Environmental Consultants

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIR)

in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

File Reference Number:

12/9/11/L191209103034/6/N

Project Title:

The proposed construction of mortality tanks for the treatment of trimmings, offcuts, condemned material, rendered blood from abattoir processing and feedlot mortalities (animal carcasses) at E&T Feedlot & Abattoir, on portion 8 of the farm Potgietershoop, Mkhondo (Piet Retief), Mpumalanga.

Prepared for:

Mr. Eugene van Schalkwyk
E&T Abattoir & Vleisfabriek BK
P.O. Box 237
Piet Retief
2380
Cell: +27 (0)82 809 7927
Fax: +27 (0)86 516 4658
Email: etvleis@lando.co.za

Compiled by:

Ecoleges Environmental Consultants

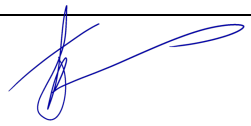
Machadodorp office
2 Generaal Street
Machadodorp
P.O. Box 516
Machadodorp
1170
Cell: +27 (0)83 644-7179
Fax: +27 (0)86 697 9316
Email: philip@ecoleges.co.za
Website: www.ecoleges.co.za

White River office
Office 8, Macadamia Offices
69 Impala Street, White River
P.O. Box 9005
Nelspruit
1200

July 2020
(Draft)

DOCUMENT CONTROL

Table 1: Document Control.

PHASE	AUTHOR	STATUS	REVISION	DISTRIBUTED ON	SIGNATURE
Author	Philip Radford	Draft for comment	00	06 April 2020	
Revision	Philip Radford	Draft	01	22nd April 2020	
Approved	Justin Bowers	Draft	02	21 July 2020	

Checklist
Content of Environmental Impact Assessment Report in terms of Appendix 3 of the EIA Regulations, 2014

"(1) An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include, and must include- "	
(a) details of-	**Page/Appendix**
(iii) the EAP who prepared the report; and	Page 18
(iv) the expertise of the EAP, including a curriculum vitae;	Page 19
(b) the location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including:	☑
(i) the 21-digit Surveyor General code of each cadastral land parcel;	Page 21
(ii) where available, the physical address and farm name;	Page 21
(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	**N/A**
(c) a plan which locates the proposed activity or activities applied for as well as the associated structures at an appropriate scale, or, if it is-	**Appendix A**
(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	**N/A**
(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	**N/A**
(d) a description of the scope of the proposed activity, including-	☑
(i) all listed and specified activities triggered and being applied for; and	Page 22
(ii) a description of the associated structures and infrastructure related to the development;	Page 23
(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;	Page 32
(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report;	Page 49
(g) a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;	Page 77
(h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including:	☑
(i) details of the development footprint alternatives considered;	Page 78
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Page 91

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Page 92 **Appendix C**
(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Page 95
(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	**Appendix D**
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	**Appendix D**
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	**Appendix D**
(viii) the possible mitigation measures that could be applied and level of residual risk;	**Appendix F**
(ix) if no alternative development footprints for the activity were investigated, the motivation for not considering such; and	Section H (i) Page 78
(x) a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;	Page 103
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including—	**Appendix D**
(i) a description of the aspects to be assessed as part of the environmental impact assessment process;	**Appendix D**
(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	**Appendix D**
(j) an assessment of each identified potentially significant impact and risk, including—	**Appendix D**
(i) cumulative impacts;	Page 105
(ii) the nature, significance and consequences of the impact and risk;	☑
(iii) the extent and duration of the impact and risk;	☑
(iv) the probability of the impact and risk occurring;	☑
(v) the degree to which the impact and risk can be reversed;	☑

(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and	☑
(vii) the degree to which the impact and risk can be mitigated;	☑
(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	Page 108
(l) an environmental impact statement which contains—	Page 110
(i) a summary of the key findings of the environmental impact assessment:	**Appendix D**
(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and	**Appendix A**
(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	**Appendix D** Section H (i)
(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	**Appendix F**
(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	**Appendix F**
(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	**N/A**
(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	**Appendix D**
(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Page 111
(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	**N/A**
(s) an undertaking under oath or affirmation by the EAP in relation to-	Page 113
(i) the correctness of the information provided in the report;	☑
(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and	☑
(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and	☑

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	☑
(t) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	**N/A**
(u) an indication of any deviation from the approved scoping report, including the plan of study, including—	**N/A**
(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and	**N/A**
(ii) a motivation for the deviation;	**N/A**
(v) any specific information that may be required by the competent authority; and	**N/A**
(w) any other matter required in terms of section 24(4)(a) and (b) of the Act.	**N/A**

(2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a scoping report, the requirements as indicated in such notice will apply.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

EXECTIVE SUMMARY

The project proponent, E&T Abattoir has appointed Ecoleges Environmental Consultants as the Environmental Assessment Practitioner (EAP), to undertake an application for a Waste Management Licence (WML). The proposed mortality tanks will trigger listed waste management activities under the National Environmental Management: Waste Act (Act 59 of 2008). The application and draft Scoping Report were submitted at the same time (22 November 2019) to the National Department of Environmental Affairs (DEA) as the designated Competent Authority for hazardous waste.

The E&T Abattoir is an existing facility located on the outskirts of Mkhondo (Piet Retief), Mpumalanga Province. It is situated upslope of a tributary to the Assegai River within the W51D quaternary catchment. The abattoir facility is associated and adjacent to a feedlot, which is the principle supplier of cattle to the abattoir for processing.

To provide context to the proposed activity, it is necessary to provide the background to the reason why a Waste Management Licence (WML) is required. After the Inkomati-Usuthu Catchment Management Agency (IUCMA) identified several deviations from the National Water Act (NWA, Act 36 of 1998) at the E&T Abattoir, there has been an extensive investigation into the enviro-legal issues relating to the operation of the abattoir. Various waste streams are generated by abattoirs during the processing of live animals into meat, but they can be broadly grouped into one of two distinct categories, namely solid waste, and wastewater.

In relation to the waste streams that are being considered for this WML, it is only the trimmings, offcuts, condemned material, rendered blood from abattoir processing and feedlot mortalities (animal carcasses) for which the waste management application is to be considered. The rumen and feedlot manure will be stored in line with the National Norms and Standards for Waste Storage GN No. 926 dated 29th of November 2013. The wastewater effluents that are generated from the abattoir washings and the sewage from the domestic and office buildings will be directed through the new WWTW, and contaminated water from the feedlot to be captured in an existing oxidation pond, which all fall under a registered General Authorisation (dated 15 August 2019) and Existing Lawful Use (dated 29 August 2019) under the National Water Act (Act 36 of 1998).

The rumen, faeces and mortality tank waste streams have been analysed in accordance with the waste classification and management regulations in order to determine the design thresholds of the waste management facilities.

The waste management authorisation will improve and replace current activities that deal with certain waste streams that have the potential to impact the environment negatively. The mortality tanks will replace the current activity that deposits mortality carcases and off cuts into an unlined pit on the property, which poses a risk to local water resource quality, especially groundwater.

The general objectives of public participation stipulated in both the EIA Regulations (2014) and the Public Participation Process (PPP) Guideline document (2017) have been undertaken during the S&EIR process to provide interested and affected parties with the opportunity to register and comment at

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

different stages of the application process, including receipt of project information and associated reports. The comments and responses will be recorded and form part of the Environmental Impact Report (EIR) and included in the assessment of impacts and Environmental Management Programme (EMPr), where relevant.

In consideration of the investigated cumulative impacts, the nature and extent of the proposed development, compliance with the relevant legal, policy and planning documentation (i.e. "need and desirability") including the findings of the specialist studies, it is the opinion of Ecoleges that the proposed new mortality tanks are supported from an environmental perspective and should be considered for Environmental Authorisation, subject to the implementation of the identified recommendations.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

TABLE OF CONTENTS

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

TABLE OF FIGURES AND PHOTOGRAPHS

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

TABLE OF TABLES

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

ABBREVIATIONS AND DEFINITIONS

Table 2. List of terms for abbreviations and acronyms used in this document.

Abbreviation	Term
AEL	Atmospheric Emission License
BAR	Basic Assessment Report
CA	Competent Authority
COD	Chemical Oxygen Demand
DEA	Department of Environmental Affairs (National)
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
E. coli	*Escherichia coli*
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EISC	Ecological Importance and Sensitivity Category
EO	Environment Officer
EMPr	Environmental Management Programme
ELU	Existing Lawful Use
FEPA	Freshwater Ecosystem Priority Area
FRAI	Fish Response Assessment Index
GA	General Authorisation
HQI	Habitat Quality Index
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IHAS	Integrated Habitat Assessment System
IHI	Index of Habitat Integrity
IIHI	Instream Index of Habitat Integrity
IRP	Integrated Resource Planning
LA	Listed Activity (EIA Regulations, 2014)
IUCMA	Inkomati-Usuthu Catchment Management Agency
IWWMP	Integrated Wastewater Management Plan
MDARDLEA	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs
MSA	Meat Safety Act, 2000
LN1	Listing Notice 1: GN R. 983, 4 December 2014 amended in GN No. 327, 7 April 2017
LN2	Listing Notice 2: GN R. 984, 4 December 2014 amended in GN No. 325, 7 April 2017
LN3	Listing Notice 3: GN R. 985, 4 December 2014 amended in GN No. 324, 7 April 2017

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

MAP	Mean Annual Precipitation
MIRAI	Macro-Invertebrate Response Assessment Index
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act, 2004
NEM: WA	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PES	Present Ecological State
pH	Potential of Hydrogen
PPP	Public Participation Process
SASS5	South African Scoring System version 5
S&EIR	Scoping & Environmental Impact Report
SAHRA	South African Heritage Resources Agency
SAR	Sodium Absorption Rate
SDF	Spatial Development Framework
WML	Waste Management Licence
WUL	Water Use License

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Table 3: Definitions of some terms used in this document.

Term	Source	Definition
Scope	ISO 14001:2004	Refers to the extent and boundaries of the EMPr including geographical location, a timeframe, organisational units and activities.
Aspect	ISO 14001:2004	Element of an organization's activities or products or services that can interact with the environment.
Development	EIA Regulations, 2014 as amended	The building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.
Development footprint	EIA Regulations, 2014 as amended	Any evidence of physical alteration as a result of the undertaking of any activity.
Environment	ISO 14001:2015	Surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans, and their relationships.
	National Environmental Management Act (Act 107 of 1998)	The surroundings within which humans exist and that are made up of— (i) the land, water, and atmosphere of the earth; (ii) micro-organisms, plant, and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic, and cultural properties and conditions of the foregoing that influence human health and well-being.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Environmental Impact	ISO 14001: 2004	Any change to the environment, whether adverse or beneficial, wholly, or partially resulting from those elements of the proposed activities that can interact with the environment.
Interested party	ISO 14001: 2015	Person or organisation that can affect, be affected by, or perceive itself to be affected by a decision or activity.
Registered Interested & Affected Party	EIA Regulations, 2014 as amended	In relation to an application, means an interested and affected party whose name is recorded in the register opened for that application in terms of regulation 42.
Significant impact	EIA Regulations, 2014 as amended	An impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence.
Scope	ISO 14001:2004	Refers to the extent and boundaries of the EMPr including geographical location, a timeframe, organisational units and activities.
Sustainable development	National Environmental Management Act (Act 107 of 1998)	The integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.
Watercourse	EIA Regulations, 2014 as amended	(a) a river or spring; (b) a natural channel in which water flows regularly or intermittently; (c) a wetland, pan, lake or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the

		National Water Act, 1998 (Act No. 36 of 1998); and a reference to a watercourse includes, where relevant, its bed and banks.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION A: DETAILS OF THE EAP AND APPLICANT

Details of –
(iii) The EAP who prepared the report; and

EAP Company Name:	Ecoleges Environmental Consultants			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100%
EAP name:	Philip Radford			
EAP Qualifications:	B.Sc., PG Dip			
Professional affiliation/registration:	SACNASP, IAIAsa, EAPASA (registration pending)			
Physical address:	Office 8, Macadamia Medical Centre, 69 Impala Street, White River, 1240.			
Postal address:	P.O. Box 9005, Nelspruit			
Postal code:	1200	Cell:	083 984 9936	
Telephone:	083 644 7179	Fax:	086 697 9316	
E-mail:	philip@ecoleges.co.za			

(iv) The expertise of the EAP, including a curriculum vitae;

Abbreviated Curriculum Vitae of Philip John Radford

Name	Philip Radford
Date of birth / ID No.	11 May 1971 710511 5898 181
Nationality	British with RSA residency
Marital Status	Divorced with one child
Current Address	P O Box 9005, Nelspruit, 1200 ● 29 Palm Street, White River, 1240, South Africa ● Work: 083 984 9936 ● e-mail: philip@ecoleges.co.za
Languages	English
Driver's License	Code EB
Specializations	Key Fields: Environmental Control Officer (ECO), Environmental Compliance Auditing, Basic & Environmental Impact Assessment.
Qualifications & Courses Attended	**1989-1992** BSc., University of Plymouth, UK **1998-2001** PG Dip., University of Salford, UK **2007** Advance Auditing for Modern Regulators, Environment Agency, UK **2009** Environmental Impact Assessment: A Practical Approach, CEM, RSA **2015** Implementing Environmental Management Systems, CEM, RSA **2017** Transition ISO 14001 course, Centre for Environmental Management, North-West University, Pretoria locale. **2017** Environmental Management Systems: Lead Auditor, Centre for Environmental Management, North-West University, Potchefstroom.
Memberships & Registrations	**2009** South African National Parks Honorary Rangers (Lowveld) **2010** International Association for Impact Assessment, South Africa (IAIAsa) (Mpumalanga Branch Chairperson and NEC member).
Career Summary	**Sept 1994 – April 1996** Scientific Support Officer for the Greater Manchester Waste Regulation Authority. **April 1996 – Sept 2000** Contaminated Land Officer for the Environment Agency (North West, UK). **Sept 2000 – Dec 2006** Environment Officer (Level 2) for the Environment Agency (North West, UK). **Jan 2006 – May 2009** Environment Officer (Level 1) for the Environment Agency (South West, UK). **June 2009 – Dec 2010** Environmental Manager for Wandima Environmental Services, Nelspruit. **Jan 2011 – Present** Senior Consultant for Ecoleges, Nelspruit.

SECTION B: THE LOCATION OF THE DEVELOPMENT FOOTPRINT OF THE ACTIVITY ON THE APPROVED SITE AS CONTEMPLATED IN THE ACCEPTED SCOPING REPORT:

Including –

(i) The 21-digit Surveyor General code of each cadastral land parcel;

(ii) where available, the physical address and farm name;

(iii) where the required information in terms (i) and (ii) is not available, the coordinates of the boundary of the property or properties;

The 21-digit Surveyor General Codes of each cadastral land parcel are as follows:

- Portion 8 of Farm Potgietershoop 151 T00HT0000015100008

SECTION C: A PLAN WHICH LOCATES THE PROPOSED ACTIVITY OR ACTIVITIES APPLIED FOR AS WELL AS THE ASSOCIATED STRUCTURES AND INFRASTRUCTURE:

At an appropriate scale, or if it is –

(i) a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities to be undertaken; or

(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;

Please refer to the following Appendices for the location plans:

- **Appendix A: Annexure A-** SITE LAYOUT PLAN
- **Appendix A: Annexure B-** SITE SENSITIVITY MAP

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION D: DESCRIPTION OF THE SCOPE OF THE PROPOSED ACTIVITY

Including -

(i) all listed and specified activities triggered and being applied for;

Legal requirements must be met before a person may commence with any Listed Activity in terms of the National Environmental Management Act, 1998.

National Environmental Management: Waste Act (Act 59 of 2008)

This application is for Waste Management Activities 4 and 10 of Category B of GN No. R921, dated 29th of November 2013, promulgated in terms of section 19 the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) regarding control over listed activities which may have a detrimental effect on the environment, must be complied with (Table 4).

Table 4. Potential listed activities triggered in respect of the proposed project.

Activity and Notice No.	Listed Activity	Motivation including a Description of the Activity
Activity 4 GN No. R921, dated 29th November 2013	**Category B** (4) The treatment of hazardous waste in excess of 1 ton per day calculated as a monthly average; using any form of treatment excluding the treatment of effluent, wastewater, or sewage.	The proposed treatment of abattoir trimmings, offcuts, condemned material, rendered blood and mortality carcasses from the abattoir processing and feedlot facilities at E&T Abattoir, Piet Retief, Mpumalanga. Each of the four proposed tanks is approximately 24m^3 in size, with at three under active biodigestion at a time.
Activity 10 GN No. R921, dated 29th November 2013	**Category B** (10) The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).	The proposed construction of new mortality tanks for the treatment of abattoir trimmings, offcuts, condemned material, rendered blood and mortality carcasses from the abattoir processing and feedlot facilities at E&T Abattoir, Piet Retief, Mpumalanga.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Detailed Description of the Scope of the Proposed Activity

(ii) a description of the activities to be undertaken, including associated structures and infrastructure;

Various waste streams are generated by abattoirs during the processing of live animals into meat, but they can be broadly grouped into one of two distinct categories, namely solid waste, and wastewater.

The different waste streams that were identified in E&T Abattoir are summarised in Table 5.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Table 5. Summary of the current waste streams identified at the E&T abattoir & feedlot, prior to proposed re-designs that will be implemented in accordance with the successful issuance of a WML and construction of a new WWTW.

Source	Waste		Site Management (current practices)	Site Management (following re-designs)
	Category	Pollutants		
Transport vehicle Washing Bay	Wastewater	Animal faeces, urine, sediment and hydrocarbons	Oxidation pond	Oxidation pond
Holding Pens		Animal faeces, urine, and storm water run-off		Oxidation pond
Dressing Area		Some blood, fat, and organic solids		Mortality tanks
Rough Offal Room		Some blood, organic solids, and rumen and intestinal contents		Mortality tanks and rumen to dung stockpile area
Bleeding Area		Blood		WWTW
Change Rooms including showers, toilets, and hand wash facilities		Grey water and human sewage	On-site septic tanks	WWTW
Holding Pens	Solid Waste	Animal faeces	Stockpiles	Stockpile area in compliance with Norms & Standards
Rough Offal Room		Rumen	Currently Windrowed as mulch on *Eucalyptus* sp. trees.	Stockpile area in compliance with Norms & Standards
Rough Offal Room		Intestinal contents	Open pit	Mortality tanks
Abattoir		Mortality Carcases/offcuts	Open pit	Mortality tanks
Offices		Paper	The offices are expected to generate general waste for recycling or disposal at a municipal landfill site.	The offices are expected to generate general waste for recycling or disposal at a municipal landfill site.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Table 6. Summary of estimated daily volumes of abattoir waste streams to be placed into the Mortality Tanks for treatment. Volumes based on Gauteng Veterinary Services, 2010.

