MOTIVATION FOR NEED AND DESIRABILITY OF PROJECT

The project motivation is two-fold. Firstly, there is a great need for the Musina ring road due to the very high volumes of traffic within the town of Musina. The N1 serves as a development spine and the link between the Zimbabwe and the economic hub of Gauteng. The current N1 is not continuous and motorists have to drive through Musina. Traffic volumes on the National Route 1 through Musina have grown to such an extent that traffic congestion, pavement damage by heavy vehicles, noise and air pollution levels and traffic and pedestrian safety have become a major concern. The proposed project aims to provide a continuous route offering an improved, safer road for all road-users.

The objective of the Musina ring route will also be to:

- Stimulate the development of Musina to the west;
- Provide an alternative route to through traffic, especially heavy vehicles currently using the existing N1 through the CBD of Musina, and reduce the average daily truck traffic through the CBD of Musina.

- Provide improved travelling conditions and reduced travelling time to the north and south of the country;
- Reduce noise and air pollution levels within the Musina CBD and improve pedestrian and traffic safety within the city centre; and
- Improve safety with the construction of various interchanges to replace existing at-grade intersections along the route.

The second aspect regarding the motivation for the project is the licensing of the Musina waste disposal site. The site is currently unlicensed and the Musina Local Municipality wishes to bring the site in line with the relevant legislation. Also, the current waste disposal site has reached full capacity due to the alignment of the Musina ring road project and additional space had to be identified for future waste disposal. Alternative 2 is the preferred alternative and encompasses the extension of the existing landfill towards the south west of the existing Musina landfill site.

MOTIVATION FOR PREFERRED DEVELOPMENT FOOTPRINT

Alternative 2 is the preferred alternative (extension of the existing landfill towards the south west of the existing Musina landfill site). The entire planned site, inclusive of the remainder of the existing disposal area that will receive an interim cap, as well as the area to be extended to the south east of the existing site, is included in this waste application process. Approximately 6 Ha is available for the development of an extension to the landfill site.

This development should have the least impact on the environment since the existing portion of the landfill will receive an interim cap, a piggy back liner be placed on the south western slope and the landfill extended towards south west of the existing site. Leachate and monitoring systems will then be on one area as opposed to if a new landfill is developed elsewhere. From a visibility point of view the landfill is well shielded from residential areas and is only visible from a farm house south west of the site.

The impact of the proposed capping of the existing landfill site as well as the extension of the waste disposal site towards the south east of the existing waste disposal site on the environment were considered for the pre-construction, construction and operational phases. The necessary mitigation measures are consolidated in the form of an Environmental Management Programme (EMPr).

PROCESS TO DATE

The Limpopo Department of Economic Development, Environment and Tourism based in Polokwane is the relevant decision-making authority regarding this application.

The application form was lodged with the Limpopo Department of Economic Development, Environment and Tourism on 4 March 2015. A meeting was then held with officials of the Department on 22 May 2015 and the amendment to the application form was submitted to the Department on 29 June 2015. An acknowledgement of receipt from the Department was received on 3 July 2015. The reference number for the project is 12/4/10/8 – B/8/V4.

A site visit was undertaken with relevant environmental authorities, including the Limpopo Department of Economic Development, Environment and Tourism and the Musina Local Municipality on 17 July 2015. The draft Scoping report was submitted for public comment from 4 August to 4 September 2015 and the final Scoping report was submitted to the DEDET on 21 September 2015. The final Scoping report was accepted by the DEDET on 2 October 2015.

POSSIBLE PROJECT BENEFITS

The project could have certain possible benefits to the Limpopo Province:

Economic Benefits

Short term Employment Creation:
New employment opportunities will be created during the construction phase. This includes much needed employment for existing industry, i.e. contractors (especially local Small, Medium and Micro Enterprises from the previously disadvantaged communities), consultants and suppliers. Improved roads will contribute to the timely delivery of goods and an increase in tourism.

Long Term Employment Creation:
Sustainable employment will be created at the waste disposal facility.

Social Benefits

Employment:
The project could provide long and short term employment opportunities. The development could provide employment to unskilled labour especially local Small, Medium and Micro Enterprises from the previously disadvantaged communities.

Skills Development:
Skills development could occur with practical training in management and technical skills. This could also include unskilled labour training and the use of small and medium enterprises.

Living Environment:
The licensed waste disposal site could increase the quality of living for residents in the nearby residential area and to the town of Musina.

THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

The Environmental Impact Assessment (EIA) process will be guided by the environmental management principles and objectives of the National Environmental Management Act, 1998 (Act No. 107 of 1998), the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) and the EIA Regulations, 2014. The Environment Impact Assessment (EIA) regulations, 2014 were promulgated on 4 December 2014 in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and came into effect on 8 December 2014.

An application form was submitted for licensing of the site at the Limpopo Department of Economic Development, Environment and Tourism (DEDET) in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). The listed activities identified in terms of the National Environmental Management: Waste Act, 2008 and the EIA Regulations, 2014 are:

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- R. 983, 4 December 2014, Item 27: The clearance of an area of 1 ha or more but less than 20 ha of indigenous vegetation.

The EIA Regulations, 2014 prohibits the undertaking of listed activities until written authorisation is obtained from the Minister or the relevant delegated authority. Authorisation, which may be granted subject to conditions, would only be considered once the EIA has been undertaken and submitted for authorisation.

The National Environmental Management Act, 1998 (NEMA) furthermore provides a set of "environmental principles" that must guide organs of state in decision-making on matters relating to the environment. NEMA, 1998 states that the public must be actively involved with regard to decisions taken relating to the undertaking of identified activities. Public participation in the environmental sphere is a process of consultation between decision-makers and interested and affected parties.

The Impact Assessment process will be undertaken in two main stages, namely: Scoping phase including Plan of Study for EIA and EIA phase including specialist studies and Environmental Management Programme (EMPr). The EIA phase commenced with the acceptance of the final Scoping report by the DEDET on 2 October 2015.

ASSESSMENT OF SIGNIFICANCE – METHOD

During this phase, the specialists will evaluate all potential impacts on the environment in terms of the following in order to determine the significance of each impact:

- Probability (how likely is it that the impact will occur?)
- Consequence (how severe will the impact be?)
- Duration (how long will the impact last?)
- Extent of the impact (what size of the area will be affected?)

Thereafter, mitigation measures will be proposed in order to reduce or eliminate negative impacts and enhance positive impacts. The impact of the proposed project on the environment will be considered for the pre-construction, construction and operational phases.

The necessary mitigation measures will be consolidated in the form of an Environmental Management Programme (EMPr).

Assessment of significance – method

The significance of every environmental impact identified will be determined using the following approach:

In assessing the potential significance of an impact two aspects will be considered:

i) Occurrence
ii) Severity

Occurrence will be sub-divided into:

a) Probability of occurrence
b) Duration of occurrence

Severity will be sub-divided into:

a) Consequence (severity) of impact
b) Extent of impact

In order to assess each of these factors for each impact, ranking scales were employed as follows:

Probability:	**Duration:**
5 - Definite/don't know	5 – Permanent
4 - Highly probable	4 - Long-term (impact ceases after
3 - Medium probability	3 - Medium-term (5-15 years)
2 - Low probability	2 - Short-term (0-5 years)
1 – Improbable	1 – Immediate
0 – None	
Extent:	**Consequence:**
5 – International	10 - Very high/don't know
4 – National	8 - High
3 – Regional	6 - Moderate
2 – Local	4 - Low
1 - Site only	2 - Minor
	0 - None

Once the above factors had been ranked for each impact, the overall risk (environmental significance) of each impact will be assessed using the following formula:

$$SP = (consequence + duration + extent) \times probability$$

The maximum value is 100 significance points (SP). Environmental impacts will be rated as either of **High**, **Moderate** or **Low** significance on the following basis:

SP $\geq$ 60 indicates high environmental significance;
SP 30 $\geq$ 59 indicates moderate environmental significance;
SP < 30 indicates low environmental significance.

SUMMARY OF SPECIALIST INVESTIGATIONS

a. Geo-Technical Report

A Geo-Technical report was compiled by JB Consult dated 15 January 2015: “Report on the Geotechnical Investigation of the Musina Landfill Site, Limpopo”. The report contains the following conclusions and recommendations:

Conclusions

- The site is underlain by quartzite and gneiss that consists mainly of coarse sands.
- During the fieldwork 16 test pits were excavated using a 20t Excavator. Four (4) of the test pits were done to determine the depth of waste on the alignment of the planned new road cutting and 12 test pits were done to determine the viability of the extension of the existing site.
- This 4 test pits done in the waste varied in depth between 3.7 and 7.6m.
- Excavation of the waste material on site will classify as *soft* with possible *boulder excavations* on the southern edge of the waste body.
- No Perched water levels or leachate were present during the excavation of the waste test pits.
- The 12 test pits excavated on the western side of the site was done on areas that was, in some areas, completely striped of the topsoil and are probably used as a source for cover material for the existing site.
- Excavation of the material on site will classify as *intermediate to hard.*
- No clay material suitable for the use as liners material was encountered on site.
- No groundwater seepage was encountered during the investigation.
- Drainage of the site is to the south.
- The site can be re-shaped and cover is present on the northern eastern section of the site that can be used in the operation of the landfill site.

Recommendations

- The proposed extension of the existing site will be suited to develop a landfill site.
- Liner material for the construction of the landfill liners must be imported or a GCL could be used.
- Normal building foundations can be used on site. Allowable bearing pressure will be approximately 300 kPa.
- Site roads could be built with the material on site.
- Proper surface drainage needs to be designed and constructed to prevent excessive erosion.

b. Preliminary Design Report

Worley Parsons RSA was appointed to compile a preliminary design report for the Musina landfill site. EB Consulting was subsequently appointed as a sub-consultant to Worley

Parsons RSA who compiled the report titled “National Route 1 Section 29: The Construction of the Musina Ring-Road: Upgrading of the Musina Landfill - Preliminary Design Report” dated March 2015. The report includes the following design components for the final closure and capping of the entire waste disposal site:

Rehabilitation of the existing phase of the Musina landfill:

- Placing and shaping of waste;
- The composition of the cover required;
- Gas management below the cover;
- Surface water management above the cover;
- Diversion of surface water around the covered area;
- Management of possible leachate that may arise on the side slopes and toe of the proposed covered area; and
- Availability of soil to be used as part of capping material.