Waste	Amount per unit	Amount per day for High Throughput (HT) Abattoir (40 units)
Condemned Material/Trimmings	9kg	360 kg
Blood from Bleeding Area	18kg	720 kg

The following photographs provide a view of where these various waste streams are generated throughout the abattoir operating processes.

Site Photographs

Photograph 1. Example of existing infrastructure including offices, kitchens, and ablutions.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Photograph 2. Example of Dressing Area. Waste-water contains some blood, fat and off-cuts.

Photograph 3. Example of the grazing fields (planted with indigenous *Cynodon* sp. grass) and modified local environment.

Photograph 4. Example of the feedlot area and where cattle mortalities will occur.

Photograph 5. Example of plant and equipment at the feedlot site used in the mixing and formulation of feed.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Photograph 6. Example of existing fuel storage and raw feed product storage.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Description of Associated Structures and Infrastructure

Mortality Tanks

The design is for four 24m^3 concrete reinforced tanks, into which trimmings, offcuts, condemned material, rendered blood from the daily processing of an average 40 cattle units in the abattoir, as well as occasional mortality carcasses from the feedlot, will be placed and filled with water and microbes, to be left for 3 months to digest. This means that at any one-time 96m^3 of material will be under active biological digestion (but not daily throughput). The abattoir facility is hence considered and registered as a high throughout red meat abattoir.

A series of four mortality tanks will be installed (Figure 2). Each tank has the capability to digest one month of mortality waste (Figure 1). During month one (1) of operation the first tank will be used, during month two (2) the second tank will be used, and the first tank will be left to digest the mortality. In month three (3), the third tank will be used and tank 1 and 2 will be left to digest mortality. In the fourth (4) month the fourth tank will be used and tank 2 and 3 will be left to digest mortality. At the end of the fourth month, tank 1 will now have finished digesting the mortality of month 1 into a rich liquid suitable as a fertilizer. This fertilizer will be piped and introduced into the inlet works of the WWTW for additional treatment to inter alia ensure no zoonotic pathogens remain in the effluent prior to being released to the environment by way of irrigation/fertigation. This will leave tank 1 open for use in month 5 and so the cycle will continue. It then takes one month to fill a tank and three months to digest the contents.

The operation should ensure that all material is covered with water to produce an anaerobic environment. Bacterial dosing will be utilized to create the digesting nature of a mortality tank. Specific cultured bacteria will be used which offers the full spectrum range of bacterial species and proven track record in the mortality treatment industry. Bacteria will be applied at a daily rate of 10ml to 1 kg of mortality. After the three-month digestion period the liquid can be used as fertilizer, the concentrated liquid needs to be mixed/diluted which will take place within the WWTW.

The existing mortality pit will be decommissioned in line with the Norms and Standards for the Disposal of Waste GN 636 dated 23rd August 2013, should the mortality tanks WML application be authorised.

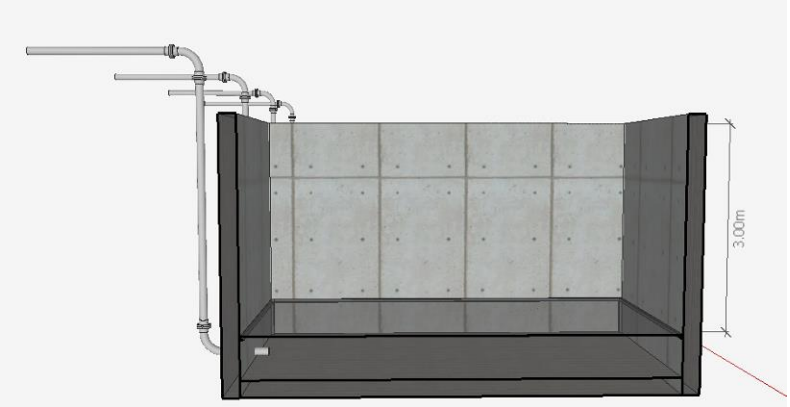


Figure 1. Illustration of the Mortality Tank cross section.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

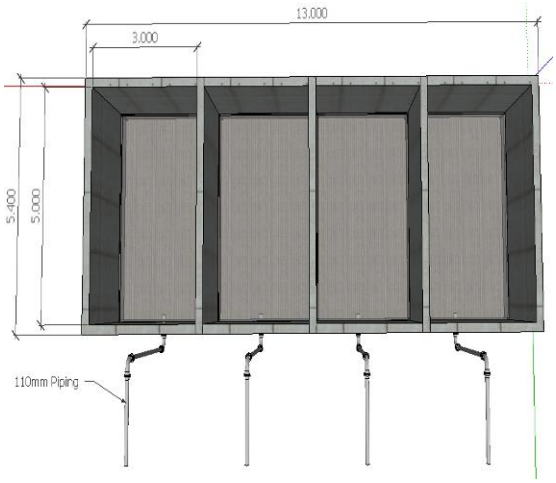


Figure 2. Illustration of the four Mortality Tanks positioned in series.

Month	Mortality Tank Number			
	1	2	3	4
1				
2				
3				
4				
5				
6				
7				
8				

Figure 3. Mortality 8-month operational cycle, with "black-filled" blocks indicating tank is being filled (at the start of a new 120-day (4 month) cycle) and the "grey-filled" blocks indicating the content is under active digestion. "White-filled" blocks indicate the tanks are empty – at start-up.

Month	Mortality Tank Number				Treatment capacity (m3)
	1	2	3	4	
1	24				24
2	24	24			48
3	24	24	24		72
4	24	24	24	24	96

Figure 4. Mortality operational cycle, with populated figures indicating tank volume capacity, and associated tonnage assuming a specific gravity of 1 when filled, and the final column indicating accumulative treatment capacity. Not all the content will be hazardous, as condemned and/or infectious material is only an intermittent fraction of the treatment volume and will not necessarily form part of the material included into a mortality tank on any given month.

Rezoning and land-use

The site is currently zoned *Agricultural* and would not need to be rezoned.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Access roads

The main access to the Abattoir is off the R33 from Piet Retief, which enters the site from the east. The unsurfaced road and the existing farm access road would also be utilised.

Buildings

The mortality tanks will be constructed from reinforced concrete in accordance with engineering standards BS8007 "Design of concrete structures for retaining aqueous liquids", which meets Department of Water & Sanitation requirements as a liner compliant with the requirements of the Waste Management Regulations and section 21(g) of the National Water Act (Act 36 of 1998). The waste type for the mortality tanks was analysed in accordance with GN No. 635, 23 August 2013 - "National Norms and standards for the assessment of waste for landfill disposal" so as to ascertain the waste type and inform landfill classification and containment barrier design (GN No. 636, 23 August 2013). The results confirm that the Mortality tanks will receive Waste Type 3 to be disposed of at a Class C (GLB+) landfill design.

The construction will likely be undertaken by the proponent under the supervision of a Pr. Eng. with currently employed staff who live on the property in formal staff housing; so no additional facilities will be required for construction other than laydown & stockpile areas for some of the materials.

Visual screening

A visual buffer will not be required as the preferred location of the mortality tanks will have limited visual impact due to the visual buffering from existing koppies and vegetation on the property.

Services:

Water supply

The current abstraction of groundwater is from four (4) boreholes and an instream dam will be used for construction and operational purposes. Storing of water takes place in seven (7) tanks, totalling a combined storage capacity of 240,000 litres.

Construction phase water requirements would depend on the time of year, with greater volumes of water required in the drier winter months. The estimated requirement is approximately 5 to 10 kL of water per day during the construction phase, including dust suppression along access roads. Should ready-mix concrete be used instead of in situ mixing, the water requirements will be even lower. The water volumes required for the construction phase and operational phases fall well within the authorised limits.

Electricity supply

Electricity would be obtained from Eskom via the existing supply to the site.

Sewerage treatment

Wastewater is currently piped into on-site septic tanks however, once the new Wastewater Treatment Works (WWTW) is built, all abattoir and domestic wastewater will be treated in the WWTW.

Waste disposal

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

All non-recyclable waste would be disposed of at the Piet Retief licensed landfill site (Permit no. 16/2/7/C231/B10/Y1/P388).

Project phases

Construction Phase

The estimated construction period for the mortality tanks is 2 months. During this period approximately 10 people would work on site. The workforce would be sourced from the local labour force in and around Piet Retief. The applicant would act as contractor and may be required to establish a small construction camp and laydown area. It is predicated that an area of approximately 0.25 ha would be required for these purposes.

It is anticipated that the construction equipment will include:

- A water tanker,
- A grader,
- A tipper truck,
- Drilling Machine,
- Excavator or TLB,
- Cement mixers,
- Compaction equipment, and
- Light delivery vehicles.

Operational Phase

The mortality tanks, as a waste management component of the abattoir and feedlot, is expected to last at least 25 years of which the abattoir will employ an estimated complement of 12 skilled, 29 semi-skilled and 5 unskilled staff shown below in Table 7.

Table 7. The current Operational workforce at E& T Abattoir.

Occupational Levels	Male				Female				Foreign Nationals		Total
	A	C	I	W	A	C	I	W	Male	Female	
Top management	0	0	0	2	0	0	0	0	0	0	2
Senior management	2	0	0	1	0	0	0	0	0	0	3
Professionally qualified and experienced specialists and mid-management	0	0	0	1	1	0	0	0	0	0	2
Skilled technical and academically qualified workers, junior management, supervisors, foremen and superintendents	2	0	0	2	0	0	0	1	0	0	5
Semi-skilled and discretionary decision-making	24	0	0	0	5	0	0	0	0	0	29
Unskilled and defined decision making	0	0	0	0	0	0	0	0	0	0	0
TOTAL PERMANENT	28	0	0	6	6	0	0	1	0	0	41
TEMPORARY EMPLOYEES	5	0	0	0	0	0	0	0	0	0	5
GRAND TOTAL	**33**	**0**	**0**	**6**	**6**	**0**	**0**	**1**	**0**	**0**	**46**

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

It is expected that currently employed labour would be used with additional skills sourced from the surrounding community.

Decommissioning Phase

There are no significant impacts expected within the potential closure of the mortality tanks, as the cessation of the mortality tanks will occur when a better alternative is discovered and implemented. Disposal of waste concrete can take place at a local landfill site following satisfactory removal and cleaning of all residual waste contents.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION E: DESCRIPTION OF THE POLICY AND LEGISLATIVE CONTEXT

(e) description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;

List of Applicable Legislation and Other Documents

The following legislation, guidelines, departmental policies, environmental management instruments and/or other decision-making instruments that have been developed or adopted by a competent authority in respect of activities associated with a development of this nature, were identified and considered in the preparation of this EIA process, and subsequent amendments.

1. Animal Diseases Act, 1984 (Act No. 35 of 1984).
2. Animal Health Act, 2002 (Act No. 7 of 2002).
3. Constitution of the Republic of South Africa Act, 1996 including section 24.
4. Conservation of Agricultural Resources Act, 1993 (Act No. 43 of 1983) and the regulations dealing with declared weeds and invader plants.
5. DAFF (1970) Sub-Division of Agricultural Land Act, 1970 (Act No. 70 of 1970).
6. DEA (2010), Guideline on Need and Desirability, Integrated Management Guideline Series 9, Department of Environmental Affairs (DEA), Pretoria, South Africa.
7. DEA (2010), Public Participation 2010, Integrated Environmental Management Guideline Series 7, Department of Environmental Affairs, Pretoria, South Africa.
8. DEA (2011), National list of ecosystems that are threatened and in need of protection. GN 1002, GG 34809, 9 December 2011.
9. DEA&DP (2010), Guideline on Alternatives, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning (DEA&DP).
10. DEAT (2002), Specialist Studies, Information Series 4, Department of Environmental Affairs and Tourism (DEAT), Pretoria.
11. DWS (2016), General Authorisation in GN No. 509 published in Government Gazette No. 40229 dated 26 August 2016.
12. DWA (2007), Guideline for Developments within a Flood line (Edition 1), Department of Water Affairs and Forestry, Pretoria, South Africa.
13. DWS (2016), General Authorisation in GN No. 538 published in Government Gazette No. 40243 dated 2 September 2016.
14. Environment Conservation Act, 1989 (Act No. 73 of 1989), including Schedules 4 and 5 of the National Regulations regarding Noise Control made under Section 25 of the Environment Conservation Act, 1989 (Act 73 of 1989) in GN No. R 154 of Government Gazette No. 13717 dated 10 January 1992. (Note that this section of the Environment Conservation Act is not repealed by NEMA (Act No. 107 of 1998)).
15. Gert Sibande District Municipality IDP (Final) 2016/17.
16. Hazardous Substances Act, 1973 (Act No. 15 of 1973).
17. Health Act, 2003 (Act No. 61 of 2003).
18. Meat Safety Act, 2000 (Act No. 40 of 2000).

19. Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
20. Mkhondo Local Municipality IDP (Final) 2016/17.
21. Mpumalanga Biodiversity Conservation Sector Plan (2014).
22. National Environmental Management Act, 1998 Act (No. 107 of 1998) including EIA Regulations, 2014 published in Government Notice No. R. 982, R. 983, R. 984 and R. 985 in Government Gazette No. 38282 dated 04 December 2014.
23. Amended EIA Regulations, 2014 published in Government Notice No. R. 324, R. 325, R. 327 and R. 328 in Government Gazette No. 40772 dated 07 April 2017.
24. National Environmental Management: Air Quality Act, 2003 (Act No. 57 of 2003) including the list of activities which result in atmospheric emissions published in GN No. 248 of Government Gazette No. 33064 dated 31 March 2010, as amended.
25. National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) including Alien and invasive species lists, GG No. 37885, GN No. 598, 1 August 2014.
26. National Environmental Management: Waste Act, 2009 (Act No. 59 of 2009).
27. National Forest Act, 1998 (Act No. 84 of 1998).
28. National Heritage Resources Act, 1999 (Act No. 25 of 1999).
29. National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998).
30. National Water Act, 1998 (Act No. 36 of 1998), Sections 27, 28,29,30,31 and 39 (Sections dealing with General Authorisations and Water Use Licenses).
31. Promotion of Access to Information Act (Act No. 2 of 2000).
32. Promotion of Administrative Justice Act (Act No. 3 of 2000).

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Legislative Context of the Proposed Activity

The National Environmental Management: Waste Act, 2008 (NEM: WA, Act No. 59 of 2008) is the relevant overarching legislation and sets out the legal framework for the management of waste in South Africa. However, there are other sectoral legislation that has relevance to hazardous waste management and impacts on the NEM: WA. It is therefore necessary to classify the different waste types to determine which legislation and which parts of that legislation apply to the E&T Mortality Tanks. The NEM: WA does differentiate between general and hazardous waste activities when listing activities that require a Waste Management Licence (GN No. 718, 3 July 2009; GN No. 921, 29 November 2013; GN No. 332, 2 May 2014 and GN No. 1094, 11 October 2017).

The various listed waste activities and NEM: WA provides the following clarity on the various waste types and definitions:

- 'animal manure' means a by-product of animal excreta which is biodegradable in nature and could further be used for fertilisation purposes (GN No. 718, 03rd July 2009);
- 'fertiliser' means any substance which is intended or offered to be used for improving or maintaining the growth of plants or the productivity of the soil (Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947).
- 'compost' means a stabilised, homogenous, fully decomposed substance of animal or plant origin to which no plant nutrients have been added and that is free of substances or elements that could be harmful to man, animal, plant or the environment (Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947).
- 'Waste' means:
    - (a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or
    - (b) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette,

    but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste-
    - (i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered;
    - (ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered;
    - (iii) where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or
    - (iv) where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste.
- 'By-product' means a substance that is produced as part of a process that is primarily intended to produce another substance or product and that has the characteristics of an equivalent virgin product or material.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

- 'Hazardous waste' means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical, or toxicological characteristics of that waste, have a detrimental impact on health and the environment.
- 'Domestic waste' means, excluding hazardous waste that emanates from premises that are used wholly or mainly for residential, educational, health care, sport, or recreation purposes.
- 'General waste' means waste that does not pose an immediate hazard or threat to health or to the environment, and includes –
    - Domestic waste;
    - Building and demolition waste;
    - Business waste; and
    - Inert waste.

The Waste Classification and Management Regulations have been promulgated (GG 36784, GN No. R634; 23 August 2013). These Regulations replace sections of the Department of Water Affairs and Forestry (DWAF) Minimum Requirements relating to the Handling, Classification and Disposal of Hazardous Waste. In terms of the DWAF Minimum Requirements, hazardous wastes are grouped into four Hazard Ratings (Extreme, High, Moderate and Low risk), which also indicates the class of hazardous waste landfill at which the waste may be disposed.

The Waste Classification and Management Regulations are aligned with the South African National Standards (SANS) 10234. SANS 10234 is the Globally Harmonized System of Classification and Labelling of Chemicals, including waste, for their safe transport, use at the workplace or in the home.

The Waste Classification and Management Regulations in terms of the NEM: WA, identify the following hazardous waste streams as wastes that do not require classification or assessment:
Waste Products:

- Asbestos Waste;
- PCB waste or PCB containing waste (<50 mg/kg or 50ppm);
- Expired, spoilt or unusable hazardous products.

Mixed Waste:

- General waste, excluding domestic waste, which contains hazardous waste or hazardous chemicals;
- Mixed, hazardous chemical wastes from analytical laboratories and laboratories from academic institutions in containers of less than 100 litres.

Other:

- Health Care Risk Waste (HCRW).

The following waste streams are pre-classified as general waste:

- Domestic waste;
- Business waste not containing hazardous waste or hazardous chemicals;
- **Non-infectious animal carcasses;**
- Garden waste;
- Waste packaging;

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

- Waste tyres;
- Building and demolition waste not containing hazardous waste or hazardous chemicals;
- Excavated earth material not containing hazardous waste or hazardous chemicals.

For all other waste streams in terms of Regulation 4(1) of the Waste Classification and Management Regulations "*all waste generators must ensure that the wastes they generate are classified in accordance with SANS 10234 within one-hundred-and-eight (180) days of generation.*" Another point of interest in respect of the Waste Classification and Management Regulations, is the ban of certain materials or substances, including organic waste from landfills.

In conclusion, the hazardous nature of all other E&T Abattoir waste streams excluding those that have already been pre-classified, have been confirmed through classification in terms of either the DWAF minimum requirements or the Waste Management and Classification Regulations. Even though the non-infectious animal carcasses are classified as General Waste under Annexure 2(a)(iii) the other waste streams needed to be classified to establish their waste classification.

Considering that waste legislation in respect of hazardous waste is more stringent than general waste, it will be in the abattoir's own interest to apply the waste hierarchy process; including but not limited to registering as a waste producer and waste management facility as per the Waste Management and Classification Regulations.

The waste analysis of the abattoir blood is summarised in Tables 9, 10 & 11 below and the results reflected against the limits within the Waste Classification Regulations (GN No. 635 dated 23 August 2013). Although the proposed waste management activity is treatment, the regulations for disposal to landfill were considered the best option to determine a risk-based analysis, including the risks in the event of a compromised concrete liner/bund structure in which the waste body will be treated.

The waste types for the mortality tanks have been analysed in accordance with GN No. 635, 23 August 2013 - "National Norms and standards for the assessment of waste for landfill disposal" so as to ascertain the waste type and inform landfill classification and containment barrier design (GN No. 636, 23 August 2013). We hereby confirm the following:

Mortality tanks will receive Waste Type 3 that is required to be disposed of at a Class C (GLB+) landfill design (concentrations above LCT0 but below LCT1 and all TC concentrations below TCT1). However, GN No. R.636, 23 August 2013 requires that "non-infectious carcasses" be disposed of at Class B landfill design. Furthermore, following technical meetings with DWS Head Office, as long as the concrete mortality tanks are designed in accordance with BS8007 "Design of concrete structures for retaining aqueous liquids" the liner design in GN No. R.636 will not be required in accordance with section 3(4) that states *"….waste may be disposed of ….at landfills with an alternative liner design approved by the competent authority for the life -span of the operational cell……".* Hence, the containment barrier will be a concrete structure design, in accordance with the provisions of the relevant Norms & Standards and as per approval of DWS.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Table 8. Abattoir blood sample LCT analysis results. Selenium, Total Dissolved Solids and Chlorine were above the LCT0 threshold.

	As	B	Ba	Cd	Co	Cr	Cu	Hg	Mn	Mo	Ni	Pb	Sb	Se	V	Zn	TDS	F	Cl	NO3 as N	SO4	CN (Total)	Cr 6+
WATER LEACH 1:20	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
BLOOD	0,002	0,092	0,177	<0.0001	0,004	0,009	0,053	<0.0001	0,249	0,001	0,006	<0.001	<0.001	0,025	0,001	0,310	9220	<0.1	601	0,29	198	<0.1	<0.05
Duplicate	0,003	0,101	0,186	0,000	0,005	0,013	0,059	0,000	0,419	0,002	0,012	<0.001	<0.001	0,021	0,002	0,242	9250	<0.1	602	0,29	186	<0.1	<0.05
LCT0	0,01	0,5	0,7	0,003	0,5	0,1	2	0,006	0,5	0,07	0,07	0,01	0,02	0,01	0,2	5	1000	1,5	300	11	250	0,7	0,05
LCT1	0,5	25	35	0,15	25	5	100	0,3	25	3,5	3,5	0,5	1	0,5	10	250	12500	75	15000	550	12500	3,5	2,5
LCT2	1	50	70	0,3	50	10	200	0,6	50	7	7	1	2	1	20	500	25000	150	30000	1100	25000	7	5
LCT3	4	200	280	1,2	200	40	800	2,4	200	28	28	4	8	4	80	2 000	100000	600	120000	4400	100000	28	20

Table 9. Abattoir blood sample of trace elements against TCT results. No elements exceeded any TCT0 value.

	As	B	Ba	Cd	Co	Cr	Cu	Hg	Mn	Mo	Ni	Pb	Sb	Se	V	Zn	F	Cr6+	CN
Total trace elements	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BLOOD/SAMPLE	1,32	0,16	24,43	<0.01	0,52	4,60	8,80	0,02	43,90	0,24	1,72	0,98	0,15	0,10	0,68	24,78	56,77	<5	<1
Duplicate	1,18	0,17	25,77	<0.01	0,55	4,03	9,00	0,01	44,40	0,22	1,92	1,00	0,15	0,11	0,68	24,61	56,74	<5	<1
TCT0	5,8	150	62,5	7,5	50	46000	16	0,93	1000	40	91	20	10	10	150	240	100	6,5	14
TCT1	500	15000	6250	260	5000	800000	19500	160	25000	1000	10600	1900	75	50	2680	160000	10000	500	10500
TCT2	2000	60000	25000	1040	20000	N/A	78000	640	100000	4000	42400	7600	300	200	10720	640000	40000	2000	42000

Table 10. Abattoir blood sample for organics against TCT results. No TCT or LCT thresholds were exceeded.

VOC's Dilution	Blood		TCT0	TCT1	TCT2	LCT0	LCT1	LCT2	LCT3
	Solids	DW							
	mg/kg	mg/l	mg/kg	mg/kg	mg/kg	mg/l	mg/l	mg/l	mg/l
Benzene	<0.2	<0.01		10	40		0,01	0,02	0,08

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat. MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Carbon Tetrachloride	<1	<0.05		4	16		0,2	0,4	1,6
Chlorobenzene	<0.4	<0.02		8800	35200		5	10	40
Chloroform	<1	<0.05		700	2800		15	30	120
1,2-Dichlorobenzene	<0.4	<0.02		31900	127600		5	10	40
1,4-Dichlorobenzene	<0.4	<0.02		18400	73600		15	30	120
1,2-Dichloroethane	<0.4	<0.02		3,7	14,8		1,5	3	12
Ethylbenzene	<0.4	<0.02		540	2160		3,5	7	28
Hexachlorobutadiene	<0.4	<0.02		2,8	5,4		0,03	0,06	0,24
MTBE	<1	<0.05		1435	5740		2,5	5	20
Naphthalene	<0.4	<0.02	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Styrene	<1	<0.05		120	480		1	2	8
1,1,1,2-Tetrachloroethane	<2	<0.1		400	1600		5	10	40
1,1,2,2-Tetrachloroethane	<2	<0.1		5	20		0,65	1,3	5,3
Toluene	<2	<0.1		1150	4600		35	70	280
1,1,1-Trichloroethane	<1	<0.05		1200	4800		15	30	120
1,1,2-Trichloroethane	<1	<0.05		48	192		0,6	1	4
Xylenes total	<1	<0.05		890	3560		25	50	200
Trichlorobenzenes (total)	<1	<0.05		3300	13200		3,5	7	28
Dichloromethane	<10	<0.5		16	64		0,25	0,5	2
1,1-Dichloroethylene	<2	<0.1		150	600		0,35	0,7	2,8
1,2-Dichloroethylene	<2	<0.1		3750	15000		2,5	5	20
Tetrachloroethylene	<2	<0.1		200	800		0,25	0,5	2
Trichloroethylene	<2	<0.1		11600	46400		0,25	2	8
TPH Dilution	**X1**	**X1**							
Petroleum H/Cs,C6-C9	<0.2	<0.01		650	2600		N/A	N/A	N/A
Petroleum H/Cs,C10 to C36	<38	1,4		10000	40000		N/A	N/A	N/A
Formaldehyde Dilution	**X10**	**X10**							

Formaldehyde	<2	<0.5		2000	8000		25	50	200
pH	6,83	6,76	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SVOCs Dilution	**X200**	**X10**							
Benzo(a)pyrene	<0.02	<0.001		1,7	6,8		0,035	0,07	0,28
Di (2ethylhexyl) Phthalate	<2	<0.1		40	160		0,5	1	4
Nitrobenzene	<0.2	<0.01		45	180		1	2	8
2,4 Dinitrotoluene	<1	<0.05		5,2	20,8		0,065	0,13	0,52
Total PAH's	<0.4	<0.2		50	200		N/A	N/A	N/A
PHENOLS Dilution	**X200**	**X10**							
2-Chlorophenol	<0.4	<0.02		2100	8400		15	30	120
2,4-Dichlorophenol	<0.4	<0.02		800	3200		10	20	80
2,4,6-Trichlorophenol	<0.4	<0.02		1770	7080		10	20	80
Phenols Speciated (total,non-halogenated)	<4	<0.2		560	2240		7	14	56
Pesticides Dilution	**X200**	**X10**							
Aldrin	<0.02	<0.001	0,05	1,2	4,8		0,015	0,03	0,03
Dieldrin	<0.02	<0.001	0,05	1,2	4,8		0,015	0,03	0,03
DDT	<0.02	<0.001	0,05	50	200		1	2	2
DDE	<0.02	<0.001	0,05	50	200		1	2	2
DDD	<0.02	<0.001	0,05	50	200		1	2	2
Heptachlor	<0.02	<0.001	0,05	1,2	4,8		0,015	0,03	0,03
Chlordane	<0.02	<0.001	0,05	4	16		0,05	0,1	0,1
2,4 Dichlorophenoxyacetic Acid	Unable to Detect		0,05	120	480		1,5	3	3
PCB Dilution	**X1**	**X10**							
Ballsmitters Totals	<0.35	<0.001		12	48		0,025	0,05	0,2
Polars Dilution	**X200**	**X10**							
2-Butanone	<20	<1		8000	32000		100	200	800

Vinyl Chloride	<0.2	<0.001		1,5	6		0,015	0,03	0,12

The following section identifies relevant legislation over and above NEM: WA and its potential relevance to the project.

The Constitution of the Republic of South Africa, 1996

Chapter 2 of the Constitution consists of a Bill of Rights, which explicitly spells out the rights of every South African citizen. The human rights relevant to the environmental management field that are safeguarded by the Constitution include:

- Right to a healthy environment;
- Right of access to land and to security of tenure; and
- Right to adequate housing and protection against evictions and demolitions.

The right to a protected biophysical environment, the promotion of social development and trans-generational equity is explicitly included in the Constitution of the Republic of South Africa 1996, which states:

"Everyone has the right -

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

When considering an environment that is not harmful to peoples' health and wellbeing, it is important to reflect on the interconnectedness of biophysical, economic and social aspects. The impact of development on people, and the true cost of development, as well as the consideration of "who pays the price?" versus "who reaps the benefits?" cannot be ignored in a discussion about human rights and the environment.

Administering Authority: The National Legislative Authority as vested in Parliament.

Relevance to the project: The right to a clean and satisfactory environment is seen as a human right supported by South Africa's environmental legislation. This project intends to implement measures to better manage its waste streams, helping to ensure a better environment for all its land use activities and surrounding land users.

The National Environmental Management (Act 107 of 1998)

The National Environmental Management Act (NEMA - Act 107 of 1998) states that the State must respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the needs of previously disadvantaged communities. It states further that sustainable development requires the integration of social, economic and environmental factors in the planning, evaluation and implementation of decisions to ensure that development serves present and future generations.

Chapter 1 of NEMA contains a list of principles and states clearly that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests. It states further that negative impacts on the environment and on peoples' environmental rights must be anticipated and prevented, and if they cannot be prevented, they should be minimised and remedied. It elaborates further on the equity of impacts, and the fact that vulnerable communities should be protected from negative environmental impacts. It refers to the principle that everyone should have equal access to environmental resources, benefits and services to meet their basic human needs.

Another important aspect of NEMA is the principle of public participation. It states that people should be empowered to participate in the environmental governance processes, and that their capacity to do so should be developed if it does not exist. All decisions regarding the environment should take the needs, interest and values of the public into account, including traditional and ordinary knowledge. There are also specific environmental management acts (SEMAs) that fall under NEMA, that also require similar public participation processes to NEMA, and the principles of NEMA also apply to them (Department of Environmental Affairs & Development Planning [DEA&DP], Provincial Government of the Western Cape, 2010).

Chapter 6 of NEMA elaborates on the public participation requirements. This is supplemented by the EIA regulations published in GN 982 of 4 December 2014 as amended in GG 40772, GN No. 326 of 7 April 2017), which contain requirements for public participation. It provides requirements for the public participation, the minimum legal requirements for public participation processes, the generic steps of a public participation process, requirements for planning a public participation process and a description of the roles and responsibilities of the various role players. A compulsory Public Participation Guideline that was published in 2012 (GN 807 of 10 October 2012) in terms of section J of NEMA (NEMA, 1998), and subsequently updated in 2017, complements these requirements.

The principles of NEMA declare further that community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, sharing of environmental knowledge and experience and any other appropriate means. It states that the social, environmental, and economic impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions taken must be appropriate given the assessment and evaluation. NEMA recognises that the environment is held in public trust for the people, and therefore the beneficial use of environmental resources must serve the peoples' interest and protect the environment as the peoples' common heritage.

Administering Authority: The National Department of Environmental Affairs, and sub-directorate for Hazardous Waste Management applications.

Relevance to the project: NEMA takes a holistic view of the environment, and promotes the consideration of social, economic and biophysical factors to obtain sustainable development and achieve effective management of the biophysical environment. These factors will be considered throughout the assessment process. There is also a clear mandate for environmental and restorative justice in the act, something that must be considered in this project. According to the guidelines, public participation must

be one of the most important aspects of the environmental authorisation process. Public participation is the only requirement of the environmental impact assessment process for which exemption cannot be given, unless no rights are affected by an application. This stems from the requirement in NEMA that people have a right to be informed about potential decisions that may affect them and that they must be given an opportunity to influence those decisions. Even though a full public participation process has already been run for the combined Water Use Authorisation and Basic Assessment process (when the application was originally run through the provincial competent authority for general waste treatment), the PPP will be repeated for this application.

The National Water (Act 36 of 1998)

Chapter 1 of the National Water Act (NWA) (Act 36 of 1998) states that sustainability and equity are identified as central guiding principles in the protection, use, development, conservation, management, and control of water resources. It affirms that the guiding principles recognise the basic human needs of present and future generations and the need to promote social and economic development using water. Chapter 2 of the NWA states amongst others that the purpose of the act is to ensure that everyone has equitable access to water, and that the results of past racial and gender discrimination are redressed. It aims to promote the efficient, sustainable, and beneficial use of water in the public interest, and to facilitate social and economic development. The NWA recognises that the nations' water resources are held in public trust for the people, and therefore the sustainable, equitable, and beneficial use of water resources must serve the peoples' interest.

Administering Authority: The Inkomati Usuthu Catchment Management Agency (IUCMA) as the appointed representative of the Department of Water and Sanitation for this region.

Relevance to the project: The project will trigger the requirement for authorisation of water uses under section 21 of the NWA. The project includes various water uses and waste management activities associated with the mortality tanks including:

- Section 21(a) *"taking of water".* Water is abstracted from boreholes to fill the mortality tanks to aid in the biodigestion process.
- Section 21(g) *"disposing of waste in a manner which may detrimentally impact on a water resource".* The abattoir offcuts, trimmings, rendered blood and condemned material will be placed in the mortality tanks for biodigestion. The structure will be constructed in such a manner as to limit/negate the risk of leakage and contamination to a water resource.
- Section 21(e) *"engaging in a controlled activity: irrigation of any land with waste or water containing waste generated through any industrial activity or by a water work".* Following initial treatment, the effluent will be included into the WWTW process for secondary treatment before the effluent is to be used for irrigating the rotational grazing camps.

General Authorisation has been registered for all the above-mentioned water uses (Ref. No.: WU8518, File No.: 27/2/1/W451/1/1 dated 15 August 2019).

The National Heritage Resources (Act 25 of 1999)

The National Heritage Resources Act (NHRA) affirms that every generation has a moral responsibility to act as trustee of the national heritage for later generations and that the State is obliged to manage

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

heritage resources in the interest of all South Africans. The Act further elaborates on the fact that heritage resources form an important part of the history and beliefs of communities and must be managed in a way that acknowledges the right of affected communities to be consulted and to participate in their management.

Administering Authority: The South African Heritage Resources Agency (SAHRA).

Relevance to the project: A qualified Heritage Practitioner was appointed to assess the potential Heritage Resources on the property, which resulted in a motivation letter for exemption from the Act. SAHRA accepted the motivational letter of exemption from the Act on the 13th of December 2019.

Promotion of Administrative Justice Act (PAJA - Act 3 of 2000)

The Bill of Rights in the Constitution of the Republic of South Africa, 1996 states that everyone has the right to administrative action that is legally recognised, reasonable and procedurally just. The PAJA gives effect to this right. The PAJA applies to all decisions of all State organisations exercising public power or performing a public function in terms of any legislation that negatively affects the rights of any person. The Act prescribes what procedures an organ of State must follow when it takes decisions. If an organ of State implements a decision that impacts on an individual or community without giving them an opportunity to comment, the final decision will be illegal and may be set aside. The Promotion of Administrative Justice Act (Act 3 of 2000) also forces State organisations to explain and give reasons for the manner in which they have arrived at their decisions and, if social issues were involved, and how these issues were considered in the decision-making process.

Administering Authority: Organs of state, include departments at national, provincial or local government level, as relevant.

Relevance to the project: The Promotion of Administrative Justice Act (Act 3 of 2000) therefore protects the rights of communities and individuals to participate in decision-making processes, especially if these processes affect their daily lives. The Public Participation Process of the project will be undertaken in accordance with PAJA.

The National Environmental Management: Biodiversity Act No. 10 of 2004

The Act provides the protection of ecosystems and species that require national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources and the establishment and functions of the South African National Biodiversity Institute (SANBI).