Development of the next phase of the Musina landfill:

- Development of future phases of the landfill;
- The composition of the liner design;
- Integration of new phase with existing phase;
- Leachate management systems;
- Storm water management systems;
- Contaminated water management systems; and
- Daily cover material.

The design components provide and demonstrate the mitigation of possible environmental impacts. The purpose of this Preliminary Design Report is to document the design criteria, assumptions and details of the proposed for approval by the authorities before detail design commences. Based on the preliminary capping design for the Musina landfill as shown in this report it is recommended that the preliminary design be submitted to the regulatory authorities (DEDET, Limpopo and DWS) with a view to obtain approval to enable the development of the detailed design.

c. Ecological Assessment

A Biodiversity Assessment (including Wetland Assessment & Terrestrial Ecology Assessment) was compiled by Johannes Oren Maree of Flori dated October 2015: “The Licensing of a General Waste Disposal Site for the Musina Local Municipality, Biodiversity Assessment (including Wetland Assessment & Terrestrial Ecology Assessment). Some mitigating measures are recommended during the construction and operational phases of the landfill site:

During construction

The following mitigating measures are recommended to assist in reducing potential impacts during the initial construction of the landfill site:

- No activities are allowed to overshoot the demarcated boundaries of the proposed landfill site. This includes topsoil or excess soil that might be pushed or stored (even on a temporary basis).
- Only one access road to be constructed to and from the landfill site.
- Roads to be maintained during construction to prevent erosion.
- Dust controls to be implemented
- Any and all temporary storage or dwelling facilities to be situated within the boundaries of the proposed landfill site.
- Proper and detailed stormwater management plan to be compiled and implemented. The implementation, which will prevent erosion, siltation of drainage lines outside of site, contamination of groundwater and contamination of drainage lines due to improper runoff.
- Baobab tree to be fenced prior to commencement with the construction phase of the landfill site.
- Rocky outcrops nearby to be partially fenced, or barriers erected to prevent traffic in terms of vehicles and people impacting on them.
- Fencing of landfill site to contain and limit wind-strewn litter in the form of plastics and papers.

Operation phase

The following mitigating measures are recommended for the operation phase:

- An ongoing maintenance plan must be put into action.
- Ongoing maintenance to include erosion control, roads, stormwater run-off.
- Fencing to be inspected and maintained.
- Erosion, which can lead to increased stormwater run-off, siltation, etc. needs to be corrected immediately if discovered.
- Areas such as the rocky outcrops, fenced baobab must be kept as off-limit areas to general traffic of people and vehicles.
- Proper management of landfill site such as compaction, covering, etc.

d. Heritage Assessment

A heritage assessment was undertaken by Dr J van Schalkwyk dated September 2015: “Cultural heritage impact assessment for the Licensing of a General Waste Disposal Site for the Musina Local Municipality, Limpopo Province”. The report contains the following conclusions and recommendations:

Conclusion and Recommendations

The aim of this survey was to locate, identify, evaluate and document sites, objects and structures of cultural significance found within the area of the proposed development, to assess the significance thereof and to consider alternatives and plans for the mitigation of any adverse impacts.

The cultural landscape qualities of the region essentially consist of a rural setup. In this the human occupation is made up of a pre-colonial element consisting of Stone Age and Iron

Age occupation, as well as a much later colonial (farmer) component. This was soon followed by the development of an urban centre, which not only served the surrounding farming communities, but also the copper mining activities that developed in the region.

As no sites, features or objects of cultural heritage significance were identified in the study area, there would be no impact from the proposed development.

Reasoned opinion as to whether the proposed activity should be authorised:

From a heritage point of view it is recommended that the proposed development be allowed to continue.

Conditions for inclusion in the environmental authorisation:

Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

ENVIRONMENAL IMPACT STATEMENT

The essence of all EIA processes is aimed at ensuring informed decision-making and environmental accountability. Furthermore, it assists in achieving environmentally sound and sustainable development. In terms of NEMA (No 107 of 1998), the commitment to sustainable development is evident in the provision that "development must be socially, environmentally and economically sustainable and requires the consideration of all relevant factors. In addition, the preventative principle is required to be applied, i.e. that the disturbance of ecosystems and loss of biological diversity are to be "…avoided, or … minimised and remedied" and "disturbance of the landscape and the nation's cultural heritage is avoided and where it cannot be altogether avoided is minimised and remedied".

Therefore negative impacts on the environment and on people's environmental rights in terms of the Constitution (Act 108 of 1996)) should be anticipated and prevented, and where they cannot be altogether prevented, they must be minimised and remedied in terms of "reasonable measures". "Reasonable measures" implies that "every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law and cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment".

The conclusions of this EIA are the result of comprehensive studies and specialist assessments, which were initiated in 2014. These studies were based on issues identified within the Scoping Phase, as well as the parallel process of public participation. The public participation process has been extensive, and every effort has been made to include representatives of all stakeholders in the study area.

The preceding chapters and the specialist reports provide a detailed assessment of the environmental impacts on specific components of the biophysical and social environments

associated with the proposed road project. This chapter concludes the EIA process by providing an evaluation of the environmental impacts of this proposal. In doing so, it draws on the information gathered as part of the EIA process, and the knowledge gained by the EAP during the course of undertaking the EIA.

Table 6 includes the environmental impacts identified in terms of their degrees of significance, both before and after mitigation.

The stated objectives of this report are as follows:

- To provide sufficient information concerning the proposed development to the authorities and to other I&APs for decision making purposes. This is aimed at ensuring that the environmental effects of the development are taken into consideration before decisions regarding its approval are taken.
- By so doing, to ensure that the development does not have a substantial detrimental effect on the environment.
- To demonstrate that sufficient consideration has been given to alternatives and potential impacts associated with the development.
- To indicate the manner in which I&APs have been afforded the opportunity to contribute to this project throughout the process followed, and to provide a final opportunity for comment and/or objection to the proposed project.

Every effort has been made to satisfy these objectives in this Final Environmental Impact Report. This has been achieved by means of the following:

- The Environmental Impact Assessment process was carried out according to the Environmental Impact Regulations, 2014;
- Information regarding information on the applicant and EAP, expertise of the EAP to perform the EIA, process to date and structure of the EIA report is presented in Chapter 1;
- The description of the project, project motivation, description of the receiving environment, project benefits, alternatives identified and comparative assessment of alternatives identified are presented in Chapter 2;
- The approach and methodology of the EIA study in the legislative context are presented in Chapter 3;
- The description of the environmental issues identified, methodology used in determining the significance of potential environmental impacts, assessment of the potential impacts and the summary and recommendation of specialist studies were presented in Chapter 4.
- Impacts were identified and assessed according to internationally and locally accepted criteria (Chapter 4). The methods used to assess the significance of potential impacts are clearly described for the readers' benefit. Mitigation measures have been proposed for most impacts, and the likely success of these measures has been evaluated;
- A public participation and consultation programme was undertaken. The manner in which these I&APs were afforded the opportunity to contribute, and the timeframe involved, is described in Chapter 5.

The primary findings of the above processes were that the proposed licensing of a general waste disposal site for the Musina Local Municipality would probably result in:

- No negative environmental impacts of high significance with mitigation;
- Potential positive impacts due to increased economic activity, employment and training and capacity building.

A comprehensive site analyses, including a specialist investigation by EB Consulting was undertaken during the Scoping phase to determine the optimal site alternative for this project. Alternative 2 is the preferred site option for the following reasons:

- The alternative 2 is a more cost effective alternative to the MLM as it is located approximately 2.5 km for the Musina CBD. The cost to transport the waste to the waste disposal site will lower than alternatives 3 and 4.
- There is enough space available for landfill development.
- Cover material is limited in the Musina area but according to the specialist waste consultant, Mr Elias Barnard of EB Consulting, there is a steady supply of cover material for the site in terms of building rubble entering the site. In addition to this, suitable spoil material from the construction work of the Musina ring road project will be stockpiled next to the site and on vacant land in the immediate vicinity of the site (as per approval by the Musina Municipality) for use as cover material as and when required. This will provide in an adequate supply of cover material for the site.
- There is access to the site from Harper road.
- The gradient of the site is suitable for landfill development.
- The land use is compatible with landfill development.
- The site is visually the most acceptable as only one farm house to the west of the site will be able to see the landfill site.
- The geology is deemed stable at the site.
- The ecological sensitivity is low at the site as it is already severely disturbed.
- There are no water courses or wetlands in close proximity to the site.
- The site is not within a radius of 3000 m of the end of an airport or landing strip.

Therefore, alternative 2 (preferred alternative) presents a better option than alternatives 1, 3 and 4 in terms of the parameters investigated.

A geo-technical investigation was conducted by JB Consulting (Jaco Bloem Consulting) as per the plan of study for EIA to determine the sub soil conditions around and on the existing Musina landfill site. The investigation included the excavation of test holes on the site in order to determine the geological layers and excavatebility of the material on site. This also provided information to determine the viability of the establishment of the landfill site. The recommendation was that the proposed extension of the existing site will be suited to develop a landfill site.

Following the geo-technical investigation, a preliminary design document was compiled by EB Consulting dated March 2015 as per the plan of study for EIA that addresses the interim capping of the existing Musina waste disposal site as well as the design for the expansion of the waste disposal site towards the south west of the existing Musina landfill site. The report

includes the preliminary design drawings and documentation for the formal development of the Musina landfill site and also demonstrates the mitigation of possible impacts due to the proposed capping design. This report also represents the closure report for the section of the existing landfill site that will receive an interim cap.

The ecological report undertaken by Flori, 2015 identified the following sensitive landscapes in the area:

- One boabab (*Adansonia digitata*) was observed close to Harper road at alternative 2 that will not be affected by the proposed expansion of the waste disposal site.
- Rocky outcrops containing *Boscia albitrunca* (Shephard's tree) and *Sclerocarya birrea* (Marula) were identified to the south west corner of the proposed expansion of the site. The infrastructure as designed was adjusted according to the plan by Flori to avoid the rocky outcrop area.
- The Musina Nature Reserve are in close proximity to the project but will not be affected by the proposed ring road.

According to the datasets obtained from Dept. Water & Sanitation (DWS), Dept. Environmental Affairs (DEA), SA National Biodiversity Institute (SANBI) and BirdLife SA, the study site does not fall within any priority areas. These priority areas include NFEPA areas, wetlands, important bird areas (IBAs), nature reserves, PAES areas, threatened ecosystems and threatened veldtypes. According to the Limpopo Conservation Plan v2 (2013) the study area is not situated within any, or immediately adjacent to any, critical biodiversity areas (CBAs). (Flori, 2015). According to the ecological specialist, Mr JO Maree of Flori, there is no fatal flaw as far as the proposed new landfill site is concerned and the project may go ahead.

There were no sites, features or objects of cultural heritage significance identified in the study area and therefore, no impact from the proposed development. From a heritage point of view it is recommended that the proposed development be allowed to continue. Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

In conclusion, it is believed the information contained in this report and the documentation attached hereto is sufficient to make a decision in respect of the activity applied for. This report covers the full suite of potential environmental issues related to the proposed development, and that sufficient information regarding the identification, assessment and potential mitigation of impacts has been presented to facilitate informed decision making by the appropriate authorities.

Based on the specialist studies undertaken within this EIA, both benefits and negative impacts are anticipated as a result of the proposed project. The findings of this EIR have highlighted these impacts and prioritised them in terms of high, medium or low significance. The negative environmental impacts that have been determined, need to be seen in balance with the assessed socio-economic benefits. It is therefore the reasoned opinion of the EAP that this project be authorized by the authorities with the condition that the mitigation measures as stipulated in the EMPr should be adhered to. The authorities need to use this

document to aid the decision- making process with respect to the future outcome of this proposal.

Conditions for Authorisation

a. The proposed mitigating measures recommended by Flori, 2015 to protect the baobab tree at alternative 2 and rocky outcrops need to be implemented.
b. Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.
c. The geo-hydrological and design reports need to be implemented as per the documents prepared by Jaco Bloem and EB Consulting.
d. An Environmental Control Officer must be on site for the implementation of the EMPr.
e. Quarterly environmental audits must be carried out by an independent environmental auditor.

CHAPTER 1

Provides information on the applicant and EAP, expertise of EAP to conduct an EIA process, location of activity, the description of the scope of the activity and the motivation for the need and desirability for the development.

1.1 INTRODUCTION

This Environmental Impact Report (EIR) for the proposed licensing of a general waste disposal site for the Musina Local Municipality has been compiled for submission to the Limpopo Department of Economic Development, Environment and Tourism for authorisation. This report presents additional information to that given in the final Scoping Report and presents the findings of the assessment in respect of issues and concerns raised during the scoping phase of the EIA.

The findings are presented in the following reports:

- The Environmental Impact Report (this report), with several appendices, including the Issues and Response report (indicating to stakeholders where their issues have been captured);

- Four specialist reports, containing the findings of the specialist studies.

1.2 PROJECT PROPONENT

The applicant for this project is the Musina Local Municipality:

Private Bag X611
Musina
0900
Tel: 015 534-6181
Fax: 086 612 6741
E-mail: johnsonm@limpopo.co.za

Contact person: Mr. Johnson Matshivha

1.3 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Chameleon Environmental Consultants
PO Box 11788
Silver Lakes
0054
Tel: +27(0)82 571 6920
Fax: 086 6855 080
E-Mail: ce.j@mwebbiz.co.za

Contact person: Dr Jenine Bothma

1.4. EXPERTISE OF EAP

Dr J Bothma has 25 years' experience in the environmental field. The managing member of Chameleon Environmental, Dr Bothma is also certified as an Environmental Assessment Practitioner with the Interim Certification Board for Environmental Assessment Practitioners of South Africa (EAPSA). Please refer to Appendix A for a Curriculum Vitae and Declaration of Independence.

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1.5 TERMS OF REFERENCE

Chameleon Environmental Consultants cc was appointed as EAP by KBK Engineers (Pty) Ltd to investigate the environmental impacts associated with this proposed project on behalf of the Musina Local Municipality.

The overall terms of reference for this report are to identify and advise the Musina Local Municipality about the potential environmental impacts (both positive and negative) of the interim capping of the exiting waste disposal site as well as the extension and development of the current waste disposal site towards the south west of the existing site and the implications for the design and environment.

1.6 LOCATION OF ACTIVITY

The general waste is sourced from the town of Musina. The site is located on a Portion of land situated north of harper road on Rem of the farm Messina No.4 –MT. The physical address the facility is Rem of the Farm Messina No. No.4 –MT (north of Harper road 772m after Maseri Avenue.). The waste will consist of general solid waste and an amount of 40000m² per annum will be handled (±75 tons or 75000 kg per day).

The 21 Digit Surveyor General code is: T0MT00000000000400000.

The Geographical coordinates of all external corner points of the preferred site is the following:

Number of corner	Latitude			Longitude		
……1……..	22°	21'	20.53"	30°	00'	43.73"
……2……..	22°	21'	14.46"	30°	00'	54.01"
……3……..	22°	21'	06.84"	30°	01'	01.85"
……4……..	22°	21'	07.69"	30°	01'	02.73"
……5……..	22°	21'	12.29"	30°	01'	01.67"
……6……..	22°	21'	16.85"	30°	01'	01.08"
……7……..	22°	21'	20.97"	30°	01'	00.90"
……8……..	22°	21'	27.22"	30°	00'	46.93"

Please find a locality plan and sensitivity plan attached as Appendix B.

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1.7 SCOPE OF PROPOSED ACTIVITY

The activity entails a new application for the licensing of the existing general waste disposal site for the Musina Local Municipality. The footprint of the existing waste disposal site will be extended as a result of the construction of the proposed Musina Ring road. In June 2012, an EIA was conducted for the proposed Musina Ring road project for the South African National Roads Agency Soc Limited (SANRAL). The initial preliminary design for the Musina ring road deviated from the N1 at km 0.5 and followed a general south to north alignment, bearing approximately 1,8 km west of the town CBD. This alignment crossed, amongst other, the Mactransco siding and would have severely affected their business. An alternative alignment was, therefore, designed further west of the initial alignment and the two alternatives were evaluated and compared to each other based on a number of criteria. It was finally decided to proceed with the alternative alignment further west of the original planned alignment. This preferred alignment was authorized by the DEA on 28 March 2013.

The alternative alignment for the proposed Musina ring road deviates from the N1 at km 0,5 and the alignment will run west of the Police dog unit, between the dog unit and the police transition camp. The alignment then runs approximately 400 m further west of the original alignment, avoiding the Mactranso development. From km 4,7 it follows the original alignment in the road reserve past the Nancefield community and rejoins the N1 at km 8.1.

Among the current infrastructure that will be influenced by moving the alignment of the Musina ring road approximately 400 m further west of the original planned alignment for the ring road, is the existing Musina landfill site. The proposed alignment cuts through the north eastern corner of the landfill site. It is the intension to remove the waste from the road reserve where the ring road will traverse the landfill site and move the waste onto the remainder of the existing landfill site. A volume of approximately 75 000 m^3 of waste has to be moved from the N1 alignment onto the remainder of the site. The existing area currently used for disposal will, therefore, be filled to capacity and will receive an interim cap of 400 mm soil. This portion of the landfill will be permanently capped and closed as per the capping design submitted as part of the Preliminary Design document, once the entire landfill, current and future is to be closed and capped in future.

This will result in the landfill airspace being completely utilised and the site will be extended to the south west of the existing disposal area to allow for a continuation of the waste disposal in Musina. The entire planned site, inclusive of the remainder of the existing disposal area that will receive an interim cap, as well as the area to be extended to the south east of the existing site, is included in this waste application process.

The general waste is sourced from the town of Musina and surrounding areas. The preferred site (alternative 2) is located on a Portion of land situated north of harper road on Rem of the farm Messina No.4 –MT. The physical address the facility is Rem of the Farm Messina No. No.4 –MT (north of Harper road 772m after Maseri Avenue.). The waste will consist of general solid waste and an amount of 40000m² per annum will be handled (±75 tons or 75000 kg per day).

SANRAL will appoint the contractor to construct the interim cap of the existing waste disposal site and the construction of the first cell of the extension of the waste disposal site. The further expansion of the waste disposal site will be handled and built by the MLM in future.

An application form was submitted for licensing of the site at the Limpopo Department of Economic Development, Environment and Tourism (DEDET) in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). The listed activities identified in terms of the National Environmental Management: Waste Act (NEMWA), 2008 and the EIA Regulations, 2014 are:

- 29 November 2013, No. 37083, Category B (8): The disposal of general waste to land covering an area in excess of 200 m2 and with a total capacity exceeding 25000 tons.
- 29 November 2013, No. 37083, Category A (2): The sorting, shredding, grinding crushing, screening or bailing of general waste at a facility that has an operational area in excess of 1000 m2.

The listed activities identified in terms of the EIA Regulations, 2014 for this project is:

- R. 983, 4 December 2014, Item 27: The clearance of an area of 1 ha or more but less than 20 ha of indigenous vegetation.

1.8 MOTIVATION FOR NEED AND DESIRABILITY OF PROJECT

The project motivation is two-fold. Firstly, there is a great need for the Musina ring road due to the very high volumes of traffic within the town of Musina. The N1 serves as a development spine and the link between the Zimbabwe and the economic hub of Gauteng. The current N1 is not continuous and motorists have to drive through Musina. Traffic volumes on the National Route 1 through Musina have grown to such an extent that traffic congestion, pavement damage by heavy vehicles, noise and air pollution levels and traffic and pedestrian safety have become a major concern. The proposed project aims to provide a continuous route offering an improved, safer road for all road-users.

The objective of the Musina ring route will also be to:

- Stimulate the development of Musina to the west;
- Provide an alternative route to through traffic, especially heavy vehicles currently using the existing N1 through the CBD of Musina, and reduce the average daily truck traffic through the CBD of Musina.
- Provide improved travelling conditions and reduced travelling time to the north and south of the country;
- Reduce noise and air pollution levels within the Musina CBD and improve pedestrian and traffic safety within the city centre; and
- Improve safety with the construction of various interchanges to replace existing at-grade intersections along the route.