Administering Authority: An organ of state in the national, provincial or local sphere of government delegated in term of section 42 of the National Environmental Management Act in combination with the South African National Biodiversity Institute.

Relevance to the Project: The E&T Abattoir, feedlot and mortality tank footprints are already heavily transformed, with no sensitive environments, ecosystems and/or areas of high biodiversity value

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

affected. The Act will be relevant to the identification and control of Listed Alien Invasive Species as per the Alien and Invasive Species Lists, GG No. 37885, GN No. 598, 1 August 2014.

National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)

Regulates air emissions generally, including air emissions resulting from the heat treatment of general and hazardous waste. In the context of abattoir waste management, it is important to note the provisions relating to waste treatment and odour control. Section 35(2) imposes an obligation on the occupier of any premises to take all reasonable steps to prevent the emission of any offensive odour caused by any activity on such premises. 'Offensive odour' means any smell which is malodorous or a nuisance to a reasonable person.

Administering Authority: In the national, provincial and local spheres of government applying this Act.

Relevance to the Project: The project will consist of developing and operating four mortality tanks. This operational phase will potentially produce offensive odours and will need to be managed and mitigated accordingly.

National Health Act, 2003 (Act No. 61 of 2003)

Regulates the provision of municipal health services, including water quality monitoring, waste management and environmental pollution control. The Act also regulates environmental health inspections, and allows Minister to regulate medical waste, health nuisances and offensive conditions.

Administering Authority: Department of Health.

Relevance to the Project: The new mortality tanks will help manage waste streams that fall outside the capacity of the local municipality as well as mitigate potential human health and nuisance conditions associated with these waste streams.

Environment Conservation Act, 1989 (Act No. 73 of 1989)

Historic legislation regulating licenses for waste disposal sites, most sections repealed by NEM: WA.

Administering Authority: National and Provincial Departments of Environmental Affairs.

Relevance to the Project: The transitional arrangements provided for in NEM: WA link and relate to historical permissibility under ECA.

Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)

Occupational Health and Safety (OHS) Act including Regulations governing Hazardous Biological Agents, 2001 which protects health and safety of workers, including against hazards to health and safety.

Administering Authority: Department of Labour.

Relevance to the Project: The various Regulations in terms of the Act regulate hazardous biological agents, including training requirements.

Meat Safety Act, 2000 (Act No. 40 of 2000)

Establish and maintain essential national standards in respect of abattoirs.

Administering Authority: National Department of Agriculture, Forestry & Fisheries.

Relevance to the Project: Regulations contain requirements for a Hygiene Management Program for waste handling. Addresses handling, storage, and disposal of condemned material.

Animal Diseases Act, 1984 (Act No. 35 of 1984)

Regulates disposal of straying and diseased animals and animal carcasses. Additional amendments address the use of proteins from ruminant origins (excluding milk and milk products). It will have a direct effect on the manufacturing of blood and bone meal.

Administering Authority: Department of Agriculture, Forestry and Fisheries.

Relevance to the Project: Although the animal carcasses that are to be disposed of in the mortality tanks are non-infectious, the license application will also cater for infectious carcasses in the case of confirmation of disease by the State Veterinarian.

National Road Traffic Act, 1996 (Act No. 93 of 1996)

Regulates the transport of dangerous goods, including hazardous waste, by road.

Administering Authority: Department of Transport.

Relevance to the Project: As the mortality tanks will be developed adjacent to and near the abattoir and feedlot, no public roads will be used in its transportation.

National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977)

Regulates, in part, the accumulation of building waste on a construction site and prescribes requirements for waste-related services, such as sewage disposal.

Administering Authority: Municipalities.

Relevance to the Project: Building Plan approval of the mortality tanks may be necessary from the Mkhondo local municipality.

ADDITIONAL GOVERNANCE TOOLS

Integrated Development Plans (IDP)

The project are falls under two IDPs namely the Gert Sibande District Municipality IDP (Final) 2016/17 and the Mkhondo Local Municipality IDP (Final) 2016/17.

This development is not provided for in the infrastructure planning of the district municipality but will not have an impact on the infrastructure planning because it is isolated from urban developments. The purpose of the proposed activity is to help enhance environmental sustainability and protection by combating illegal treatment of waste.

However, the final Mkhondo Local Municipality 2016/17 IDP on page 21, section 1.4.3 lists the following relevant opportunity:

- Recycling of waste could provide business opportunities and enhance environmental sustainability.

Page 33 of the same document states that the Mpumalanga Provincial Government has identified six priority areas of intervention as part of the Mpumalanga Provincial Growth & Development Strategy, of which one is relevant to the proposed project:

- Environmental Development (i.e. protection of the environment and sustainable development).

Furthermore, the page 26 of the Executive Summary of the NDP 2030, lists the critical actions to be taken by 2030, including:

- Interventions to ensure environmental sustainability and resilience to future shocks.

Administering Authority: Local and District Municipalities.

Relevance to the project: The granting of this waste management licence (the applicant's intervention through upgrading his current system) will help enhance environmental sustainability and protection by combating illegal treatment of waste, which might have an impact on the environment and will enhance sustainable business practices of E&T Abattoir.

National Development Plan

On 11 November 2011, the National Planning Commission released the National Development Plan: Vision for 2030 (NPC, 2012) for South Africa and it was adopted as government policy in August 2012. The National Development Plan (NDP) was undertaken to envision what South Africa should look like in 2030 and what action steps should be taken to achieve this (RSA, 2013). The aim of the NDP is to eliminate poverty and reduce inequality by 2030. The report identifies nine central challenges to development in South Africa:

1. Too few people work.
2. The standard of education for most black learners is of poor quality.
3. Infrastructure is poorly located, under-maintained and insufficient to foster higher growth.
4. Spatial patterns exclude the poor from the fruits of development.
5. The economy is overly and unsustainably resource intensive.
6. A widespread disease burden is compounded by a failing public health system.
7. Public services are uneven and often of poor quality.
8. Corruption is widespread.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

9. South Africa remains a divided society (NPC, 2012).

The plan focuses on creating an enabling environment for development and wants to shift from a paradigm of entitlement to a paradigm of development that promotes the development of capabilities, the creation of opportunities and the involvement of all citizens (NPC, 2012). The National Development Plan (NPC, 2012) wants to achieve the following:

1. An economy that will create more jobs.
2. Improving infrastructure.
3. Transition to a low-carbon economy.
4. An inclusive and integrated rural economy.
5. Reversing the spatial effects of apartheid.
6. Improving the quality of education, training, and innovation.
7. Quality healthcare for all.
8. Social protection.
9. Building safer communities.
10. Reforming the public service.
11. Fighting corruption.
12. Transforming society and uniting the country.

All 189 Members States of the United Nations, including South Africa, adopted the United Nations Millennium Declaration in September 2000 (UN, 2000). The commitments made by the Millennium Declaration are known as the Millennium Development Goals (MDGs), and 2015 was targeted as the year to achieve these goals. The United Nations Open Working Group of the General Assembly identified seventeen sustainable development goals, built on the foundation of the MDGs as the next global development target (UN, 2014). The sustainable development goals include aspects such as ending poverty, addressing food security, promoting health, wellbeing and education, gender equality, water and sanitation, economic growth and employment creation, sustainable infrastructure, reducing inequality, creating sustainable cities and human settlements, and addressing challenges in the physical environment such as climate change and environmental resources (UN, 2014). These aspects are included in the NPD, and it can therefore be assumed that South Africa's development path is aligned with the international development agenda.

Administering Authority: National Planning Commission.

Relevance to the project: Through its contribution to a low-carbon economy, job creation, infrastructure and the rural economy, the E&T project will contribute in some small measure to achieving some of the goals of the National Development Plan.

E&T Abattoir can assist with contributing to achieving goals such as economic growth and employment creation, sustainable infrastructure and promoting health, wellbeing and education through their enterprise development and socio-economic development programmes in alignment with the Millennium Declaration.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION F: MOTIVATION FOR THE NEED AND DESIRABILITY FOR THE PREFERRED DEVELOPMENT FOOTPRINT

(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report;

Legislative Background and Strategic Context

National Environmental Management Principles of NEMA, 1998, which guide the interpretation, administration and implementation of NEMA, 1998 (and the EIA Regulations, 2014) specifically *inter alia* require that environmental management must place people and their needs at the forefront of its concern (Section 2(2)). The latter refers to the broader societal / community needs and interests, and is put into effect through the EIA Regulations, 2014, which require environmental impact assessments to specifically consider 'need and desirability' in order to ensure that the 'best practicable environmental option' is pursued and that development more equitably serves broader societal needs now and in the future. Furthermore, it ensures that the proposed actions of individuals are measured against the long-term public interest.

What is needed and desired for a specific area must be strategically and democratically determined (DEA&DP (2010) Guideline on Need and Desirability). The strategic context for informing need and desirability is best addressed and determined during the formulation of the sustainable development vision, goals and objectives of Integrated Development Plans ('IDPs') and Spatial Development Frameworks ('SDFs') during which collaborative and participative processes play an integral part, and are given effect to, in the democratic processes at local government level (DEA&DP (2010) Guideline on Need and Desirability). The need and desirability must therefore be measured against the contents of the credible IDP, SDF and EMF for the area, and the sustainable development vision, goals and objectives formulated in, and the desired spatial form and pattern of land use reflected in, the area's IDP and SDF (DEA&DP (2010) Guideline on Need and Desirability). Integrated Development Planning (and the SDF process) effectively maps the desired route and destination, whilst the project-level EIA decision-making finds the alternative that will achieve the desired goal (DEA&DP (2010) Guideline on Need and Desirability). However, inadequate planning or the absence of a credible IDP and SDF means that the EIA must address the broader need and desirability considerations. Consequently, 'need and desirability' is determined by considering the broader community's needs and interests as reflected in a credible IDP, SDF and EMF for the area, and as determined in the EIA decision-making process.

Furthermore, the Constitution calls for *justifiable* economic development. The specific needs of the broader community must therefore be considered together with the opportunity costs and distributional consequences in order to determine whether the development is 'justified'.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

The general meaning of need and desirability refers to time and place, respectively, i.e. is this the right time and is it the right place for locating the proposed activity. The need and desirability of this application was addressed separately and in detail by answering *inter alia* the following questions required by the published Need & Desirability Guideline (2017).

1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?

The study area has had a present ecological state (PES) assessment of the reaches of the drainage line that runs from the abattoir towards the lower dams below the abattoir. In summary, the following Ecological Importance and Sensitivity (EI&S) for the drainage line were found as follows: Ecological Importance and Sensitivity Category (EISC) = Low; Instream ecological category = 18.6 (E/F) (Serious to Critically modified); Riparian vegetation ecological category = 51.0% (D) (Largely modified); Ecostatus = E (Seriously modified). PES Overall = E (Seriously modified). The development including the mortality tanks is going to bring a positive impact to the ecological integrity of the receiving environment as the mortality carcasses, blood and off cuts will no longer be deposited into an unlined pit that has the potential to have a negative impact on especially ground water resources. The waste streams from the abattoir have been analysed including the mortality pit contents, manure and rumen. This has identified the requirements for pollution control measures to be installed. This aspect will be quantitatively monitored through the EMPr.

Please see the full report attached as **Appendix E (Annexure A).**

1.1. How were the following ecological integrity considerations taken into account?

1.1.1. Threatened Ecosystems

Mpumalanga Tourism and Parks Agency (MTPA), as the authority mandated to conserve biodiversity in Mpumalanga, have developed the Mpumalanga Biodiversity Sector Plan (MBSP). All site perspective biodiversity assessments therefore need to be contextualised within this provincial biodiversity plan including mapping of the Terrestrial and Aquatic Biodiversity classes and vegetation units.

The Terrestrial and Aquatic sensitivity classes for the E&T Abattoir site computed “Heavily modified”. See Appendix A, Annexure B for the Site Sensitivity Plan.

There was a desktop study of the area of concern completed to evaluate if any threatened ecosystems are found under the National Biodiversity Act (2011) and the Mpumalanga Biodiversity Conservation Plan. The results of this evaluation are detailed in the attached site sensitivity plan in **Appendix A: Annexure B** and the specialist report can be found in **Appendix E: Annexure A**. In conclusion the project area is registered as vulnerable under the NBA and under the MBSP its registered as an area of least concern with no habitat remaining on portion 8 and 10 of Farm Potgieter’s 151- HT.

In addition, the potential impacts and quantification of cumulative impacts were assessed by the following appointed specialists in relation to threatened ecosystems:

- Aquatic Study including PES and Wetland Delineation Assessment.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

The impact assessment shows that almost all identified impacts can be effectively mitigated, indicating that the cumulative impact effect will also be mitigated. (Refer to **Appendix D & F**)

1.1.2. Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure

The potential impacts and quantification of cumulative impacts were assessed by the following appointed specialists in relation to sensitive, vulnerable, highly dynamic or stressed ecosystems such as wetlands:

- Aquatic Study including PES and Wetland Delineation Assessment.

The summary of the key findings is provided below;

- The Ecological Importance and Sensitivity (EI&S) for the drainage line: Ecological Importance and Sensitivity Category (EISC) = Low; Instream ecological category = 18.6 (E/F) (Seriously to Critically modified); Riparian vegetation ecological category = 51.0% (D) (Largely modified); Ecostatus = E (Seriously modified). PES Overall = E (Seriously modified).

- Since the drainage line below Dam 2 represents a wetland with a wide valley and multiple channels, this area is perceived as having higher ecological and sensitivity values than the single channel drainage line upstream of Dam 2. Therefore, an additional EISC determination was done for this reach and it was found that the EISC has an improved median of determinants (1.0 to the 0.5 of the upstream reach), but the EISC category remains “Low”.

- Improvements to waste management of the site including the mortality tanks, wastewater treatment works and containment of feedlot waste, will have a positive downstream impact.

Please see the full report attached in **Appendix E: Annexure A.**

1.1.3. Critical Biodiversity Areas (“CBAs”) and Ecological Support Areas (“ESAs”)

The Terrestrial and Aquatic sensitivity classes for the E&T Abattoir site computed “Heavily modified”. See Appendix 2 for the Site Sensitivity Plan.

There were no CBAs or ESAs identified within the project area. See **Appendix A: Annexure B** for further details.

1.1.4. Conservation targets

The property Potgietershoop falls within the KaNgwane Montane Grassland described in Mucina and Rutherford, 2006. **Conservation:** Vulnerable. The conservation target 27% with only 0.4% protected within any formally proclaimed nature reserves (Malalotja, Nooitgedacht Dam and Songimvelo). Several private conservation areas protect small patches of this unit. It is well suited for afforestation and 30% has already been converted to plantations of alien trees. A further 6% is under cultivation. Erosion potential very low (55%) and low (7%).

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

The property on which E&T Abattoir is located has largely been transformed from a natural landscape by direct ecological drivers due to intensive farming practices including but not limited to, cattle feedlots and grazing, *Eucalyptus* sp. afforestation and associated farming and processing infrastructure. There are only small remnants of natural vegetation left on the property mostly associated with rocky ridges and watercourses that cannot be used for farming practices. However, the landowner is in the process of removing all *Eucalyptus* sp. afforestation in a phased approach and seeding these areas with indigenous *Cynodon* sp. grass which is well suited for the soil type, for high intensity grazing and irrigation.

1.1.5. Ecological drivers of the ecosystem

A driver is any natural or human-induced factor that directly or indirectly causes a change in an ecosystem. A direct driver unequivocally influences ecosystem processes. An indirect driver operates more diffusely, by altering one or more direct drivers.

The main economic sectors of the Mkhondo municipal area are forestry, agriculture, transport and mining. These have had a direct impact or change on the local ecosystems.

- Forestry

  The main economic activities in the Piet Retief (now known as eMkhondo) area are timber, paper and wattle bark production. Piet Retief is surrounded by forestry and plantations. Much of its economy originates from these sources. Mondi, Sappi, TWK and Komati Land Forests are the major companies that lead the forestry industry in the area. Three major sawmills, Mondi, Tafibra and PG Bison, are located just outside of eMkhondo.

- Agriculture

  The Mkhondo Local Municipality land-use is fundamentally agricultural and has forestry support.

- Transport

  The eMkhondo district is the main link for both industrial and commercial transport from Gauteng to the import/export harbour at Richards Bay.

- Mining

  Several scattered pockets of mica, kaolin and iron mining are found in the municipal area of jurisdiction.

In the context of the project area, undesirable waste management practices are having a negative impact on the receiving environments, both terrestrial and aquatic. Improved waste management facilities will assist in negating the current negative system drivers and improve localised ecosystem function.

1.1.6. Environmental Management Framework

The municipality does not have an EMF in place.

1.1.7. Spatial Development Framework

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

This development is not provided for in the infrastructure planning of the municipality but will not have an impact on the infrastructure planning because it is isolated from urban developments. The purpose of the proposed activity is help enhance environmental sustainability and protection by combating treatment of waste in a more environmentally sustainable manner.

However, the final Mkhondo Local Municipality 2016/17 IDP on page 21, section 1.4.3 lists the following as opportunities:

- N2 National road cuts through the central parts of the municipal area;
- Centrally located for industrial development and tourism;
- Existence of Tourism Centre could enhance tourism potential in the area;
- Markets could be established, with beneficiation of forest products to be a focus area;
- High residential demand;
- Land Reform provides opportunities for access to more land and economic benefits for the people;
- Batho Pele principles could enhance service delivery and development in general;
- Strong business community;
- **Recycling of waste could provide business opportunities and enhance environmental sustainability**;
- Availability of external funding for development and infrastructure; and
- Key partners have already been identified.

Page 33 of the same document states that the Mpumalanga Provincial Government has identified six priority areas of intervention as part of the Mpumalanga Provincial Growth & Development Strategy, namely:

- Economic Development (i.e. investment, job creation, business and tourism development and SMME development);
- Infrastructure Development (i.e. urban/rural infrastructure, housing and land reform);
- Human Resource Development (i.e. adequate education opportunities for all);
- Social Infrastructure (i.e. access to full social infrastructure);
- **Environmental Development (i.e. protection of the environment and sustainable development);** and
- Good Governance (i.e. effective and efficient public-sector management and service delivery).