The second aspect regarding the motivation for the project is the licensing of the Musina waste disposal site. The site is currently unlicensed and the Musina Local Municipality

wishes to bring the site in line with the relevant legislation. Also, the current waste disposal site has reached full capacity due to the alignment of the Musina ring road project and additional space had to be identified for future waste disposal. Alternative 2 is the preferred alternative and encompasses the extension of the existing landfill towards the south west of the existing Musina landfill site.

1.9 STRUCTURE OF THE FINAL EIA REPORT

This report consists of 6 Chapters, the contents are outlined in table 1.

Table 1: Structure of the Final EIA Report

CHAPTER	CONTENTS
Executive Summary	Provides an overview of the EIA Report.
Chapter 1	Provides information on the applicant and EAP, expertise of EAP to conduct an EIA process, location of activity, the description of the scope of the activity and the motivation for the need and desirability for the development
Chapter 2	Covers the approach and methodology of the EIA Study in the legislative context.
Chapter 3	Provides a description of the process followed to reach development footprint, development footprint alternatives investigated, motivation for preferred development footprint, environmental attributes associated with the development, potential impacts and risks identified and methodology used in determining and ranking potential impacts and risks identified.
Chapter 4	Provides a summary of specialist studies undertaken.
Chapter 5	Provides a description of the public participation process.
Chapter 6	Provides an Environmental Impact Statement for the proposed project that includes a summary of the key findings, any assumptions and limitations and conditions for authorisation.

CHAPTER 2

Covers the approach and methodology of the EIA Study in the legislative context.

2.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998)

The Environmental Impact Assessment (EIA) process will be guided by the environmental management principles and objectives of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and the EIA Regulations, 2014. The Environment Impact Assessment (EIA) regulations, 2014 were promulgated on 4 December 2014 in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and came into effect on 8 December 2014.

An application form was submitted for licensing of the site at the Limpopo Department of Economic Development, Environment and Tourism (DEDET) in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). The listed activities identified in terms of the EIA Regulations, 2014 are:

- R. 983, 4 December 2014, Item 27: The clearance of an area of 1 ha or more but less than 20 ha of indigenous vegetation.

The EIA Regulations, 2014 prohibits the undertaking of listed activities until written authorisation is obtained from the Minister or the relevant delegated authority. Authorisation, which may be granted subject to conditions, would only be considered once the EIA has been undertaken and submitted for authorisation.

The National Environmental Management Act, 1998 (NEMA) furthermore provides a set of “environmental principles” that must guide organs of state in decision-making on matters relating to the environment. NEMA, 1998 states that the public must be actively involved with regard to decisions taken relating to the undertaking of identified activities. Public participation in the environmental sphere is a process of consultation between decision-makers and interested and affected parties.

The Impact Assessment process will be undertaken in two main stages, namely: Scoping phase including Plan of Study for EIA and EIA phase including specialist studies and Environmental Management Programme (EMPr). The EIA phase commenced with the acceptance of the final Scoping report on 2 October 2015.

Areas needing further investigation, as raised in the scoping report, will be addressed in this Environmental Impact Report. The Environmental Impact Report (EIR) will be the culmination of the environmental impact assessment process contemplated in the EIA Regulations, 2014.

On completion of the EIR, the final EIR will be submitted to the DEDET, together with an Environmental Management Programme (EMPr), to review the results of the study and issue an environmental authorisation.

The EMPr would contain, amongst other, the following:

- Communication structures;
- Requirements for environmental training and awareness;
- Legislative Requirements;
- Guidelines for minimizing environmental impacts; and
- Monitoring and auditing procedures.

2.2 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008 (ACT 59 OF 2008)

An application form was submitted for licensing of the Musina waste disposal site at the Limpopo Department of Economic Development, Environment and Tourism (DEDET) in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

The listed activities identified in terms of the National Environmental Management: Waste Act (NEMWA), 2008 and the EIA Regulations, 2014 are:

- 29 November 2013, No. 37083, Category B (8): The disposal of general waste to land covering an area in excess of 200 m^2 and with a total capacity exceeding 25000 tons.
- 29 November 2013, No. 37083, Category A (2): The sorting, shredding, grinding crushing, screening or bailing of general waste at a facility that has an operational area in excess of 1000 m^2.

The Standard for Disposal of Waste to Landfill in terms of Notice 615 of 2012 i.to the NEMWA was also applied in this EIA process.

2.3 THE CONSTITUTION

In terms of the Constitution, 1996 (Act No. 108 of 1996) everyone has the right to an environment that is not harmful to their health or well-being. The Constitution states that government must act reasonably in order to protect the environment by preventing pollution and promoting conservation and sustainable development and further, that it must secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development (Section 24).

2.4 NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998)

The Minimum Requirements for Waste Disposal by Landfill (DWAF 1998) was applied to this EIA process. The Department of Water and Sanitation have provided comment on the proposed interim capping of the existing waste disposal site and the extension of the site towards the south east.

2.5 NATIONAL HERITAGE RESOURCES ACT, 1999 (ACT NO. 25 OF 1999)

Section 38 of the National Heritage Resources Act 25, 1999 states that the relevant South African Heritage Resource Agency (SAHRA) office must at the very earliest stages of

initiating the following development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development:

(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
(b) the construction of a bridge or similar structure exceeding 50m in length;
(c) any development or other activity which will change the character of a site-
    (i) exceeding 5 000 m^2 in extent; or
    (ii) involving three or more existing erven or subdivisions thereof; or
    (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
    (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or
(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

2.6 NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT, 2004 (ACT NO. 10 0F 2004)

Provincial and National legislation will be evaluated in order to provide lists of any plant or animal species that have protected status. The most important legislation is the National Environmental Management: Biodiversity Act (Act No 10 of 2004).

2.7 CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT NO. 43 OF 1983)

A list of naturalised plant species, indicating which are declared weeds or alien invasive species will be included in the specialist ecological study according to the Conservation of Agricultural Resources Act (Act No. 43 of 1983) as amended in 2001.

2.8 OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO. 85 OF 1993)

The OHS Act provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery during the operational phase of the waste disposal site.

2.9 COMPLIANCE WITH LEGISLATION

This EIA study complies with the necessary legislation and promotes the principles of the Integrated Environmental Procedure (IEM) stipulated in NEMA, which include:

- Conducting an EIA in terms of the EIA Regulations, 2014;
- Compliance with the environmental legislations as listed by means of separate applications, where necessary;

- Thorough, unbiased impact assessment;
- Promoting informed decision- making;
- Giving a broad meaning to the term “environment”;
- Using a transparent and participatory approach;
- Aiming to mitigate negative impacts and enhance positive aspects;
- Providing the opportunity for public and specialist input in the decision making process;
- That all parties understand the implications associated with the study;
- As much discussion and debate as needed, and
- Evaluation of significance of negative impacts and positive impacts fully in next phase.

2.10 GUIDELINES

The following guidelines were consulted during this EIA process:

Department of Environmental Affairs Departmental Guidelines under www.environment.gov.za, 2010.

CHAPTER 3

Provides a description of the process followed to reach development footprint, development footprint alternatives investigated, motivation for preferred development footprint, environmental attributes associated with the development, potential impacts and risks identified and methodology used in determining and ranking potential impacts and risks identified.

3.1 PROCESS TO DATE

The application form was lodged with the Limpopo Department of Economic Development, Environment and Tourism on 4 March 2015. The Limpopo Department of Economic Development, Environment and Tourism based in Polokwane is the relevant decision-making authority regarding this application. A meeting was then held with officials of the Department on 22 May 2015 and the amendment to the application form was submitted to the Department on 29 June 2015. An acknowledgement of receipt from the Department was received on 3 July 2015. The reference number for the project is 12/4/10/8 – B/8/V4.

A site visit was undertaken with relevant environmental authorities, including the Limpopo Department of Economic Development, Environment and Tourism and the Musina Local Municipality on 17 July 2015. The draft Scoping report was submitted for public comment from 4 August to 4 September 2015 and the final Scoping report was submitted to the DEDET on 21 September 2015. The final Scoping report was accepted by the DEDET on 2 October 2015.

3.2 DEVELOPMENT FOOTPRINT ALTERNATIVE CONSIDERED

Four site alternatives were identified and discussed in the specialist report by EB Consulting attached as Appendix C and the Scoping report accepted by the DEDET on 2 October 2015. Please refer to Table 2: Site Selection Matrix from the report conducted by EB Consulting, 2014. The table includes a comparative assessment for the four alternative sites identified with the following criteria:

- Economic Criteria;
- Environmental Criteria; and
- Public Acceptance Criteria.

Plan for all the alternatives considered are included in Appendix D.

The site alternatives identified are the following:

3.2.1 Alternative 1

Alternative 1 is situated approximately 500 north east of the existing Musina landfill site with an approximate area of 6 Ha available for the development of a landfill. The site was identified and earmarked by the MLM in the past for the development of a new landfill site. The site is fairly close to the existing landfill and will, therefore, be familiar to the residents.

Negatives of this site are that it is close to the old Harper mine's underground working as well as the Musina fault. Being on the side of a hill will also make the site visible from certain areas of Musina Town. This site location may also impact negatively on the southern portion of Nancefield when considering that the prevailing wind direction is from the east.

3.2.2 Alternative 2

Alternative 2 is the preferred alternative and encompasses the extension of the existing landfill towards the south west of the existing Musina landfill site. Approximately 6 Ha is available for the development of an extension to the landfill site. This development should have the least impact on the environment since the existing portion of the landfill can receive an interim cap, a piggy back liner be placed on the south western slope and the landfill extended towards south west of the existing site. Leachate and monitoring systems will then be on one area as opposed to if a new landfill is developed elsewhere. From a visibility point of view the landfill is well shielded from residential areas and is only visible from a farm house south west of the site.

3.2.3 Alternative 3

Alternative 3 is situated approximately 1,8 km south west of the existing Musina landfill site on a vacant piece of land. The municipality originally earmarked an area directly adjacent to the south west of this site for development of a landfill. There is, however a residential area bordering this site on the south western side and there is also a number of large baobab trees on this property. In consultation with the MLM it was decided to move to the area north east of this area identified by the MLM. This area also has a number of smaller baobab trees and has approximately 21 Ha available for landfilling. The site is fairly densely vegetated and a number of large baobabs are also visible in this area. Access will be from the extension of Harper road.