Also, page 26 of the Executive Summary of the NDP 2030, the Critical actions to be taken by 2030, lists the following:

1. A social compact to reduce poverty and inequality and raise employment and investment.
2. A strategy to address poverty and its impacts by broadening access to employment, strengthening the social wage, improving public transport and raising rural incomes.
3. Steps by the state to professionalise the public service, strengthen accountability, improve coordination and prosecute corruption.
4. Boost private investment in labour-intensive areas, competitiveness and exports, with adjustments to lower the risk of hiring younger workers.
5. An education accountability chain, with lines of responsibility from state to classroom.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

6. Phase in national health insurance, with a focus on upgrading public health facilities, producing more health professionals and reducing the relative cost of private health care.
7. Public infrastructure investment at 10 percent of gross domestic product (GDP), financed through tariffs, public-private partnerships, taxes and loans and focused on transport, energy and water.
8. Interventions to ensure environmental sustainability and resilience to future shocks.
9. New spatial norms and standards – densifying cities, improving transport, locating jobs where people live, upgrading informal settlements and fixing housing market gaps.
10. Reduce crime by strengthening criminal justice and improving community environments. (pg 26).

Therefore, the granting of this waste management licence (the applicant's intervention through upgrading his current system) will help enhance environmental sustainability and protection by combating illegal treatment of waste, which will have a mitigating effect on pollution prevention and improve sustainable business practices.

1.1.8. Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.)

Climate change is a serious international environmental concern and the subject of much research. Moreover, in international scientific circles, a consensus is growing that the build-up of $C0_2$ and other Green House Gases (GHGs) in the atmosphere will lead to major environmental changes such as (1) rising sea levels that may flood coastal and river delta communities; (2) shrinking mountain glaciers and reduced snow cover that may diminish fresh water resources; (3) the spread of infectious diseases and increased heat-related mortality;(4) possible loss in biological diversity and other impacts on ecosystems; and (5) agricultural shifts such as impacts on crop yields and productivity (McCarthy, 2001).
Climate change could result in changes in temperatures, cloud cover, rainfall patterns, wind speeds, and storms: all factors that could impact future waste management facilities' development and operation. The time scales for climate change and waste management are similar. For instance, landfill sites can be operational for decades and remain active for decades following their closure. There is, therefore, a need to consider potential changes in waste management over significant timescales and respond appropriately.
To give some indication of how climate change and waste management could interact, the table below presents a general assessment of what climate change could mean for waste management.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Table 3: Summary of Potential Climate Change and their Impacts

Climate Variable	Potential Climate Change	Examples of Impacts on Waste Management
Temperature	Annual warming of between 1^0 and 5^{0C} by the 2080s	Increased water demand for both workers and site operations.
	More hot days increases especially in dry seasons	Decline in air quality and subsequent negative impacts of heat on vulnerable groups.
	Number of cold days decreases, especially in rainy seasons	Impacts on biological processes e.g. composting anaerobic digestion etc.
	More frequent stagnant summer anticyclones.	Increased risk of changes in distribution of vermin and pests.
Precipitation	Generally wetter days for Nigeria, especially in the south.	Increased risk of flooding from groundwater, surface water, tidal and sea surfaces.
	Precipitation intensity increases in rainy seasons	Disruption to infrastructure e.g. road and rail
		Increased precipitation intensity could affect slope stability on waste management sites (Jones, 1993)
		Impacts on biological processes e.g. composting, anaerobic digestion etc.
Cloud Cover	Reduction in cloud cover	Risk to workers of skin conditions associated with increased exposure to sunshine during outdoor workings.
Humidity	Specific humidity increases especially during rainy seasons	Impacts on outdoor biological processes.
Sea level	Mean sea level may be up to 86cm above its current level due to thermal expansion and natural land movements by the 2080s.	Inundation of waste management facilities. Increased erosion of coastal areas.

Figure 5. Summary table of potential climate changes derived from McCarthy, 2001.

References:

EC (2001): Determination of the Impacts of Waste Management Activities on Greenhouse Emission. Submitted by ICF Consulting, Tonic-Smith Associates and Environs – RIS.

McCarthy, J.J. (2001): Climate Change (2001): Impacts, Adaptation, and Vulnerability. IPCC. Cambridge University Press. pp. 9 – 13.

1.2. How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?

The potential impact on local water resources including wetlands and terrestrial ecosystems from abattoir waste streams and effluents has been well documented. The development of the proposed waste and wastewater infrastructure at the abattoir will improve the pollution control measures on site. The construction of mortality tanks for the replacement of the current unlined mortality pit and the installation

of a WWTW to receive the wastewater effluent from the abattoir will significantly reduce the potential impact on the local environment from these polluting sources.

The waste streams that are concerned with this application have been analysed to determine their hazardous nature and that will determine the requirements of the control measures needed to mitigate any potential negative impact on the environment.

The proposed new abattoir waste and wastewater infrastructure will also take pressure off existing municipal services including sewage treatments works and waste management facilities that are already under pressure.

Page 37 of the Executive Summary of the NDP 2030, touches on improving infrastructure by saying: *Infrastructure is not just essential for faster economic growth and higher employment. It also promotes inclusive growth, providing citizens with the means to improve their own lives and boost their incomes. Infrastructure is essential to also enhance ecosystems.*

Furthermore, to that, the impact assessment and environmental management programme identifies all the potential impacts and how they could be managed (refer to **Appendix D & F,** respectively).

The impact assessment shows that almost all identified impacts can be effectively mitigated, indicating that the cumulative impact effect will also be mitigated. Additional impacts and quantification of cumulative impacts were assessed by the following appointed specialists:

- Aquatic studies including Present Ecological Status (**Appendix E: Annexure A**); and
- Geohydrological Study (**Appendix E: Annexure B**).

1.3. How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?

The purpose of the WML application for the construction of mortality tanks is intended to improve the treatment of waste at the abattoir and prevent the potential risks posed by the current unlined mortality pit. The reinforced concrete mortality tanks will improve the biophysical environment by implementing a licenced waste treatment facility and the management and operational requirements that will have to fulfilled.

The main reason for the project development and the WML application is to replace several of the waste activities on site that currently have a potential negative impact on the environment. This development will improve the biophysical environment surrounding the abattoir site. The proposed location of the mortality tanks will be on already disturbed land and waste management facilities will comply with the requirements of the Waste Act including the correct mitigation measures.

The potential impact on local water resources including wetlands and terrestrial ecosystems from abattoir waste streams and effluents has been well documented. The development of the proposed waste and

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

wastewater infrastructure at the abattoir will improve the pollution control measures on site. The construction of mortality tanks for the replacement of the current unlined mortality pit and the installation of a WWTW to receive the wastewater effluent from the abattoir will significantly reduce the potential impact on the local environment from these polluting sources.

The impacts of the new mortality tanks have been assessed within an Impact Assessment, considering all specialist studies undertaken and an EMPr formulated (refer to **Appendix E & F,** for the full findings and management thereof).

1.4. What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?

The project will generate general waste in the form of building and demolition waste (discarded concrete, bricks, soil, stones and other discarded building and demolition wastes during construction of the mortality tanks. Please refer to the Waste Management section of the EMPr (**Appendix F**) to see what measures were taken to avoid, minimise, reuse and/or recycle any waste generated on site.

Furthermore, the treated waste from the mortality tanks will now be beneficiated into a fertilizer to be irrigated/fertigated along with the treated WWTW onto the rotational grazing areas of the feedlot; reducing both waste generation and raw water usage.

The applicant will have to take note of Chapter 7 within the GSDM Waste By-Laws, as follows, on page 28:

WASTE MINIMIZATION AND RECYCLING
22. Reduction, Re-use, Recycle & Recovery of waste
(1) All generators and holders of waste must ensure that waste is avoided, or where it cannot altogether be avoided, minimized, re-used, recycled, or recovered wherever possible and disposed of in an environmentally sound manner.
(2) Any person who is undertaking reduction, re-use, recycling or recovery of waste including scrap dealers, waste treatment facilities and formalised recycling groups must, before undertaking that activity, make sure that the activity is less harmful to the environment than the disposal of such waste, waste management will be successful.

Apart from a holder of waste's duty to apply the waste hierarchy process in terms of section 16 of the NEMWA, 2009, it will be in the applicants financial and the environment's best interests to do so.

1. Avoid

   It goes without having to say that waste prevention and reduction (below) should be a compulsory component of any Waste Management Programme given that it costs the generator nothing and has the greatest benefit to the environment. Avoidance can be achieved by separating the different waste streams at source to prevent the contamination of waste streams by hazardous waste. Grease traps should be installed in the drains. The fat solidifies, rises to the surface and can be removed regularly.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Solids (meat or skin trimmings, hair, pieces of bones, hooves, etc.) can be screened by providing the drains with vertical sieves, which act as a filter, catching the solids, but letting the water through. Prevent solids and other materials from being hosed into the drainage system of the Dressing Area by dry brush cleaning the floor before watering the area. Avoid the contamination of wastewater with hydrocarbons at the vehicle wash bay by prohibiting drivers from washing their engines and undercarriage.

2. Reduce

You can minimise waste volumes through water conservation and optimum water housekeeping. High levels of water are being wasted by washing faeces from the holding pens (lairages) into the drainage system without prior removal of any waste. Do not hose down animal faeces from the holding pens into the drains. Shovel most of the solid waste to the trailer for the rumen and intestinal content before washing the floors. Similarly, brush the faecal waste from the transport vehicles before washing them with water. Fit the water hoses with water saving devices. Water hoses that are not pressurized result in higher than necessary volumes of water being used. Separate the storm water runoff from areas containing waste or wastewater from the abattoir's/feedlot's activities.

Use existing waste disposal facilities to minimise the amount of waste that needs to be handled by the abattoir. Consequently, we support the proponent's intention to pump the domestic wastewater, including grey water and human sewerage from the Change Rooms (showers, toilets and hand wash facilities) to the new WWTW. Investigate the potential for pumping the wastewater from the holding pens and vehicle washing bay, excluding hydrocarbons and animal faeces, to the WWTW. We further recommend that general waste generated in the offices is separated for recycling and/or disposal at a registered municipal landfill site.

3. Reuse, Recycling and Recovery

The remaining waste streams after implementing the abovementioned avoidance and reduction strategies include:

- condemned meat,
- rendered blood from the Bleeding Area,
- organic solids (meat or skin trimmings, hair, pieces of bone and hooves) from the Dressing Area,
- manure, rumen and intestinal contents from the Holding pens and Rough Offal Room, and
- wastewater/effluent (including some blood, organic solids (meat or skin trimmings), hair, pieces of bone, hooves, and grease/fat) from the Dressing Area and Rough Offal Room.

All the aforesaid waste streams can be recovered or treated. Any portion of waste once re-used, recycled, or recovered ceases to be waste (following approval by the Department), the resulting products have commercial value and there is an element of cost recovery.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

All treated waste from the mortality tanks will be enter the inlet works of the WWTW for secondary treatment to be included with the treated effluent from WWTW to be used in the irrigation of the grazing lands. The quality of this irrigation water will be monitored to ensure it conforms with the relevant Section 21(e) standard under the National Water Act (Act 36 of 1998).

1.5. How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?

Although the risk that the development will disturb landscapes and/or sites that constitute the nation's cultural heritage is considered low, a desk top heritage resource assessment was completed by a qualified archaeologist to determine if a full heritage assessment is required. The risk was determined low resulting in a motivation for exemption being submitted to SAHRA. SAHRA accepted the motivational letter of exemption from the Act on the 13th of December 2019.

In terms of visual impact, the proposed development will have a limited or negligible visual impact due to the preferred position of the new mortality tanks within the current footprint of the feedlot property. These footprints have existing vegetation and rocky ridges that act as buffers or screens to any view from outside the property, and are largely below ground level.

1.6. How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?

Strictly speaking, no non-renewable resources will be affected nor depleted from this development, other than a marginal increase in electricity usage when pumping treated effluent from the mortality tanks to the inlet works of the WWTW. However, the local water resources will be protected from pollution and contamination from these waste bodies, which will now be treated in a bunded structure.

An Impact Assessment has been completed, considering all specialist studies undertaken and an EMPr formulated (refer to **Appendix D & F**, for the full findings and management thereof).

1.7. How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

The mortality tanks will provide a fully bunded and contained environment in which certain abattoir and feedlot waste streams will be treated. This is a significant improvement on the current unlined pit system and will help ensure that no contamination takes place to any water resource or soil contamination and ensure that surrounding land users retain access to high quality water resources.

Please refer to the Impact Assessment on **Appendix D.**

1.7.1. Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)

Page 37 of the Executive Summary of the NDP 2030, states that improving infrastructure is not just essential for faster economic growth and higher employment. It also promotes inclusive growth, providing citizens with the means to improve their own lives and boost their incomes. Infrastructure is essential to development.

It is considered that the proposed mortality tanks will help reduce the amount of waste going to landfill for disposal, instead the treatment of the waste will generate a by-product of final effluent which will used as an organic fertiliser. The WML application is part of a holistic approach being implemented at the abattoir and feedlot to reduce waste and wastewater generation, including cleaner and more efficient operation. As the mortality tanks rely on microbial digestion, it is a very energy efficient option of waste treatment.

1.7.2. Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)

The GSDM Final IDP 16/17 on page 26 states that all Municipalities are expected to consider the 12 Outcomes when reviewing their IDPs and developing their annual Budgets. One of those 12 outcomes is that of:

• OUTCOME 10: PROTECTION AND ENHANCEMENT OF ENVIRONMENTAL ASSETS AND NATURAL RESOURCES

The mortality tanks provide a low capital and operational cost option for treating the stated waste streams. Furthermore, the waste will be beneficiated into a suitable fertilizer to be included into the irrigation of the rotational grazing lands. Irrigating with a nutrient enriched effluent will mitigate the need for inorganic fertiliser inputs yet help improve the production of grass biomass and nutritional status of the fields.

1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?

The mortality tanks will require the input of water on a monthly basis, to create the suitable anaerobic environment necessary for the breakdown of the waste products. However, the water volumes are not

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

excessive and can be easily met by the water resources available and within the legal abstraction limits. Furthermore, these water resources are not lost to the system, as the treated volume is again irrigated onto the grazing lands. No external energy sources are required in the treatment process, in the form of heat or electricity, making this treatment option very low on resource dependency and sustainable over the long-term.

1.8. How were a risk-averse and cautious approach applied in terms of ecological impacts?

The impact assessment undertaken aimed to cover ecological impacts too. Please refer to **Appendix D** for the Impact Assessment to see how the risk-averse and cautious approach was applied. The ecological specialist recommendations and mitigations were included for implementation in the EMPr.

1.8.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?

Assumptions made when assessing the impact:

- No servitude wayleaves are required prior to commencement of construction.
- The requisite "Waste Management License to construct" under the NEM: WA will be in place prior to construction.
- The site is not so remote that access to services, especially during construction is restrictive e.g. toilet facilities etc.
- There will be no requirement for a workshop or wash bay at the construction site as existing permanent facilities of the Abattoir will be utilised.
- The project construction phase will not include any sand mining, borrow pits, blasting or rock drilling.
- Although this treatment efficiency of this type of technology cannot be quantified, this uncertainty is mitigated by ensuring secondary treatment in the WWTW.

1.8.2. What is the level of risk associated with the limits of current knowledge?

The level of risk is low and will be minimised through adherence to the EMPr. The quality of the final treated effluent cannot be accurately determined, and the assumption is made that the technology will achieve the desired standards. Section 21(e) of the National Water Act (Act 36 of 1998) provides quality thresholds for wastewater irrigation, which will need to be attained before allowing the treated waste to be used for irrigation purposes. The fact that the treated waste will be combined with the treated effluent from the WWTW will further help ensure compliance with the relevant irrigation quality standards from the dilution factor.

1.8.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?

An environmental impact assessment was done as part of the EIA process covering all activities and associated environmental aspects to ensure a full life-cycle approach was adopted. This process included quantifying the pre- and post-mitigation risks to ensure any residual risk was still acceptable. All the findings, recommendations and mitigations are included in there. Please refer to **Appendix D** for the Impact Assessment.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

1.9. How will the ecological impacts be resulting from this development impact on people's environmental right in terms of the following:

1.9.1. Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?

The current practice of treating mortalities and certain abattoir waste streams in open pits poses a threat to groundwater. Furthermore, the pits are open and pose a further injury and drowning risk to both human and animals. The new concrete mortality tanks will provide a closed system that complies with Engineering Standard BS8007, to significantly limit risk to both the receiving environment and people.

Any known negative impacts in terms of access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts have been addressed in an environmental impact assessment. Please refer to the impact assessment in **Appendix D.**

1.9.2. Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?

Positive impacts include, but are not limited to:

- Increase in and enhancement of the treatment of the mortality carcases;
- Decrease in the possibility of groundwater contamination currently posed by the unlined mortality pit;
- Decrease in the safety risk i.e. people and animals falling into the existing pit;
- Improved rangeland production using the treated waste as a fertiliser and reduced need for inorganic fertilisers;
- Reduced raw water usage for irrigation;
- Measures to enhance these positive impacts are included in the EMPr.

1.10. Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?

The mortality tanks footprint is very small and results in minimal transformation of the natural landscape. The treated waste emanating from the mortality tanks will be used to irrigate the rotational camps, that form part of the broader feedlot system. The fertilising effect of this waste stream will help improve grass production and in turn growth of the livestock. The increased production outputs translate into an improved ecosystem service to the applicant and remains a more sustainable option than the use of inorganic fertilisers. Very little linkages and dependencies exist outside the abattoir and feedlot operations, other than to say that the on-site treatment of the waste will reduce the burden on municipal treatment facilities.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

1.11. Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?

The Aquatic PES study that was undertaken showed that many of the integrity indices of the area were very poor and the proposed mortality tanks, coupled with other interventions (wastewater treatment works) will help reduce pollution and contamination of especially the receiving aquatic environments. These wastes and wastewater interventions will result in a direct improvement to the immediate ecological integrity.