3.2.4 Alternative 4

Alternative 4 is situated approximately 3,8 km south west of the existing Musina landfill site on a vacant piece of land adjacent to a sport facility (which is shown as a baobab tree reserve). This area is however densely populated with baobab trees with a number of large trees visible. Access to site will be from the Harper road extension. There is a gravel access road for a lodge running from south east to north west. The lodge owners may also object to a landfill be placed next to their access road. The closest residential area is approximately 550 m east of the site. The site is also fairly flat sloping gently towards the north.

3.2.5 No-Go Alternative

Should the licencing of the site not be approved, the Musina ring road will not be able to be built on the current alignment approved by the DEA on 28 March 2013. The status quo will remain with the traffic travelling through the Musina CBD. The road through the Musina CBD is already heavily congested during peak hour traffic. A capacity and geometric upgrade will, therefore, be required to improve capacity and traffic flow through the CBD. This option is however not favoured due to the following reasons:

- Upgrade and widening of the travel ways will be severely restricted due to existing road reserve width constraints. Widening of the road through the CBD would therefore involve the loss of street parking over certain sections of the CBD. The loss of street parking in the CBD will have a severe effect on business and trade in the CBD;
- This option will also not reduce air pollution and noise pollution in the CBD. It is anticipated that it will increase with the predicted increase in traffic volumes on the N1-29;
- This option will also not significantly improve traffic and pedestrian safety in the CBD;
- This will only be an interim solution with traffic volumes set to increase to such an extent over the next 10 years that the road through the CBD will again become congested;
- High volumes of heavy vehicle traffic will remain in the CBD reducing the quality of Musina's living environment.

As preferred option the proposed Musina ring road will provide an alternative route to through traffic, especially heavy vehicles currently using the existing N1 through the CBD of Musina. It will reduce the average daily truck traffic through the CBD of Musina. It will also provide improved traveling conditions and reduced traveling time.

Also, should the licensing of the site not be approved, the existing Musina general waste disposal site will remain illegal in terms of the legislation. It is proposed that the existing area currently used for disposal will be filled to capacity and receive an interim cap to allow for the Musina ring road project to continue. Should the expansion of the site to the south east not be approved, this will result in the landfill airspace being completely utilised and there will be no other area for a continuation of waste disposal in Musina.

3.3 MOTIVATION FOR PREFERRED DEVELOPMENT FOOTPRINT

Alternative 2 is the preferred alternative (extension of the existing landfill towards the south west of the existing Musina landfill site). The entire planned site, inclusive of the remainder of the existing disposal area that will receive an interim cap, as well as the area to be extended to the south east of the existing site, is included in this waste application process. Approximately 6 Ha is available for the development of an extension to the landfill site.

This development should have the least impact on the environment since the existing portion of the landfill will receive an interim cap, a piggy back liner will be placed on the south western slope and the landfill extended towards south west of the existing site. Leachate and monitoring systems will then be on one area as opposed to if a new landfill is developed elsewhere. From a visibility point of view the landfill is well shielded from residential areas and is only visible from a farm house south west of the site.

The impact of the proposed capping of the existing landfill site as well as the extension of the waste disposal site towards the south east of the existing waste disposal site on the environment were considered for the pre-construction, construction and operational phases. The necessary mitigation measures are consolidated in the form of an Environmental Management Programme (EMPr).

Table 2: Site Selection Matrix (Source: EB Consulting, 2014)

Alternative Site	Economic Criteria				Environmental Criteria				Public Acceptance Criteria				Total score
	Distance	Size	Access	Ease of development	Environmental impact	Surface water	Soil depth	Setting	Familiar with site	Distance	Visibility	Wind	
Site 1	5/5	3/5	4/5	3/5	3/5	5/5	1/5	3/5	4/5	5/5	3/5	3/5	42/60
	Closest to collection areas	6 Ha	From Harper road	Brown field site, close to undermined area and Musina fault	Undermined area and Musina fault	No Impact	Only shallow excavation possible	Visible from residential area, already a brown field site	Close to existing site	Closest to collection residential areas	Visible from residential area	East, may impact southern portion of Nancefield	Ranking 2
Site 2	4/5	3/5	5/5	5/5	5/5	5/5	1/5	4/5	5/5	4/5	4/5	4/5	49/60
	2nd	6 Ha	Use existing access	Already brown field, next to existing site	Next to existing site, infrastructure can be shared	No Impact	Only shallow excavation possible	Visible from farm house, already a brown fields site	Next to existing site	2nd	Visible from farm house	East, may impact southern tip of Nancefield	Ranking 1
Site 3	2/5	5/5	4/5	3/5	1/5	5/5	1/5	2/5	3/5	3/5	3/5	5/5	37/60
	3rd	20 Ha	From Harper road	Green field site	Baobab trees	No Impact	Only shallow excavation possible	Visible from residential area, green field site	Some distance from existing site	3rd	Visible from residential area	East, no impact	Ranking 3
Site 4	1/5	5/5	3/5	3/5	1/5	5/5	1/5	2/5	2/5	2/5	3/5	5/5	33/55
	4th	20 Ha	From harper extension, new access to site to be constructed	Green field site	Baobab trees	No Impact	Only shallow excavation possible	Visible from residential area, green field site	Furthest from existing site	4th	Visible from residential area	East, no impact	Ranking 4

3.4 ENVIRONMENT ATTRIBUTES ASSOCIATED WITH DEVELOPMENT FOOTPRINT

a. Topography

The proposed site lies at an elevation of approximately to 800m above mean sea level and the area comprise mostly undulating to very irregular plains, with some hills (Mucina and Rutherford, 2006).

b. Climate

Musina is dry and normally receives around 246mm of rain per year, with most rainfall occurring during mid-summer. The winters are very dry with usually no rainfall at all in June, while the wettest month is normally January (average of 55mm). Rainfall is usually very sporadic and limited, with short-lived downpours.

The area is hot to very hot, with average midday temperatures for Musina ranging from 23.9°C in July to 32.1°C in January. The region is the coldest during July when the mercury drops to 7.6°C on average during the night. The study area is frost-free (Flori, 2015).

c. Land-Use

The study site is situated southwest on the outskirts of Musina Town along Harper Road. The current land-use of the study area is open bushveld (expansion of existing site). However, approximately 40% (2,6ha) of the study area has been seriously modified by topsoil removal, excavations, etc. the remaining 3,8ha is fairly undisturbed to moderately disturbed open bushveld. The disturbed area is in the northern half of the study area. The total area of the proposed landfill extension is about 6,4ha. The land-use immediately west / northwest of the study site (expansion of existing site) is currently used for the town's main dump site (landfill site). High density urbanisation (Nancefield) is approximately 1km north of the study site, while the immediate area around the study site is open, unused bushveld (Flori, 2015).

d. Geology and Soils

The stratigraphy in the area consists mainly of the Limpopo Belt Basin, the Karoo Sequence and quanternary deposits. The study area is located on the central zone of the Limpopo Mobile Belt Basin consisting of a complex of assortment of meta sediments interlayered with quartzo – feldspathic gneisses and mafic rocks i.e the Beit Bridge complex.

The main geological feature in the study area is the Musina fault running in a north easterly to south westerly direction just south of Nancefield. Soils are variable consisting of red/brown to dark clays, sandy soils (deep to moderately deep) to Glenrosa and Mispah soils in on or just below surface. Copper deposits are also evident in some places (EB Consulting, 2014).

e. Flora and Fauna

The study area is found within the Savanna biome and the Mopane bioregion. The veldtypes in which the study area is situated are Musina Mopane Bushveld and Limpopo Ridge Bushveld (Mucina & Rutherford, 2006).

Alternative sites 1 and 2 identified are severely disturbed sites. No protected trees species are found directly within the study area. One baobab tree (*Adansonia digitata*) was identified at alternative 2 but it could be avoided as it is situated next to Harper road. Soil is currently removed from the area identified as alternative 2 by the MLM. A number of baobab trees were identified on the sites for alternatives 3 and 4.

Other, protected trees observed during field investigations were all situated on the rocky outcrops, which are outside of the proposed boundaries of the landfill site. The protected trees observed are listed in the table below:

Table 3: Protected Trees Observed

Botanical Name	Common Name	Preferred Habitat
Adansonia digitata	Baobab	Associated with hot, dry areas. Prefers well-drained sandy soils and rocky areas
Boscia albitrunca	Shepherd's tree	Associated with hot, dry areas. Prefers well-drained sandy soils and rocky areas
Sclerocarya birrea	Marula	Grows in most soil types at medium- to low-altitudes. Seldom found in dense stands. Common bushveld tree in warmer regions

No priority plant species or red data (endangered & threatened) species were observed during field investigations, except for Baobab, Marula and Shepherd's trees. According to the SANBI database, no red data species have been recorded in the study area.

No large- or medium-sized mammals or other wild faunal species were observed during field investigations, with the exception of some bird species and lizard species. No large active burrows and droppings were observed that might belong to animals such as mongoose, warthogs, polecat or porcupine (Flori, 2015 included in Appendix C).

f. Surface and Ground Water

The proximity of any water resource was calculated in the specialist report conducted by EB Consulting. The distance of 2360m from a perennial river to alternative 2 is not considered as close proximity and the perennial river will not be affected by the proposed site. The non-perennial stream located at 240 m from alternative 2 is not considered a significant water body and was merely shown for reference purposes. The lowest point of the landfill (alternative 2) is also at least 7m higher than the stream and any non-perennial runoff in the stream will, therefore, not impact on the landfill. Any contaminated runoff from the landfill will be contained in the contaminated water dam on site and this stream will, therefore, not be impacted by the proposed waste disposal site. A geo-hydrological was undertaken on the site identified for the preferred alternative (alternative 2) to assess any groundwater issues in the area that will be affected by the proposed development.

There is no surface water in close proximity to alternative sites 1, 3 and 4 identified.

g. Air Quality

The region where the existing waste disposal site is located towards the west of the town of Musina is sparsely populated and the air quality fairly good. The gaseous emissions as a result of increased traffic volumes as a result of the ring road project may affect the air quality, although the relative close proximity to Musina may render the effect negligible.

It was noted that the existing waste disposal site is not management properly as the waste is not covered daily with appropriate amounts of top soil. As a result of this, the waste is able to be blown towards the areas surrounding the waste disposal site.

h. Noise

The area currently is typically relatively quiet during the day and experience low levels of night time noise. Rural areas generally have a background (ambient) noise level of 35dB at night and 45dB during the day, which is considerably lower than in the average urban area (65dB during the day). These areas are thus susceptible to noise intrusion, particularly at night. Existing sources of noise would include road traffic using the secondary and farm roads in the area. The proposed area that is earmarked for the expansion of the landfill site towards the south east of the existing landfill site, is located fairly close to the existing Harper road.

The ring road will cut through the north eastern corner of the existing waste disposal site in the future which will increase the noise levels significantly.

i. Visual

The existing waste disposal site in the area already poses a severe visual impact in the area. It is envisaged that the proposed expansion of the existing waste disposal site would have a positive visual effect in the area as the site would not be visible from the houses near the site. Also, the capping of the exiting waste disposal site could have a positive impact on the visual impact of the waste disposal site as this is the area that is visible from the houses near the site and it is anticipated that the capping will have a positive impact on the aesthetic impact in the area.

j. Sensitive Landscapes

The following sensitive landscapes were indentified in the area:

- One boabab (*Adansonia digitata*) was observed close to Harper road at alternative 2 that will not be affected by the proposed expansion of the waste disposal site.
- Rocky outcrops containing *Boscia albitrunca* and *Sclerocarya birrea* were identified by the specialist ecological consultant to the south west corner of the proposed expansion of the site. The infrastructure as designed was adjusted according to the plan by Flori to avoid the rocky outcrop area.

- The Musina Nature Reserve are in close proximity to the project but will not be affected by the proposed ring road.

According to the datasets obtained from Dept. Water & Sanitation (DWS), Dept. Environmental Affairs (DEA), SA National Biodiversity Institute (SANBI) and BirdLife SA, the study site does not fall within any priority areas. These priority areas include NFEPA areas, wetlands, important bird areas (IBAs), nature reserves, PAES areas, threatened ecosystems and threatened veldtypes. According to the Limpopo Conservation Plan v2 (2013) the study area is not situated within any, or immediately adjacent to any, critical biodiversity areas (CBAs) (Flori, 2015).

k. Sites of Archaeological and Cultural Interests

No sites of archaeoligical or cultural interest were found at the site following the specialist assessment conducted by Dr J van Schalkwyk.

l. Cumulative Impacts

The cumulative impacts associated with the project could be the following:

- Additional traffic on the local roads during the construction period;
- The influx of people in the area as a result of the construction period;
- Additional water and electricity supply to the area.

m. Fatal Flaws

According to the ecological specialist, Mr JO Maree of Flori, there is no fatal flaw as far as the proposed new landfill site is concerned and the project may go ahead. However, the proposed mitigating measures recommended to protect the baobab tree and rocky outcrops need to be implemented.

3.5 POSSIBLE ENVIRONMENTAL ISSUES AND RISKS IDENTIFIED

The specialist study undertaken by EB Consulting dated October 2014 (Appendix C), identified possible fatal flaws and risks pertaining to the four site alternatives investigated.

The possible fatal flaws and risks identified for each alternative are the following:

a) Proximity of residential/collection areas;
b) Distance from CBD (economic implication of transporting waste to waste disposal site);
c) Visual impact;
d) Area available for landfill development;
e) Available cover material;
f) Access to site;
g) Gradient of the site;
h) Compatible land use;
i) Geology of the site (stability of the site);

j) Ecological sensitivity;
k) Within a 3000 m radius of the end of an airport or landing strip;
l) In close proximity of any water body;
m) Adjacent or above an aquifer;
n) Heritage areas in close proximity to the sites;
o) Within or close to an unstable area.
p) Area characterised by shallow bedrock with little soil cover;
q) Areas where buffer zones not possible;
r) Nearest land use;
s) Areas upwind from residential area in the prevailing wind direction; and
t) Servitudes within area.

Please refer to the table 2 in the report included in Appendix C.

3.6 METHODOLOGY USED IN DETERMINING SIGNIFICANCE OF POTENTIAL IMPACTS

Please refer to table 3 for the impact assessment undertaken. Table 3 include the significance, consequence, extent, duration and probability of the impacts including the degree to which these impacts could be mitigated. The table also includes the methodology used in determining the consequence, extent, duration and probability of potential environmental impacts and risks associated with the alternatives investigated.

The significance of every environmental impact identified was determined using the following approach:

In assessing the potential significance of an impact two aspects will be considered:
i) Occurrence
ii) Severity
Occurrence will be sub-divided into:
c) Probability of occurrence
d) Duration of occurrence
Severity will be sub-divided into:
c) Consequence (severity) of impact
d) Extent of impact

In order to assess each of these factors for each impact, ranking scales were employed as follows:

Table 4: Assessment Criteria

Probability:	**Duration:**
5 - Definite/don't know	5 - Permanent
4 - Highly probable	4 - Long-term (impact ceases after
3 - Medium probability	3 - Medium-term (5-15 years)
2 - Low probability	2 - Short-term (0-5 years)
1 – Improbable	1 - Immediate
0 – None	
Extent:	**Consequence:**
5 – International	10 - Very high/don't know
4 – National	8 - High
3 – Regional	6 - Moderate
2 – Local	4 - Low
1 - Site only	2 - Minor
	0 - None

Once the above factors had been ranked for each impact, the overall risk (environmental significance) of each impact will be assessed using the following formula:

$$SP = (consequence + duration + extent) \times probability$$

The maximum value is 100 significance points (SP). Environmental impacts will be rated as either of **High**, **Moderate** or **Low** significance on the following basis:

SP $\geq$ 60 indicates high environmental significance;
SP 30 $\geq$ 59 indicates moderate environmental significance;
SP < 30 indicates low environmental significance.

3.7 POSSIBLE PROJECT BENEFITS

The project could have certain possible benefits to the Limpopo Province:

Licensing of Current Waste disposal site

The site is currently unlicensed and the Musina Local Municipality wishes to bring the site in line with the relevant legislation.

Economic Benefits

Short term Employment Creation:
New employment opportunities will be created during the construction phase. This includes much needed employment for existing industry, i.e. contractors (especially local Small, Medium and Micro Enterprises from the previously disadvantaged communities), consultants and suppliers.

Long Term Employment Creation:
Sustainable employment will be created by the waste disposal facility.

Social Benefits

Employment:
The project could provide long and short term employment opportunities. The development could provide employment to unskilled labour especially local Small, Medium and Micro Enterprises from the previously disadvantaged communities.

Skills Development:
Skills development could occur with practical training in management and technical skills. This could also include unskilled labour training and the use of small and medium enterprises.

Living Environment:
The licensed waste disposal site could increase the quality of living for residents in the nearby residential area and to the town of Musina.

3.8 POSSIBLE NEGATIVE IMPACTS

The following possible environmental impacts were identified with regard to the project. All the impact could either be avoided, managed or mitigated to acceptable standards. The impact assessment and mitigation measures are included in table 6 included in Appendix F.

a) Ecological sensitivity: The development of the waste disposal site will result in the local clearing of vegetation. One baobab tree is present at alternative 2 that need to be protected. Also there are rocky outcrops in close proximity to alternative 2 that needs to be avoided.
b) Distance from CBD (economic implication of transporting waste to waste disposal site): The distance of the waste disposal site to the Musina CBD determines the cost of transporting the waste to the waste disposal site.
c) Visual impact: The establishment of a waste disposal site will have a visual impact on a localized basis, as the site will be in contrast to surrounding area.
d) Air quality and noise: The development of the waste disposal site could have a local impact on air quality and noise in the immediate vicinity of the site.
e) Heritage areas in close proximity to the sites: The stripping of soil could uncover a site of cultural or archaeological importance.
f) Geology and groundwater: The suitability of the geology and groundwater could have a local impact on the development of a waste disposal site.
g) Aquatic systems: There is no surface water that will be impacted on by any of the alternatives investigated.

CHAPTER 4

Provides a summary of specialist studies undertaken for the project.

4.1 SUMMARY OF SPECIALIST INVESTIGATIONS

4.1.1 Geo-technical Investigation

A geo-technical investigation was conducted by JB Consulting (Jaco Bloem Consulting) to determine the sub soil conditions around and on the existing Musina landfill site. The investigation included the excavation of test holes on the site in order to determine the geological layers and excavatebility of the material on site. This also provided information to determine the viability of the establishment of the landfill site.

The purpose of the geo-technical investigation was as follows:

a. Existing Landfill Site

Determine the depth of the waste body on the alignment of the proposed Musina ring road.

b. Extension of the Existing Landfill Site

- Determine excavatebility of the in-situ material on site;
- Identify geotechnical constraints for the establishment of a Class B Landfill facility;
- Comment on possible liner quality material on site; and
- Give recommendations as to any other special precaution to be taken, including shallow ground water seepage.

The conclusions and recommendations of the report are as follows:

Conclusions

- The site is underlain by quartzite and gneiss that consists mainly of coarse sands.
- During the fieldwork 16 test pits were excavated using a 20t Excavator. Four (4) of the test pits were done to determine the depth of waste on the alignment of the planned new road cutting and 12 test pits were done to determine the viability of the extension of the existing site.
- This 4 test pits done in the waste varied in depth between 3.7 and 7.6m.
- Excavation of the waste material on site will classify as soft with possible boulder excavations on the southern edge of the waste body.
- No perched water levels or leachate were present during the excavation of the waste test pits.
- The 12 test pits excavated on the western side of the site was done on areas that was, in some areas, completely striped of the topsoil and are probably used as a source for cover material for the existing site.
- Excavation of the material on site will classify as intermediate to hard.

- No clay material suitable for the use as liners material was encountered on site.
- No groundwater seepage was encountered during the investigation.
- Drainage of the site is to the south.
- The site can be re-shaped and cover is present on the northern eastern section of the site that can be used in the operation of the landfill site

Recommendations

- The proposed extension of the existing site will be suited to develop a landfill site.
- Liner material for the construction of the landfill liners must be imported or a Geosynthetic Clay Liner (GCL) could be used.
- Normal building foundations can be used on site. Allowable bearing pressure will be approximately 300 kPa.
- Site roads could be built with the material on site.
- Proper surface drainage needs to be designed and constructed to prevent excessive erosion.