The paragraphs below elucidate on several of the broader ecological objectives that may be relevant to the project area and which the project will help to achieve:

Page 39 of the final MLM IDP 2016/17, under the government priority outcomes, outcome 10 is "PROTECTION AND ENHANCEMENT OF ENVIRONMENTAL ASSETS AND NATURAL RESOURCES", which is as follows:

1. Enhance quality and quantity of water resources.
2. Reduce greenhouse gas emissions, mitigate climate change impacts, and improve air quality.
3. Sustainable environment management.
4. Protect biodiversity.

The Mkhondo Local Municipality (MLM) SDF 2016, Page 43 & 198, respectively states the following:

Biodiversity:

Negative impacts on biodiversity hot spots and environmentally sensitive areas found within the District originate primarily from economic activities such as forestry, mining and subsistence agriculture. Mining specifically, is encroaching on several conservation areas and important wetlands. Other activities impacting on biodiversity levels and environmentally sensitive areas include industry, urban development, and natural resource usage within economically isolated areas showcasing high levels of poverty.

The irreplaceable sites within the GSDM are mainly situated on the southern boundary with KZN in Mkhondo and Dr Pixley ka Isaka Seme Local Municipalities. There are wide-spread areas of high significance situated in the central areas of the District stretching across in an east-west direction.

Essentially, natural and untouched habitats are rapidly decreasing and becoming increasingly fragmented into unsustainable habitats, which leads to loss of biodiversity.

Conservation Areas:

Crucial to the optimal functioning of important eco-system services that support the agriculture, forestry and tourism sectors as well as national water security, the following conservation areas are protected in MLM:

Protected Areas: Areas that are formally protected by law and recognised in terms of the Protected Areas Act;

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Critical Biodiversity Areas (CBAs): Areas that are required to meet biodiversity targets for species, ecosystems or ecological processes. CBAs are areas of high biodiversity value and need to be kept in a natural state, with no further loss of habitat or species. These include (1) all areas required to meet biodiversity pattern targets and to ensure continued existence and functioning of species and ecosystems, special habitats and species of conservation concern; (2) critically endangered ecosystems; and (3) critically linkages (corridors 'pinch points') to maintain connectivity;

Ecological Support Areas (ESAs): Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of protected areas or CBAs and for delivering ecosystem services. In the terrestrial assessment, these areas support landscape connectivity and strengthen resilience to climate change. ESAs need to be maintained in at least a functional and often natural state, supporting the purpose for which they were identified. They include features such as riparian habitat surrounding rivers or wetlands, corridors, over-wintering sites for Blue Cranes, and so on; and

Strategic Water Source Areas supply a disproportionally high amount of the country's mean annual runoff in relation to their surface area. These areas are acknowledged strategic national assets and are legally protected, requiring land to be managed in a way that it does not significantly undermine their role as key water sources.

The proposed new mortality tanks will have a positive impact on the ecological integrity of the area as it will improve control measures and containment of the waste treatment. It will enable the decommissioning of the current unlined mortality pit which poses potential negative environmental impacts on local water resources. The construction of the mortality tanks will be a positive impact and assist in the achievement of the targets and objectives discussed above for the local municipality.

1.12. Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?

Refer to Alternatives section on **Section G**.

1.13. Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?

Refer to Impact Assessment (**Appendix D)** and Alternatives in **Section G**.

2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?

2.1.1. The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Page 33 of the GSDM IDP 2016/2017, mentions an Integrated Support Plan (ISP) for accelerated municipal service delivery which has the following objectives:

I. To provide democratic and accountable government for local municipalities,

II. To ensure the provision of service to communities in a sustainable manner,

III. To promote social and economic development,

IV. To promote a safe and healthy environment,

V. To encourage the involvement of communities and community organisation in matters of local government,

VI. To secure sound and sustainable management of the fiscal and financial affairs of municipalities and municipal entities by establishing norms, standards and other requirements.

2.1.2. Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.)

Page 68 of the MLM Final IDP 2017 – 2021:

Figure 6. Table on Page 68 of the MLM Final IDP 2017 – 2021.

2.1.3. Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.)

This development is merely a change and/or improvement to an existing operational waste management system, in order to comply with environmental and water regulations. There will be no significant impacts or changes to existing land uses, planned land uses, cultural landscapes, etc.

2.1.4. Municipal Economic Development Strategy ("LED Strategy")

Page 119 of the Final Mkhondo LM IDP 2016/17 states that the main objectives of LED as per LED framework and Mkhondo IDP are to:

- Align LED Strategy with all government policies and development objects, which are mainly job creation and eradication of poverty.
- Ensure gaps identified are covered in this strategy
- Ensure the strategy meets and works towards Mkhondo Local Municipality's vision
- Ensure a credible and implementable LED Strategy
- Diversification of economic sectors to reduce reliance on mining, quarrying and agriculture,
- **A productive economy with high levels of service, skilled workforce and modern systems of work organization and management.**
- Eradication of poverty reduce the income inequalities and provide basic services for all.
- Economic growth in a sustainable manner, for the benefit of all the communities living in the Mkhondo Local Municipality.
- Employment and increase levels of participation in the economy by all, especially by the previously excluded and presently marginalised, and
- A fair, effective, and conductive business environment for enterprises and consumers.

The approval of this application will result in a productive economy with high levels of service (the upgraded system will affect the groundwater less and will produce an end product that can be used as a fertiliser), skilled workforce and modern systems (the proposed system will have a positive impact on the

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

ecological integrity of the area as it will improve control measures and containment of the waste treatment) of work organization and management.

2.2. Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?

Page 27 of the MLM Final IDP 16-17 has the following diagram to depict the socio-economic state of the municipality.

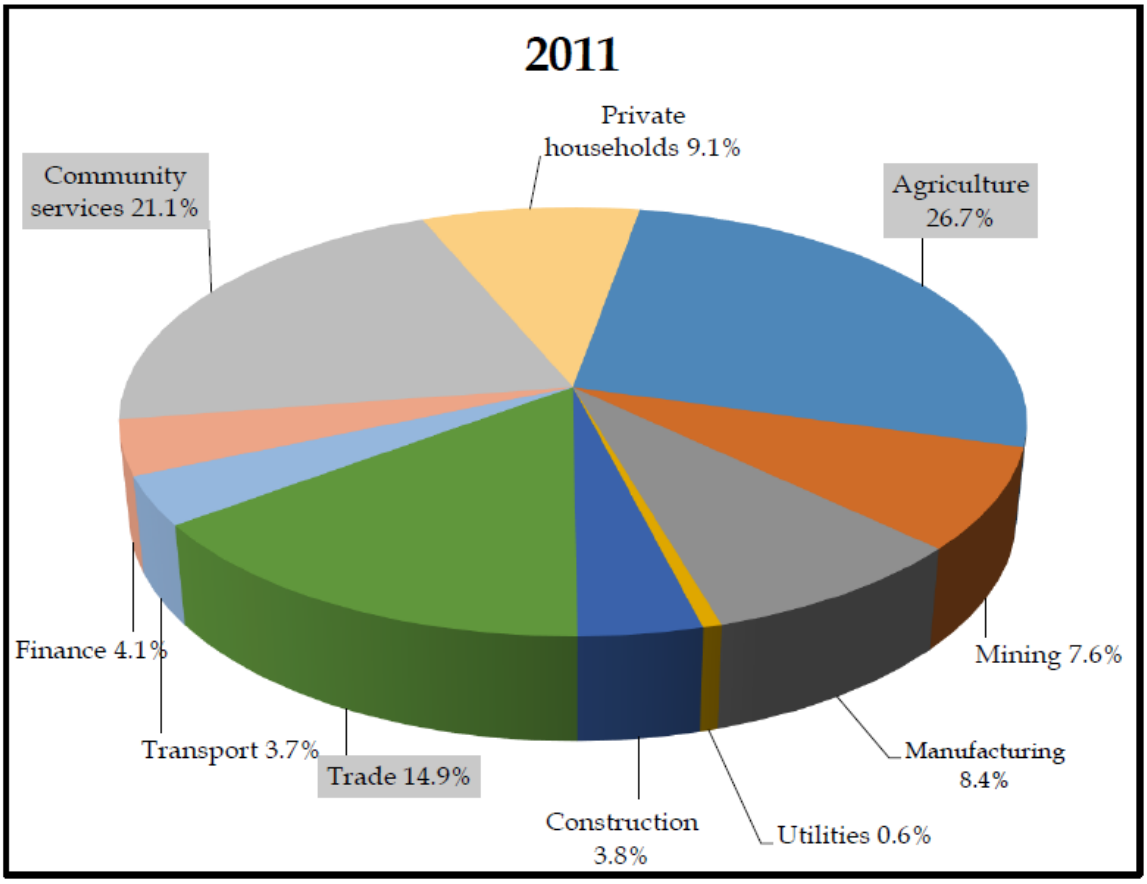


Figure 7. Socio-economic pie chart.

This development will improve waste management of the existing facility, in a self-regulating manner and will not place an additional burden on any municipal systems. These improvements will help the applicant to comply with environmental and water regulations and assist in regional attained of some of the socio-economic objectives relating to sustainability and environmental management.

2.2.1. Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?

This development is to upgrade an existing facility, and in so doing will augment the current skills and knowledge base of the current work force. Page 18 of the GSDM IDP Summary 16/17, suggests that according to the public, small businesses need to be nurtured, as well as improved and compliant waste management activities and water quality.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Municipality	Issues raised during Public Consultations	Issues emanating from the IDP analysis
Mkhondo LM	• Invest on local contractors • Roads upgrade and construction of bridges • Water shortage • There is a need for new boreholes and repair of existing ones • There is a need for dislaging of VIP toilets • Electricity • Request for sanitation facilities for the elderly • Nurturing of small businesses	• High rates of youth unemployment • Second largest waste producer in the district • Low rate of refuse removal • The lowest in terms of number of households with access to piped water at 60% • Highest number of people without sanitation • Ranked at 18(last in the province) in terms of blue drop performance • The lowest in terms of electric connections at 67,5%

Figure 8. Extract from the GSDM IDP highlighting certain socio-economic needs which includes the need to nurture small businesses, high rates of waste production and poor "Blue Drop" performance in terms of water and effluent quality.

2.3. How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?

This development is to upgrade, improve and replace an existing unlined mortality pit, and will not directly address any specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities. However, a more efficient waste management system and cleaner resultant environment will have an indirect benefit to surrounding communities and those within the employment of the applicant.

2.4. Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?

The development will result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term, as the proposed waste management improvements will result in less pollution, lowered compliance risk and help ensure the ecological integrity of the affected land parcels.

Short- and long-term social impacts: The safety risk of having people or animals falling into the pit will no longer exist.
Short- and long-term economic impacts: The risk of having to rehabilitate or reverse ground water contamination will no longer exist. The amount spent on fertilisers will be reduced, because the new system will have fertilizer as a by-product.

2.5. In terms of location, describe how the placement of the proposed development will:

2.5.1. result in the creation of residential and employment opportunities near or integrated with each other

This development is to upgrade, improve and replace an existing unlined mortality pit, there will not be any creation of residential and employment opportunities. The existing work force will be used to manage the facilities and their skills and knowledge on the operation will be upgraded accordingly.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

2.5.2. reduce the need for transport of people and goods

Previously, condemned material was transported and treated at a local Alkaline Hydrolysis facility, which will no longer be required with the upgraded mortality tanks.

2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport)

The current work force resides on the property and does not make use of transport to and from site daily.

2.5.4. compliment other uses in the area

The decreased risk of groundwater contamination will improve the quality of the water for the boreholes on site and possibly groundwater resources further afield. The fertiliser that will be a by-product of the new system can be used to fertilise the area for better grass to feed the cattle and landscaping purposes.

2.5.5. be in line with the planning for the area

This development conforms to many aspects of municipal strategic plans for the areas.

2.5.6. for urban related development, make use of underutilised land available with the urban edge

This is a non-urban related development, as it falls outside the urban edge surrounded by commercial forestry.

2.5.7. optimise the use of existing resources and infrastructure

The decreased risk of groundwater contamination will improve the quality of the water for localised boreholes. The fertiliser that will be a by-product of the new system can be used to fertilise the area for better grass to feed the cattle and landscaping purposes.

Page 37 of the Executive Summary of the NDP 2030, touches on improving infrastructure by saying: *"Infrastructure is not just essential for faster economic growth and higher employment. It also promotes inclusive growth, providing citizens with the means to improve their own lives and boost their incomes."* Infrastructure improvement is essential for this development to optimise the operation use of the abattoir and feedlot operations and improve on the current unlined mortality pits.

2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement)

This development is not provided for in the infrastructure planning of the municipality as it is a private development outside of the urban edge of the local municipality and as such will not have any negative impacts on any municipal infrastructure planning.

2.5.9. discourage "urban sprawl" and contribute to compaction/densification

The purpose of the proposed activity is to upgrade, replace and improve an existing unlined mortality pit, therefore will not discourage "urban sprawl" nor contribute to compaction/densification. However, the

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

existing labour force is already accommodated on the property, an aspect that will not change with the implementation of this project.

2.5.10. contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs

The existing labour force is already accommodated on the property, an aspect that will not change with the implementation of this project.

2.5.11. encourage environmentally sustainable land development practices and processes

The safety risk of having people or animals falling into the pit will no longer exist.
The risk of having to rehabilitate or reverse ground water contamination will no longer exist.
The amount spent on fertilisers will be reduced, because the new system will have fertilizer as a product.

2.5.12. consider special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.)

The location of the mortality tanks is strategically placed to remain accessible to the areas of waste generation, but far enough away that any potential offensive odours do not affect the workforce. The location of the site is 1.7km outside the town of Piet Retief, so no surrounding landowners or occupiers will be affected, while the site remains close enough to retain access to almost all basic needs and services.

2.5.13. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential)

Page 21 of the MLM Final IDP 16-17, outlines the following opportunities for the municipality:

- N2 National road cuts through the central parts of the municipal area;
- Centrally located for industrial development and tourism;
- Existence of Tourism Centre could enhance tourism potential in the area;
- Markets could be established, with beneficiation of forest products to be a focus area;
- High residential demand;
- Land Reform provides opportunities for access to more land and economic benefits for the people;
- Batho Pele principles could enhance service delivery and development in general;
- Strong business community;
- **Recycling of waste could provide business opportunities and enhance environmental sustain-ability;**
- Availability of external funding for development and infrastructure; and
- Key partners have already been identified.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

The capital and operational costs of the mortality tanks are low while still be able to beneficiate the treated waste into a fertiliser to be used for the improvement of the grazing lands. Meanwhile the environmental sustainability will be enhanced through the decreased risk of groundwater contamination.

2.5.14. impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and

The proposed activity will have no negative impact on the sense of history, sense of place and heritage of the area, the socio-cultural and cultural-historic characteristics, and sensitivities of the area.

2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?

The mortality tanks will assist in more sustainable waste management which will help ensure the overall well-being of the labour force, who are accommodated with staff housing on the affected properties.

2.6. How were a risk-averse and cautious approach applied in terms of socio-economic impacts?

The identified activities associated environmental aspects and impacts were identified during the Impact Assessment process and mitigated where necessary. However, the replacement and improvement on the existing unlined mortality pit reduces environmental and human health risks.

2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?

The following assumptions were made when assessing the project impacts:

- No servitude wayleaves are required prior to commencement of construction.
- The requisite "Waste Management License to construct" under the NEM: WA will be in place prior to construction.
- Construction will be constrained to within the dry season.
- There will be no requirement for a workshop or wash bay at the construction site as existing permanent facilities of the Abattoir will be utilised.
- The project construction phase will not include any sand mining, borrow pits, blasting or rock drilling.

2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?

Water quality has been identified as a key area of concern in the area, and the current practice of placing mortality and offcuts into an unlined earthen pit, poses a risk to groundwater quality. The construction and operation of concrete bunded tanks, built in accordance to the BS8007 Engineering Standard, will almost eliminate this risk. Clean water remains a critical resource in the area and South Africa as a whole, and every measure must be made to retain our scarce water resources in an uncontaminated state.

2.6.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

The activities associated with the upgrade were identified before their impacts could be predicted. Safety nets were considered to capture those elements that were unidentified. Then, mitigations were sought and tailored to counteract the project-specific impacts and achieve goals and objectives in line with environmental best practices. Finally, an Environmental Management Programme **(Appendix F)** was formulated to help minimise and/or avoid any risks that might occur.

2.7. How will the socio-economic impacts be resulting from this development impact on people's environmental right in terms following:

2.7.1. Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?

This project, if approved, will in fact be able to combat the possibility of people and animals falling into the current mortality pit and the possibility of the air-borne diseases that might occur from the existing pit.

In addition, the potential impacts and quantification of cumulative impacts were assessed by the following appointed specialists in relation to threatened ecosystems:

- Aquatic Study including PES and Wetland Delineation Assessment.
- Geohydrological Study.

The impact assessment shows that almost all identified impacts can be affectively mitigated, indicating that the cumulative impact effect will also be mitigated (Refer to **Appendix D & F**).

2.7.2. Positive impacts. What measures were taken to enhance positive impacts?

The principle positive impact relates to the minimising of risk posed by the contamination of groundwater and risk to human safety, posed by the current treatment system on site. For further information on how the positive impacts can be enhanced, please refer to the Impact Assessment **(Appendix D)**.

2.8. Considering the linkages and dependencies between human wellbeing, livelihoods, and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?

The development poses a positive socio-economic impact and ecological impact, in such that the waste treatment will create a final effluent that can be used as a fertiliser for irrigation and reduces contamination risk to groundwater resources. Irrigating with wastewater will help reduce the use of raw water and improves the grazing quality of the cattle. This local business is an important source of employment to the local population.

2.9. What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?

The Best Practicable Environmental Option (BPEO) is a tool advocated for making waste management decisions emphasising that the waste hierarchy of reduce, reuse, recycle, recovery and finally disposal

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

cannot be applied without taking into consideration, environmental, economic, and social impacts. The current proposal has no negative socio-economic implications, only positive ones.

Any concerns raised by registered Interested and Affected Parties (I&APs) have been captured and addressed in the Public the Participation Process in **Section H (iii) & Appendix C**.