Please find the full report included in Appendix C.

4.1.2 Preliminary Design Report

Worley Parsons RSA was appointed to compile a preliminary design report for the Musina landfill site. EB Consulting was subsequently appointed as a sub-consultant to Worley Parsons RSA who compiled the report titled “National Route 1 Section 29: The Construction of the Musina Ring-Road: Upgrading of the Musina Landfill - Preliminary Design Report” dated March 2015. The report includes the following design components for the final closure and capping of the entire waste disposal site:

<u>Rehabilitation of the existing phase of the Musina landfill</u>:

- Placing and shaping of waste;
- The composition of the cover required;
- Gas management below the cover;
- Surface water management above the cover;
- Diversion of surface water around the covered area;
- Management of possible leachate that may arise on the side slopes and toe of the proposed covered area; and
- Availability of soil to be used as part of capping material.

<u>Development of the next phase of the Musina landfill</u>:

- Development of future phases of the landfill;
- The composition of the liner design;
- Integration of new phase with existing phase;
- Leachate management systems;
- Storm water management systems;
- Contaminated water management systems; and
- Daily cover material.

The design components provide and demonstrate the mitigation of possible environmental impacts. The purpose of this Preliminary Design Report is to document the design criteria, assumptions and details of the proposed for approval by the authorities before detail design commences. Based on the preliminary capping design for the Musina landfill as shown in this report it is recommended that the preliminary design be submitted to the regulatory authorities (DEDET, Limpopo and DWS) with a view to obtain approval to enable the development of the detailed design.

This report also represents the closure report for the section of the existing landfill site that will receive an interim cap. The design document is included in Appendix C.

4.1.3 Ecological Assessment

A Biodiversity Assessment (including Wetland Assessment & Terrestrial Ecology Assessment) was compiled by Johannes Oren Maree of Flori dated October 2015: "The Licensing of a General Waste Disposal Site for the Musina Local Municipality, Biodiversity Assessment (including Wetland Assessment & Terrestrial Ecology Assessment). Some mitigating measures are recommended during the construction and operational phases of the landfill site (Appendix C):

During construction

The following mitigating measures are recommended to assist in reducing potential impacts during the initial construction of the landfill site:

- No activities are allowed to overshoot the demarcated boundaries of the proposed landfill site. This includes topsoil or excess soil that might be pushed or stored (even on a temporary basis).
- Only one access road to be constructed to and from the landfill site.
- Roads to be maintained during construction to prevent erosion.
- Dust controls to be implemented
- Any and all temporary storage or dwelling facilities to be situated within the boundaries of the proposed landfill site.
- Proper and detailed stormwater management plan to be compiled and implemented. The implementation, which will prevent erosion, siltation of drainage lines outside of site, contamination of groundwater and contamination of drainage lines due to improper runoff.
- Baobab tree to be fenced prior to commencement with the construction phase of the landfill site.
- Rocky outcrops nearby to be partially fenced, or barriers erected to prevent traffic in terms of vehicles and people impacting on them.
- Fencing of landfill site to contain and limit wind-strewn litter in the form of plastics and papers.

Operation phase

The following mitigating measures are recommended for the operation phase:

- An ongoing maintenance plan must be put into action.
- Ongoing maintenance to include erosion control, roads, stormwater run-off.
- Fencing to be inspected and maintained.
- Erosion, which can lead to increased stormwater run-off, siltation, etc. needs to be corrected immediately if discovered.
- Areas such as the rocky outcrops, fenced baobab must be kept as off-limit areas to general traffic of people and vehicles.
- Proper management of landfill site such as compaction, covering, etc.

These mitigation measures are included in the EMPr for the project.

4.1.4 Heritage Assessment

A heritage assessment was undertaken by Dr J van Schalkwyk dated September 2015: "Cultural heritage impact assessment for the Licensing of a General Waste Disposal Site for the Musina Local Municipality, Limpopo Province". The report contains the following conclusions and recommendations (Appendix C):

Conclusion and Recommendations

The aim of this survey was to locate, identify, evaluate and document sites, objects and structures of cultural significance found within the area of the proposed development, to assess the significance thereof and to consider alternatives and plans for the mitigation of any adverse impacts.

The cultural landscape qualities of the region essentially consist of a rural setup. In this the human occupation is made up of a pre-colonial element consisting of Stone Age and Iron Age occupation, as well as a much later colonial (farmer) component. This was soon followed by the development of an urban centre, which not only served the surrounding farming communities, but also the copper mining activities that developed in the region.

As no sites, features or objects of cultural heritage significance were identified in the study area, there would be no impact from the proposed development.

Reasoned opinion as to whether the proposed activity should be authorised:

From a heritage point of view it is recommended that the proposed development be allowed to continue.

Conditions for inclusion in the environmental authorisation:

Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

4.1.5 Closure Report

The preliminary design document compiled by EB Consulting dated March 2015, also represents the closure report for the section of the existing landfill site that will receive an interim cap. The design document is included in Appendix C.

CHAPTER 5

Provides a description of the public participation process followed.

5.1 BACKGROUND TO PUBLIC PARTICIPATION PROCESS

A public participation process was undertaken in accordance with the EIA Regulations, 2014. Public Participation is an essential component of the EIA process. The process of public involvement at this stage encourages interested and affected parties (I&APs) to contribute their comments during the planning and design phases of the proposed development.

The public participation and communication process aims to identify issues in order to maximise the social and environmental benefits, and to minimise the social and environmental costs of the proposed project. Interested and affected parties (I&APs - any person that has an interest in the project or are directly affected), were consulted and afforded the opportunity to participate. I&APs were informed and involved in the project from the outset in order to promote participation and transparency.

5.2 OBJECTIVES OF THE PUBLIC PARTICIPATION PROCESS

The public participation and communication process aims to identify issues in order to maximise the social and environmental benefits, and to minimise the social and environmental costs of the proposed project. Interested and affected parties (I&APs) were consulted and afforded the opportunity to participate. I&APs were informed and involved in the project from the outset in order to promote participation and transparency.

The key objectives of the public participation process are to:

- Identify the complete range of I&APs, and inform them about the proposed development and its implications;
- Understand and clearly document all issues, underlying concerns and suggestions raised by I&APs;
- An exchange of information relevant to the proposed project through Background Information Documents (BID), consultations and newspaper advertisements.
- The development of an understanding with regards to the broader project objectives and goals and knowledge of the project; and
- The identification of issues and concerns with regards to all potential alternatives associated with the proposed development.

5.3 METHODOLOGY

a. Proof of Site Notice

Site notifications in English in A2 format requesting comments or objections were placed at the site on 17 July 2015 and on the public notice board at the Spar in Irvin street as well as on the window at the Musina Local Municipality at 21 Irvin street, Musina. Please find the proof of site notice erected in Appendix G.

b. Written Notices Issued

Letters were written to the following Interested and Affected Parties and either faxed or e-mailed:

- Department of Water and Sanitation
- South African Heritage Resources Agency (posted on webpage)
- Musina Local Municipality
- Relevant Ward Councillor

A Background Information Document was compiled and distributed to identified I&APs. The main objective of the BID was to introduce I&APs to the proposed project.

The notices and BID are included in Appendix E.

c. Proof of Newspaper Advertisement

In accordance with the EIA Regulations, 2014 an advertisement was placed requesting I&APs to register their interest in the project. An advertisement was placed in the Northern Gazette of 13 July 2015 and in the Limpopo Mirror of 17 July 2015. Copies of the advertisements are included in Appendix E.

d. Communications to and from Local Municipality and other Service Providers

Table 5: Notification letters and BID documents were e-mailed to the following people

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
Mr Johnson Matshivha	Musina Local Municipality Upington Municipal Manager	Tel: 015 534-6181/0820405343 Fax: 086 515 1328 E-mail: johnsonm@musina.gov.za
Mrs Randani Kutama	Musina Local Municipality Manager: Waste Management, Parks and Recreation	Tel: 015 534-6100/0760622177 Fax: 086 612 6741 E-mail: rendanik@musina.gov.za
Clr Sewani Kaunda	Ward 6	Tel: 082 626 3992 E-mail: jc.kaunda@gmail.com

The letters are included in Appendix E.

e. Meeting with Municipality

A meeting was held on 3 October 2014 with Ms Rendani Kutama of the Musina Local Municipality to introduce the project to her. A site visit was also undertaken to the various alternatives investigated in the Scoping report. The minutes of the meeting is attached in Appendix E.

f. Open Day

An open day was held on 30 July 2015 at the Old Chambers at the Municipal Offices, 21 Irwin Street, from 12:00 until 16:00. A letter was e-mailed to all the I&APs on the list to inform them about the open day. A team was present with the necessary plans to interact with the public on any issues raised.

g. Meeting with Landowners

Meetings were held with current landowners opposite the existing landfill site north of Harper road in Maseri Avenue on 30 July 2015. No objections were received.

h. Comments and Response Report

A comments and response report was drafted that included all the issues raised by the Interested and/or Affected Parties as well as the responses to the issues raised. The Comments and Response report is included in Annexure 6.

i. Comments from I&APs on draft EIA Report

As required by legislation, a review process of 30 days was undertaken from 20 November 2015 to 20 December 2015. However, due to the school holiday season, the comments period was extended to 20 January 2016 affording I&APs an opportunity to comment on the draft EIA Report.

The draft EIA Report was available for comment at the Public Library in 21 Irvin Street Musina, Tel: 015 534-6168.

j. Copy of the register of I&APs

A list of key I&APs was generated during the environmental process. A list of the registered I&APs is attached as Appendix E.

k. Summary of Issues Raised

The following issues were raised by I&APs:

- Mr Carel Schmahl of Lepelle Water indicated that the current General Manager: Operations and Maintenance (Lepelle Northern Water), Mr. Ahuiwi Netshidaulu, as well as our Environmental Officer, Me. Gillian Moloto, should be added to the mailing list. The e-mail addresses were added.
- Lt Col Hennie Davel of the Department of Defence that after carefully studying your proposed document for the relocation of the Musina Landfill site, it became clear that it

will not affect the business of the Military nor will it impact on our property in the Musina area.

- Mr CP Kloppers, the landowner on Portion 49 Remainder Musina 4-MT opposite the existing Musina waste disposal site indicated that the municipality started the dumping site in 1996 without any public participation. The response was that it is recognized that the current site is not legal in terms of the legislation and that this EIA process aims to legalise the site.
- Department of Water and Sanitation (T.W. Phuluwa): Letter dated 21 September 2015 included in Appendix E.

CHAPTER 6

Provides an Environmental Impact Statement for the proposed project that includes a summary of the key findings, any assumptions and limitations and conditions for authorisation.

6.1 SUMMARY OF KEY FINDINGS

The essence of all EIA processes is aimed at ensuring informed decision-making and environmental accountability. Furthermore, it assists in achieving environmentally sound and sustainable development. In terms of NEMA (No 107 of 1998), the commitment to sustainable development is evident in the provision that "development must be socially, environmentally and economically sustainable and requires the consideration of all relevant factors. In addition, the preventative principle is required to be applied, i.e. that the disturbance of ecosystems and loss of biological diversity are to be "…avoided, or … minimised and remedied" and "disturbance of the landscape and the nation's cultural heritage is avoided and where it cannot be altogether avoided is minimised and remedied".

Therefore negative impacts on the environment and on people's environmental rights in terms of the Constitution (Act 108 of 1996)) should be anticipated and prevented, and where they cannot be altogether prevented, they must be minimised and remedied in terms of "reasonable measures". "Reasonable measures" implies that "every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law and cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment".

The conclusions of this EIA are the result of comprehensive studies and specialist assessments, which were initiated in 2014. These studies were based on issues identified within the Scoping Phase, as well as the parallel process of public participation. The public participation process has been extensive, and every effort has been made to include representatives of all stakeholders in the study area.

The preceding chapters and the specialist reports provide a detailed assessment of the environmental impacts on specific components of the biophysical and social environments associated with the proposed road project. This chapter concludes the EIA process by providing an evaluation of the environmental impacts of this proposal. In doing so, it draws on the information gathered as part of the EIA process, and the knowledge gained by the EAP during the course of undertaking the EIA.

Table 6 includes the environmental impacts identified in terms of their degrees of significance, both before and after mitigation.

The stated objectives of this report are as follows:

- To provide sufficient information concerning the proposed development to the authorities and to other I&APs for decision making purposes. This is aimed at ensuring that the environmental effects of the development are taken into consideration before decisions regarding its approval are taken.
- By so doing, to ensure that the development does not have a substantial detrimental effect on the environment.
- To demonstrate that sufficient consideration has been given to alternatives and potential impacts associated with the development.
- To indicate the manner in which I&APs have been afforded the opportunity to contribute to this project throughout the process followed, and to provide a final opportunity for comment and/or objection to the proposed project.

Every effort has been made to satisfy these objectives in this Final Environmental Impact Report. This has been achieved by means of the following:

- The Environmental Impact Assessment process was carried out according to the Environmental Impact Regulations, 2014;
- Information regarding information on the applicant and EAP, expertise of the EAP to perform the EIA, process to date and structure of the EIA report is presented in Chapter 1;
- The description of the project, project motivation, description of the receiving environment, project benefits, alternatives identified and comparative assessment of alternatives identified are presented in Chapter 2;
- The approach and methodology of the EIA study in the legislative context are presented in Chapter 3;
- The description of the environmental issues identified, methodology used in determining the significance of potential environmental impacts, assessment of the potential impacts and the summary and recommendation of specialist studies were presented in Chapter 4.
- Impacts were identified and assessed according to internationally and locally accepted criteria (Chapter 4). The methods used to assess the significance of potential impacts are clearly described for the readers' benefit. Mitigation measures have been proposed for most impacts, and the likely success of these measures has been evaluated;
- A public participation and consultation programme was undertaken. The manner in which these I&APs were afforded the opportunity to contribute, and the timeframe involved, is described in Chapter 5.

The primary findings of the above processes were that the proposed licensing of a general waste disposal site for the Musina Local Municipality would probably result in:

- No negative environmental impacts of high significance with mitigation;
- Potential positive impacts due to increased economic activity, employment and training and capacity building.

A comprehensive site analyses, including a specialist investigation by EB Consulting was undertaken during the Scoping phase to determine the optimal site alternative for this project. Alternative 2 is the preferred site option for the following reasons:

- The alternative 2 is a more cost effective alternative to the MLM as it is located approximately 2.5 km for the Musina CBD. The cost to transport the waste to the waste disposal site will lower than alternatives 3 and 4.
- There is enough space available for landfill development.
- Cover material is limited in the Musina area but according to the specialist waste consultant, Mr Elias Barnard of EB Consulting, there is a steady supply of cover material for the site in terms of building rubble entering the site. In addition to this, suitable spoil material from the construction work of the Musina ring road project will be stockpiled next to the site and on vacant land in the immediate vicinity of the site (as per approval by the Musina Municipality) for use as cover material as and when required. This will provide in an adequate supply of cover material for the site.
- There is access to the site from Harper road.
- The gradient of the site is suitable for landfill development.
- The land use is compatible with landfill development.
- The site is visually the most acceptable as only one farm house to the west of the site will be able to see the landfill site.
- The geology is deemed stable at the site.
- The ecological sensitivity is low at the site as it is already severely disturbed.
- There are no water courses or wetlands in close proximity to the site.
- The site is not within a radius of 3000 m of the end of an airport or landing strip.

Therefore, alternative 2 (preferred alternative) presents a better option than alternatives 1, 3 and 4 in terms of the parameters investigated.

A geo-technical investigation was conducted by JB Consulting (Jaco Bloem Consulting) as per the plan of study for EIA to determine the sub soil conditions around and on the existing Musina landfill site. The investigation included the excavation of test holes on the site in order to determine the geological layers and excavateability of the material on site. This also provided information to determine the viability of the establishment of the landfill site. The recommendation was that the proposed extension of the existing site will be suited to develop a landfill site.

Following the geo-technical investigation, a preliminary design document was compiled by EB Consulting dated March 2015 as per the plan of study for EIA that addresses the interim capping of the existing Musina waste disposal site as well as the design for the expansion of the waste disposal site towards the south west of the existing Musina landfill site. The report includes the preliminary design drawings and documentation for the formal development of the Musina landfill site and also demonstrates the mitigation of possible impacts due to the proposed capping design. This report also represents the closure report for the section of the existing landfill site that will receive an interim cap.

The ecological report undertaken by Flori, 2015 identified the following sensitive landscapes in the area:

- One boabab (*Adansonia digitata*) was observed close to Harper road at alternative 2 that will not be affected by the proposed expansion of the waste disposal site.
- Rocky outcrops containing *Boscia albitrunca* (Shephard's tree) and *Sclerocarya birrea* (Marula) were identified to the south west corner of the proposed expansion of the site. The infrastructure as designed was adjusted according to the plan by Flori to avoid the rocky outcrop area.
- The Musina Nature Reserve are in close proximity to the project but will not be affected by the proposed ring road.

According to the datasets obtained from Dept. Water & Sanitation (DWS), Dept. Environmental Affairs (DEA), SA National Biodiversity Institute (SANBI) and BirdLife SA, the study site does not fall within any priority areas. These priority areas include NFEPA areas, wetlands, important bird areas (IBAs), nature reserves, PAES areas, threatened ecosystems and threatened veldtypes. According to the Limpopo Conservation Plan v2 (2013) the study area is not situated within any, or immediately adjacent to any, critical biodiversity areas (CBAs) (Flori, 2015).

There were no sites, features or objects of cultural heritage significance identified in the study area and therefore, no impact from the proposed development. From a heritage point of view it is recommended that the proposed development be allowed to continue. Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

According to the ecological specialist, Mr JO Maree of Flori, there is no fatal flaw as far as the proposed new landfill site is concerned and the project may go ahead.

In conclusion, it is believed the information contained in this report and the documentation attached hereto is sufficient to make a decision in respect of the activity applied for. This report covers the full suite of potential environmental issues related to the proposed development, and that sufficient information regarding the identification, assessment and potential mitigation of impacts has been presented to facilitate informed decision making by the appropriate authorities.

Based on the specialist studies undertaken within this EIA, both benefits and negative impacts are anticipated as a result of the proposed project. The findings of this EIR have highlighted these impacts and prioritised them in terms of high, medium or low significance. The negative environmental impacts that have been determined, need to be seen in balance with the assessed socio-economic benefits. It is therefore the reasoned opinion of the EAP that this project be authorized by the authorities with the condition that the mitigation measures as stipulated in the EMPr should be adhered to. The authorities need to use this document to aid the decision- making process with respect to the future outcome of this proposal.

6.2 ASSUMPTIONS AND LIMITATIONS

a. Assumptions

The following assumptions have been made for the purposes of this report:

- All information received from sources contributing to this project is correct;
- That Musina Local Municipality would consider the recommendations derived from this study, and
- That the Limpopo Department of Economic Development, Environment and Tourism will be the decision making authority with regard to this project.

b. Limitations

No known limitations.

6.3 CONDITIONS FOR AUTHORISATION

a. The proposed mitigating measures recommended by Flori, 2015 to protect the baobab tree at alternative 2 and rocky outcrops need to be implemented.
b. Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.
c. The geo-hydrological and design reports need to be implemented as per the documents prepared by Jaco Bloem and EB Consulting.
d. An Environmental Control Officer must be on site for the implementation of the EMPr.
e. Quarterly environmental audits must be carried out by an independent environmental auditor.

Dr Josephine Bothma_____
NAME OF EAP

_____ _2015-11-17_____
SIGNATURE OF EAP DATE

APPENDICES

APPENDIX A – CURRICULUM VITAE AND DECLARATION OF EAP

APPENDIX B – LOCALITY AND SENSITIVITY PLANS

APPENDIX C – SPECIALIST STUDIES

APPENDIX D – ALTERNATIVES CONSIDERED

APPENDIX E – PUBLIC PARTICIPATION PROCESS

APPENDIX F – IMPACT ASSESSMENT

APPENDIX G – PHOTOGRAPHS

APPENDIX H – ENVIRONMENTAL MANAGEMENT PROGRAMME