2.10. What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?

Refer to the Alternatives **Section on H (i).**

2.11. What measures were taken to pursue equitable access to environmental resources, benefits, and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?

The development aims to reduce the risk of groundwater contamination and ensure access to clean groundwater by surrounding land uses. Several of the surrounding land users are historically disadvantaged communities living in informal settlements that may not have access to municipal services.

Any concerns raised by registered Interested and Affected Parties (I&APs) have been captured and addressed in the Participation Process in **Section H (iii) & Appendix C**.

2.12. What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?

Please refer to the Impact Assessment and Environmental Management Programme in **Appendix D** & **Appendix F**, respectively.

2.13. What measures were taken to:

2.13.1. ensure the participation of all interested and affected parties

Please refer to the Public Participation Process **Section H (iii) & Appendix C**.

2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation

Please refer to the Public Participation Process **Section H (ii) & Appendix C**.

2.13.3. ensure participation by vulnerable and disadvantaged persons

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Please refer to the Public Participation Process **Section H (iii) & Appendix C**.

2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means

The proposed project was made public knowledge, refer to the Public Participation Process **Section H (ii) & Appendix C**.

2.13.5. ensure openness and transparency, and access to information in terms of the process

Please refer to the Public Participation Process **Section H (iii) & Appendix C**.

2.13.6. ensure that the interests, needs and values of all interested and affected parties were considered, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and

Please refer to the Public Participation Process **Section H (iii) & Appendix C**.

2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein where be promoted?

Please refer to the Public Participation Process **Section H (iii) & Appendix C,** for the details of the interested and affected parties that were brought into consideration, what issues or concerns they raised and how they are going to be addressed. Table 7 provides the workforce profile, including indicating the number of women employed.

2.14. Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?

The proposed activity is to upgrade, replace and improve an existing unlined mortality pit. The main community benefit will be the continued supply of employment opportunities through the abattoir and feedlot. The purpose of the proposed mortality tanks is to ensure the abattoir is fully compliant with the NEM: Waste Act and does not lead to the closure of the operation and loss of labour due to environmental non-compliance with associated employment implications.

2.15. What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?

A section on social, health and safety has been incorporated into the Impact Assessment as well as the Environmental Impact Assessment which will be carried through to the EMP which adopts a life-cycle approach and will aid in the ongoing compliant operation of the mortality tanks.

2.16. Describe how the development will impact on job creation in terms of, amongst other aspects:

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

2.16.1. the number of temporary versus permanent jobs that will be created

No jobs will be created. The proposed activity is to upgrade, replace and improve an existing unlined mortality pit. The applicant is not looking to hire any new staff, he will be keeping his existing workforce, no additional temporary or permanent jobs will be created as direct effect of the proposed development.

2.16.2. whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area)

The applicant is not looking to hire any new staff, he will be keeping his existing workforce, no additional jobs will be created.

2.16.3. the distance from where labourers will have to travel

The existing workforce resides on the property, so the development will have no travel implications.

2.16.4. the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and

The location of the mortality tanks will be near the existing unlined mortality pits, so no additional costs or benefits will be derived from an employment basis.

2.16.5. the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.)

No additional jobs will be created, nor will any jobs be negatively impacted. Improvements to sustainable business practices helps ensure *inter alia* job security.

2.17. What measures were taken to ensure:

2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and

Please refer to **Section E (i)** for the list of environmental legislation and policies that was considered and used for the formulation of the main report and the appendices. Furthermore, any authorisations that are required through the listed legislation is being applied for concurrently with this WML e.g. Water Use Authorisation through the IUCMA and registration against the Norms and Standards for Storage of Waste.

2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?

Please refer to the Public Participation Process **Section H (iii) & Appendix C** for more detail. Conflict arose as to whether the application relates to General Waste or Hazardous Waste, and which Competent Authority should be dealing with the application. Following much consultation, including a meeting held at DEA Head Office with representatives of National and Provincial Environmental Affairs, the application was withdrawn from the provincial office for general waste and submitted to the national department for hazardous waste.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

2.18. What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?

An impact assessment that shows that almost all identified impacts can be affectively mitigated was undertaken, indicating that the cumulative impact effect will also be mitigated, was undertaken. Additional impacts and quantification of cumulative impacts were assessed by the following appointed specialists:

- Aquatic studies including Present Ecological Status
- Geohydrological Study.

(Please refer to **Appendix E**)

2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?

The mitigation measures proposed are realistic, ensure proper rehabilitation and will leave no negative environmental legacy or burden.

2.20. What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?

The replacement of waste treatment in unlined earthen pits with concrete mortality tanks is the most effect measure to reduce environmental pollution and degradation. The Impact Assessment and Environmental Management Programme were formulated to cover ways and means of ensuring that all the stakeholders (applicant, contractor & ECO) have roles to play in combating pollution during all the phases (from planning through to decommissioning).

2.21. Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?

Please refer to the alternative types within **Section G (i).**

2.22. Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?

There will be limited socio-economic impacts and the development is at a small localised scale with limited impact on anyone other than the applicant and his workforce.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION G: A MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE;

(g) a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;

The E&T Abattoir is an existing facility located on the outskirts of Mkhondo (Piet Retief), Mpumalanga Province. The development footprint for the Mortality Tanks is required to be near the waste generated at the abattoir & feedlot, to reduce travel costs and time. However, the preferred footprint is also far enough away from any sensitive receptors. Several potential development footprints have been considered by the proponent, but the current location under review has been identified as preferred. Only one (1) alternative site within the property location has been identified in consultation with the EAP, Client and Landowner, which has been assessed to ensure that this preferred site does not result in unacceptable biodiversity impact relative to the alternatives.

The preferred mortality treatment tanks development footprint was based on the findings of the site investigation, the existing mortality pit location and geohydrology of the area. In addition to the preliminary site investigations, there have been additional specialist site assessments completed, including;

- An Aquatic and PES Study was undertaken to, *inter alia*, establish the present ecological state of the project area;
- Heritage Assessment;
- Geohydrological Assessment; and
- Borehole yield site investigation.

These were undertaken to determine the potential impacts on sensitive habitats within the study area and the impact of the proposed mortality tanks on the geohydrology of the local catchment area.

The preferred footprint is to use the same area as the existing mortality pit which will be decommissioned in line with the Norms and Standards for disposal of waste GN 636 dated 13th August 2013. The main reasons for the selection by the applicant and the EAP were the following:

- Access and proximity to the abattoir and feedlot to transport the waste;
- Adequate distance from domestic housing and reduced potential of any odour nuisance;
- The site is already disturbed and heavily modified;
- An existing rocky ridge that screens the waste facility both visually and as a buffer zone between sensitive receptors such as the domestic housing.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION H: INVESTIGATION OF ALTERNATIVES TO REACH THE PROPOSED PREFERRED DEVELOPMENT FOOTPRINT

(h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including:

(i) Details of all the alternatives considered;

Legislative background

The very consideration of a development in terms of EIA is about the consideration of alternatives related to the development. NEMA prescribes that all environmental impact assessments, which are to be utilised in informing an application for environmental authorisation, must identify and investigate the alternatives to the activity on the environment. This should include a description and comparative assessment of the advantages and disadvantages of the proposed activity including feasible and reasonable alternatives will have on the environment and on the community, that may be affected by the activity. If, however, after having identified and investigated alternatives, no feasible and reasonable alternatives exist, no comparative assessment of alternatives, beyond the comparative assessment of the preferred alternative and the option of not implementing the proposed project, is required during the assessment phase. In this instance, the EAP managing the application must provide the competent authority/DEA with detailed, written proof of the investigation(s) undertaken and motivation indicating that no reasonable or feasible alternatives, other than the preferred alternative and the no-go option, exist.

Definition of Alternatives

"Alternatives", in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include the following types of alternatives:

- The property on which, or location where, it is proposed to undertake the activity;
  - Refers to both alternative properties (locations) as well as alternative sites and footprints on the same property.
- The type of activity to be undertaken;
  - e.g. Provision of public transport rather than increasing the capacity of roads.
- The design or layout of the activity;
  - Different architectural and or engineering designs.
  - Consideration of different spatial configurations of an activity on a site (Site Layout).
- The technology to be used in the activity;
  - Option of achieving the same goal by using a different method or process.
- The operational aspects of the activity;
- Demand;
  - When a demand for a certain product or service can be met by some alternative means, i.e. the demand for electricity/storm water controls could be met by supplying more energy or using energy more efficiently by managing demand.
- Input;

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

  - Input alternatives for projects that may use different raw materials or energy sources in their processes.
- Routing;
  - Alternative routes generally apply to linear developments (pipeline routes).
- Scheduling and Timing;
  - Where several measures might play a part in an overall programme, but the order in which they are scheduled will contribute to the overall effectiveness of the result.
- Scale and Magnitude;
  - Activities that can be broken down into smaller units and can be undertaken on different scales, i.e. for a housing development there could be the option 10, 15 or 20 housing units.
- The option of not implementing the activity (no-go option).
  - The no-go option is taken to be the existing rights on the property, and this includes all the duty of care and other legal responsibilities that apply to the owner of the property. All the applicable permits must be in place for a land use to be an existing right.

The key criteria when identifying and investigating alternatives are that they should be "feasible" and "reasonable". The "feasibility" and "reasonability" of and the need for alternatives must be determined by considering, *inter alia*, (a) the general purpose and requirements of the activity, (b) need and desirability, (c) opportunity costs, (d) the need to avoid negative impact altogether, (e) the need to minimise unavoidable negative impacts, (f) the need to maximise benefits, and (g) the need for equitable distributional consequences. The (development) alternatives must be socially, environmentally and economically sustainable. They must also aim to address the key significant impacts of the proposed development by maximising benefits and avoiding or minimising the negative impacts.

Given the definition and description of alternatives, alternatives for investigation in this assessment were first identified by considering whether the different types of alternatives could meet the general purposes and requirements of waste treatment facility for non-infectious carcasses, and subsequently constitute a comparable activity. Thereafter, the need for an alternative was assessed to determine whether it warranted further investigation.

Purpose and requirements of the Mortality Tanks

After the Inkomati-Usuthu Catchment Management Agency (IUCMA) identified several deviations from the National Water Act (NWA, Act 36 of 1998) at the E&T Abattoir, there has been an extensive investigation into the enviro-legal issues relating to the operation of the abattoir. Various waste streams are generated by abattoirs during the processing of live animals into meat, but they can be broadly grouped into one of two distinct categories, namely solid waste, and wastewater. This Waste Management Licence application will be to authorise the construction of new mortality tanks to treat various solid waste streams emanating from the abattoir and feedlot.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

The proposed new mortality tanks will improve the current disposal of mortalities from the abattoir within an unlined mortality pit. The mortality tanks will be part of several improvements in waste and wastewater management and treatment on site.

Identification and investigation of alternatives including motivations

Alternative Type No. 1: Site and Development footprint

- Purpose and Requirements

Given the intention to treat mortality carcasses from the feedlot and trimmings, offcuts, rendered blood and condemned material from the abattoir on portion 8 of Farm Potgieter's 151- HT Farm, alternative properties (Sites) were not considered to meet the requirement of the proposed activity. However, it is possible to construct mortality tanks, to meet the same general purpose and requirement, at alternative development footprints on the same property. Furthermore, there may be a need for alternative development footprints to avoid or minimise negative environmental impacts, such as the destruction of potentially sensitive terrestrial habitats, and the potential prevention or reduction of surface water run-off to downstream users.

The development footprint for the Mortality Tanks is required to be near the waste generated at the abattoir and feedlot, to reduce travel costs and time. However, the preferred footprint is also far enough away from any sensitive receptors. Several potential development footprints have been considered by the proponent, but the current location under review has been identified as preferred. Only one (1) alternative development footprint within the property (Site) has been identified in consultation with the EAP, Client and Landowner and must be assessed to ensure this preferred site does not result in unacceptable biodiversity impact relative to the alternatives.

- Methodology

The preferred mortality treatment tanks development footprint was based on the findings of the site investigation, existing mortality pit and geohydrology of the area. In addition to the preliminary site investigations, there have been additional specialist site assessments completed, including;

- An Aquatic and PES Study was undertaken to, *inter alia*, establish the present ecological state of the project area;
- Heritage Assessment;
- Geohydrological Assessment; and
- Borehole yield site investigation.

These were undertaken to determine the potential impacts on sensitive habitats within the study area and the impact of the proposed mortality tanks on the geohydrology of the local catchment area.

-Criteria used to investigate and assess alternatives

Requirements (criteria) used to identify comparable development footprints included:

- Within portion 8 and 10 of Farm Potgieter's 151- HT Farm.

It was not feasible or reasonable to consider alternative properties (Sites) as the proposed mortality tanks were for the applicants existing activities on the Farm Potgietershoop. However alternative development

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

footprints on the properties have been considered. The alternative development footprints for the mortality tanks were then based on the following technical, topography and environmental criteria:

Technical Siting Criteria for a Waste Facility

Waste Classification and liner design requirements;
Proximity to abattoir and feedlot;
Access roads;
Footprint size requirements;
Topography; and
Buffer zone.

Environmental impacts (Sensitive Receptors)

Loss of biodiversity;
Disturbance to riparian and/or wetland habitat;
Changes in local catchment hydrology/geohydrology;
Storm water management; and
Air quality impacts (i.e. odour).

Social Impacts on human habitations

Job creation; and
Health and Safety aspects.

Economic Considerations

Transport costs.

-Reasoned explanation why an alternative was not found to be feasible:

N/A.

-Environmental Considerations

The property Potgietershoop falls within the KaNgwane Montane Grassland described in Mucina and Rutherford, 2006. However, the property on which E&T Abattoir is located has largely been transformed from a natural landscape due to intensive farming practices including but not limited to, cattle feedlots and grazing, *Eucalyptus* sp. afforestation and associated farming and processing infrastructure. There are only small remnants of natural vegetation left on the property mostly associated with rocky ridges and watercourses that cannot be used for farming practices. A large majority of afforested areas are in the process of being removed and replaced with planted pastures, to increase the area available for grazing as an expansion to the feedlot rotational grazing system.

Mpumalanga Tourism and Parks Agency (MTPA), as the authority mandated to conserve biodiversity in Mpumalanga, have developed the Mpumalanga Biodiversity Sector Plan (MBSP). All site perspective biodiversity assessments therefore need to be contextualised within this provincial biodiversity plan including mapping of the Terrestrial and Aquatic Biodiversity classes and vegetation units.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

The Terrestrial and Aquatic sensitivity classes for the E&T Abattoir site computed "Heavily modified". See **Appendix A: Annexure B** for the Site Sensitivity Plan.

Therefore, in the sub-regional context, development of the mortality tanks will not have a significant negative affect on the biodiversity of the Potgieterhoop area. The main no-go areas would be to avoid the sensitive riparian zones of the unnamed tributary of the Assegaai River that flows through the property.

The following specialist studies have been completed within the Environmental Impact Assessment;

- An Aquatic Study, PES and Wetland Delineation assessment (**Appendix E: Annexure A**);
- A geohydrological assessment (**Appendix E: Annexure B**); and
- Heritage Desktop Assessment with exemption motivation letter from completing a Phase 1 Heritage Impact Assessment.

-Geotechnical Considerations

There were no geotechnical constraints at the abattoir site. The design of the mortality tanks will be approved by a registered Civil Engineer (Pr.Eng.).

-Economic Considerations

The preferred development footprint would be deemed the most practicable, when cost and logistics are combined, meaning the most financially feasible.

Site Selection matrix: Development Footprint Alternative Conclusion

The environmental assessment phase has identified the potential positive and negative environmental (biophysical and social) impacts associated with the proposed new mortality tanks and alterative footprints on the same property (Site). Several issues for consideration were identified by the EAP and appointed specialists during the initial assessment process. These have concluded that there is one preferred footprint, and other alternative footprints on the property cannot achieve the desired outcome. Due to no specific no-go areas on the property (already 'Heavily Modified') other than the sensitive riparian zones, a full site selection matrix could not be achieved.

The preferred footprint is to use the same area as the existing mortality pit which will be decommissioned in line with the Norms and Standards for disposal of waste GN 636 dated 13th August 2013. The main reasons for the selection by the applicant and the EAP were the following:

- Access and proximity to the abattoir and feedlot to transport the waste;
- Adequate distance from domestic housing and reduced potential of any odour nuisance;
- The site is already disturbed and heavily modified;
- An existing rocky ridge that screens the waste facility both visually and as a buffer zone between sensitive receptors such as the domestic housing.

In this case there was no other alternative footprints on the farm Potgietershoop that would be suitable for the mortality tanks in regard of the points highlighted above and investigations by the appointed specialists and EAP.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Alternative Type No. 2: Type of Activity

- Purpose and Requirements

The treatment of non-infectious carcasses/animal off-cuts, trimmings, condemned material and rendered blood in mortality tanks, can be achieved by providing different waste management options. These can involve waste avoidance, reduction, minimisation, recovery, treatment or disposal.

- Methodology

To assess alternative waste management activities, it's important to address the waste hierarchy and investigate if the waste generated cannot be avoided, reduced, minimised, recovered, or by disposal.

The most cost-effective option is to develop your own waste management solutions on site in accordance with the relevant legal requirements. The most cost-effective solution will be to implement technology that can deal in an integrated manner with both the wet and solid waste streams e.g. bio-digestion.

Apart from a waste producer's duty to apply the waste hierarchy process in terms of section 16 of the NEMWA, 2009, it will be in his/her financial and the environment's best interests to do so.

1. Avoid

It goes without having to say that waste prevention and reduction (below) should be a compulsory component of any Waste Management Programme given that it costs the generator nothing and has the greatest benefit to the environment. Avoidance can be achieved by separating the different waste streams at source to prevent the contamination of waste streams by hazardous waste. Where possible, grease traps should be installed in the drains. The fat solidifies, rises to the surface and can be removed regularly. Solids (meat or skin trimmings, hair, pieces of bones, hooves, etc.) can be screened by providing the drains with vertical sieves, which act as a filter, catching the solids, but letting the water through. Prevent solids and other materials from being hosed into the drainage system of the Dressing Area by dry brush cleaning the floor before watering the area. Avoid the contamination of wastewater with hydrocarbons at the vehicle wash bay by prohibiting drivers from washing their engines and undercarriage.

2. Reduce

You can minimise waste volumes through water conservation and optimum water housekeeping. High levels of water are being wasted by washing faeces from the holding pens (lairages) into the drainage system without prior removal of any waste. Do not hose down animal faeces from the holding pens into the drains. Shovel most of the solid waste to the trailer for the rumen and intestinal content before washing the floors. Similarly, brush the faecal waste from the transport vehicles before washing them with water. Fit the water hoses with water saving devices. Water hoses that are not pressurized result in higher than necessary volumes of water being used. Separate the storm water runoff from areas containing waste or wastewater from the abattoir's activities.

Use existing waste disposal facilities to minimise the amount of waste that needs to be handled by the abattoir. Consequently, we support the proponent's intention to pump the domestic wastewater, including

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

grey water and human sewerage from the Change Rooms (showers, toilets and hand wash facilities) to the new WWTW. Investigate the potential for pumping the wastewater from the holding pens and vehicle washing bay, excluding hydrocarbons and animal faeces, to the WWTW. We further recommend that general waste generated in the offices is separated for recycling and/or disposal at a registered municipal landfill site or recycling centre.

3. Reuse, Recycling and Recovery

The remaining waste streams after implementing the abovementioned avoidance and reduction strategies include:

- condemned meat,
- rendered blood from the Bleeding Area,
- organic solids (offcuts, trimmings or skin trimmings, hair, pieces of bone and hooves) from the Dressing Area,
- manure, rumen and intestinal contents from the Holding pens and Rough Offal Room, and
- wastewater/effluent (including some blood, organic solids (meat or skin trimmings), hair, pieces of bone, hooves and grease/fat) from the Dressing Area and Rough Offal Room.

All the aforesaid waste streams can be recovered or treated. The waste can be used in the recovery of energy. One methodology for recovering organic waste includes the Anaerobic Digestor/Biomass Converter. It is a generic application that can be implemented in an abattoir to recover energy. Anaerobic Digestors/Biogas Convertors use bacteria to breakdown organic matter to produce biogas including a by-product, namely compost.

4. Treat Waste

The waste water/effluent can be treated in a Waste Water Treatment Works (WWTW), the faeces and ruminal/intestinal content can be composted or stored for use on agricultural lands, and the animal-based waste can be processed in the Mortality Tanks or a MAAHP Tissue Processor.

Alkaline Hydrolysis

The Modified Acid/Alkaline Hydrolysis Process (MAAHP) is specifically engineered for the sustainable management of blood and condemned meat. MAAHP rapidly dissolves all animal tissue (meat, blood, intestines and organs, offal, fat and fatty tissue, hooves, hair, horns and heads) into a Hydrolized Protein Liquid (HPL) and/or Hydrolized Protein (HP) which are stable and pathogen free. The resulting HPL is a liquid mixture of amino acids, small peptides, sugars, nutrients and soap along with the mineral ash of the bones and teeth (calcium phosphate). HPL and acidified fallow both have commercial value and an element of cost recovery is possible. HPL is not harmful to soil and can effectively be used as a liquid fertiliser base or soil ameliorant. It is an excellent liquid fertiliser due to the elevated levels of nitrogen and potassium. HP is an excellent compost additive or feedstock for an Anaerobic Digestor or a Biomass Converter when energy recovery is the objective. Different models are capable of processing different volumes of tissue and blood per 18-24 hr cycle. Their capacities range from 500kg of tissue and 500 litres of blood to 2 000 kg and 1 500 litres of blood. One of the inputs to the MAAHP Tissue Processor is water. The volume of wastewater that needs to be treated can be reduced by reusing it in the Processor.

5. Disposal

Disposal is the least preferred alternative for the remaining waste streams. Unfortunately, it is not feasible for most abattoirs to send all condemned products to a H:h landfill due to great distances and therefore the cost implications.

Unfortunately, the MAAHP will not utilise all the wastewater generated by the abattoir. Consequently, a wastewater treatment plant will need to be purchased to treat the remaining wastewater. The reuse of that treated wastewater is ideal and/or irrigation in accordance with the relevant standards under General Authorisation in terms of the NWA, 1998. Furthermore, the MAAHP does not treat plant tissue, such as manure and the rumen and intestinal contents. So, the latter will need to be either composted or used in the recovery of energy, such as a Biomass Converter or Anaerobic Digestor. The combined cost of all three plants is prohibitive. However, it should be possible to combine the MAAHP and a Biomass Converter or Anaerobic Digestor without the WWTW, if the energy recovery process utilises all the wastewater not used by the MAAHP. Alternatively, a Biomass Converter or Anaerobic Digestor may be able to utilise all the waste types to recover energy for the abattoir.

- Criteria used to investigate and assess alternatives

Numerous reports, guideline documents and government gazettes were reviewed to assess the feasibility of Mortality waste treatment tanks as a sustainable waste management option.

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

The combined cost of all three plants is prohibitive. The most reasonable and feasible options were to propose a new WWTW to deal with the wastewater from the abattoir. The solid organic animal waste would be treated within mortality tanks that has a reduced capital outlay than the MAAHP. The manure and rumen waste will be stored on site under the conditions of the norms and standards for waste storage.

Alternative Type No. 3: Design and Layout

- Purpose and Requirements

The purpose and requirement of the proposed mortality tanks may be achieved using different tank designs. The relationship between waste quantities and anaerobic breakdown rate will be important within the tank design considerations and economic feasibility. The methodology to determine the preferred design are discussed below.

- Methodology

The preliminary design was developed based on the findings of the abattoir site investigation, quantity and the quality of animal carcass/off-cut waste generated per day.

-Criteria used to investigate and assess alternatives

The following guidelines were used to predict the design of the mortality tank that would influence the size and containment requirements, including;

- NEM: Waste Act (2008);
- Waste Classification and Management Regulations - GN 634 of 2013

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

The provisional design is for four 24m^3 concrete reinforced tanks, into which carcasses will be placed and filled with water and microbes, to be left for 3 months to digest. This means that at any one-time 96m^3 of material will be under active biological digestion (but not daily throughput).

Alternative Type No. 4: Technology

Refer to Activity No. 2 in respect of the type of activity.

- Purpose and Requirements

The purpose of the new mortality tanks includes the establishment of best practice at the abattoir for waste management, which can be achieved by providing different waste treatment options.

- Methodology

Technology alternatives have been considered where identified by the specialists. The EAP has undertaken an extensive investigation into the legal and technology options regarding waste management at the abattoir. This investigation considered both the financial constraints at achieving full compliance with the legal requirements of the Waste Act (2008) and achieving the outcome of reducing the environmental impacts from handling wastes generated the abattoir operation.

- Criteria used to investigate and assess alternatives included in references

- DWA, Guidelines for the Handling, Treatment and Disposal of Abattoir Waste, First Draft, published on 29th August 2001.
- DWAF, Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, 2nd Edit. 1998.
- SANS 10234. Classification and Labelling of Chemicals in accordance with the Globally Harmonized System
- DEA, National Policy on Thermal Treatment of General and Hazardous Waste, Government Gazette No. 32439, Government Notice No. 777, 24 July 2009
- DEA, 3110: National Organic Waste Composting Strategy: Draft Guideline Document for Composting February 2013.

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

Alternative waste treatment technologies have been investigated. These included modified Acid/Alkaline Hydrolysis Process (MAAHP) and a biogas converter. The MAAHP is specifically engineered for the sustainable management of blood and condemned meat. The bio-digester would be used to create biogas as a recovery resource output. The investigation into these two alternative technologies for waste treatment resulted in discovering certain negative outcomes if these were established at the abattoir. The MAAHP produces a final effluent quality that has no beneficial nutrient content due to the chemical process and can be referred to as 'dead water'. This final effluent cannot be used as irrigation on the abattoir pastures as beneficial use of the waste treatment.

It was determined that biogas converters are very ambient temperature and pH sensitive. The biogas converter requires stable warm ambient conditions for most efficient conversion of organic waste to

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

biogas. The ambient temperatures in Piet Retief can fluctuate considerably and the winter months can see lows down to 3.9°C. These temperatures would affect the efficiency of the biogas converter and considered not the best alternative for the abattoir. It is also key to note that both technology alternatives would require larger capital investment than the mortality tanks and not necessarily achieve the desired outcomes from the waste treatment.

The preferred technology for the proposed waste treatment makes use of anaerobic digestion within mortality tanks and the addition of microbes to help speed up the digestion of the organic waste including animal carcasses, offcuts and blood. The benefits of this preferred alternative included the final effluent nutrient quality from the mortality tanks can be used as irrigation for the farm pastures. This waste treatment technology alternative would provide the beneficial use of the final effluent for irrigation of the abattoir pastures at a lower capital investment.

Alternative Type No. 5: Operational Aspects

- Purpose and Requirements

The purpose and requirement of the proposed mortality tanks may be achieved using different operational aspects.

- Methodology

Operational alternatives have been considered where identified by the specialists.

- Criteria used to investigate and assess alternatives

N/A

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

Alternative operational aspects were investigated during the Environmental Impact Assessment phase as in-depth specialist studies have been completed. On-site operational activities should clearly be guided by best labour practices in relation to optimal use of local labour, provision of a good standard workplace environment and facilities without undue or avoidable impacts on the environment. This is especially applicable concerning the use of potable water as well as good management practice for wastewater and solid waste, considering operational procedures related to disposal.

The following points were recommended for the operational phase alternatives but not exhaustive, please refer to **section K** (Summary of Specialist findings) and **Appendix E: Annexure A & B** (Specialist Reports);

Alien Plant Invasion Risk During Construction and Operation

- Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.

Soil erosion and associated degradation of ecosystems

- All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk.

- All cleared areas should be revegetated with indigenous perennial grasses from the local area. These can be cut when dry and placed on the cleared areas if natural recovery is slow.

Alternative No. 6: Demand

- Purpose and Requirements

The purpose and requirements regarding demand are compliance driven to ensure the abattoir waste management activities including waste treatment within mortality tanks is compliant with the NEM: WA (2008) and will make more efficient use of water for irrigation.

- Methodology

Not applicable

- Criteria used to investigate and assess alternatives

Not applicable

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

The demand for a meat product from the local abattoir service cannot be met by alternative means. However, the demand for meat products could be met by supplying more environmental controls or using waste and effluents more efficiently whilst managing that demand

Alternative No. 7: Input

- Purpose and Requirements

The purpose and requirement of the proposed mortality tanks can be met using different raw materials either from stainless steel metal, reinforced concrete, or plastic liners.

- Methodology

Waste Classification and Management Regulations - GN 634 of 2013
Mortality Design Report (Appendix B: Annexure A)

- Criteria used to investigate and assess alternatives

Cost of raw materials and transport; and
Durability properties of the raw material.

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible

Due to the sustainability and versatility of reinforced concrete it has been considered the most reasonable and feasible alternative to use this raw material. Its fire-resistant properties and durability against water damage compared to the water corrosive effects on metal.

Alternative No. 8: Routing

Purpose and Requirements

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

- The purpose and requirement of the proposed mortality tanks cannot be met using an alternative route. This specific type of alternative generally applies to linear developments, such as pipeline routes.

- Methodology
NA

- Criteria used to investigate and assess alternatives
NA

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible
NA

-Alternative No. 9: Scheduling and Timing

Purpose and Requirements
The purpose and requirement of the proposed mortality tanks can be met using alternative scheduling and timing, specifically changing the order in which activities are scheduled to contribute to the overall effectiveness of the result.

- Methodology
- Mortality Design Report (**Appendix B: Annexure A**)
- Aquatic Ecology Study and PES Report (**Appendix E: Annexure A**)

- Criteria used to investigate and assess alternatives
- Local rainfall data; and
- Geotechnical properties of the soil.

- Reasoned explanation why an alternative was or was not found to be reasonable or feasible
The reasonable and feasible alternative for timing would include the requirement that construction works of the mortality tanks should be completed within the drier winter months. This will prevent the potential negative impacts from storm events during the summer wetter months. These can be soil erosion, recruitment of alien invasive plants on disturbed ground and contamination of storm water from the construction works.

-Alternative No. 10: Scale and Magnitude

Purpose and Requirements
It is possible to construct fewer or smaller tanks to meet the same general purpose and requirement of the proposed activity, although the same storage capacity cannot be achieved. There may be a need for fewer or smaller tanks to avoid or minimise negative environmental impacts, such as the potential for odour nuisance and the potential prevention or reduction of surface water contamination during construction works. Smaller tanks will result in smaller impacts.

-Methodology

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

- Mortality Tank design Investigation and Site Inspection. To calculate the optimum size of mortality tanks for the desired end use.

-Criteria used to investigate and assess alternatives

- Determine the quantity of organic animal carcass waste that is generated per day at the abattoir.

The size and number of tanks required was dependent on the quantity of waste generated per day and volume of tanks to accommodate the waste and number of tanks to fulfil the complete anaerobic digestion of the organic animal carcasses and offcuts.

-Reasoned explanation why an alternative was not found to be reasonable or feasible

Taking into consideration the following: the quantity of abattoir waste generated and economic feasibility, it was proposed that the mortality tanks would achieve complete anaerobic digestion with a sequence of four tanks with the capacity of 24m^3 accounting for 96m^3 maximum volume at any one time. It would not be reasonable or feasible to have fewer or larger tanks as this would not achieve the desired outcome.

-Alternative No. 11: No-go Option

The option of not implementing the activity (no-go option) was used as the benchmark against which all impacts associated with the proposed development were assessed.

The No-Go alternative relates to the option of not developing the proposed mortality tanks and associated infrastructure (i.e. the Status Quo). If the proposed project is not developed, the current land use activities are assumed to continue in the long-term including livestock grazing.

If the proposed activity was not to go ahead, there would be no additional impacts on the local biodiversity, hydrology, heritage resources provided the current land use remained the same as livestock grazing intensity and carrying capacity. However, the no-go option would result in a loss of positive opportunities including the beneficial use of the final effluent from the waste treatment for irrigation of pastures. If there was no waste treatment facility for the mortality carcasses and offcuts, then they would be transported for landfill disposal. This option of waste disposal is the least desirable due to the potential environmental impacts associated with landfills. The proposed new mortality tanks will mean that the current unlined mortality pit operation would be decommissioned and the potential negative impacts on the environment will be removed.

There would also be a lost opportunity within job creation and skills development associated with the proposed project. As continued non-compliance against the Waste Act (2008) would lead to the closure of the abattoir operation.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Details of the Public Participation Process

(ii) details of the public participation process undertaken in terms of regulation 14 of the Regulations, including copies of the supporting documents and inputs;

(iii) a summary of the issues raised by interested and affected parties, and an indication of the way the issues were incorporated, or the reasons for not including them;

Level of Public Participation

1. Introduction

The Public Participation Process (PPP) was undertaken according to Chapter 6 of the EIA Regulations, 2014, as amended, and took into consideration the Public Participation 2017 Guideline Document (DEA, 2017) which complies with the requirements of the National Water Act (Act 36 of 1998).

2. Objectives of the public participation

The level of public participation (**Appendix C: Annexure A**) was determined by taking into account the scale of the anticipated impacts of the proposed project, the sensitivity of the affected environment, the degree of controversy of the project and the characteristics of the potentially affected parties. Based on the findings of the consideration there was no reason to elaborate on the minimum requirements of the public participation process outlined in the EIA Regulations, 2014 or use reasonable alternative methods for people desiring of but unable to participate in the process due to illiteracy, disability or any other disadvantage.

3. Identification of interested and affected parties

Over and above the placement of site notices on site and an advert in the local newspaper inviting I&APs to participate in the application process, certain stakeholders were specifically approached (organs of state, the owner or person in control of the land are automatically regarded as I&AP's).

The following means of identifying stakeholders were used:
• established lists and databases on Ecoleges' previous projects in the surrounding area or jurisdiction, and
• network or chain referral systems according to which key stakeholders were asked to assist in identifying other stakeholders.

4. Notification of interested and affected parties

All potential and registered I&APs (I&AP's Register: **Appendix C: Annexure H**) have a right to be informed early and in an informative and proactive way regarding proposals that may affect their lives or livelihoods. Early communication can aim to build trust among participants, allow more time for public participation, and improve community analysis and increases opportunities to modify the proposal regarding the comments and information gathered during the PPP.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

4.1 Method of notification

Notification of a proposal to all I&APs may be given through several methods including fixing of notice boards, providing written notice, and placing advertisements. Potentially interested and affected parties were notified of the site meeting and proposed application by –

a. fixing a notice board at a place conspicuous to the public at the boundary or on the fence of –
    i. the site where the activity to which the application relates is or is to be undertaken; and
    ii. any alternative site mentioned in the application;

Three notice boards (**Appendix C: Annexure C**) were fixed at places conspicuous to the public, at the following coordinates: Site Notice 1: 27°01'42.9"S and 30°49'47.4"E Site Notice 2 & 3: S27°01'10.4 E30°48'24.0, on the 18th October 2019.

b. giving written notice to –

- Giving written notice (Background Information Document – BID - **Appendix C, Annexure D**) to owners and occupiers of land adjacent to Portion 8 of Farm Potgietershoop 151 HT and organs of state having jurisdiction in respect of the proposed activity. The applicant is the owner of the land where the activity is to be undertaken. The BID was prepared and distributed via email and registered mail (**Appendix C: Annexure E**) to:

The owner, whom is the applicant and person in control of the land: • Eugene van Schalkwyk, 082 809 7927, evs@lando.co.za
The occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken: • Eugene van Schalkwyk, 082 809 7927, evs@lando.co.za
Owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken: • Ralph Conrad; 0824460392; rconrad@lantic.net • Hendrik Klopper; 0823385563; bakenkop76@gmail.com • Cassena Mansoor; 0824586456; lsttransport27@gmail.com • Wilson Ngema; 0791982430; wilsonngema@gmail.com • Nozipho Simelane; 017 826 3875; khulumaezakhot@gmail.com or aminamkmansoor@gmail.com
The municipality which has jurisdiction in the area: <u>Mkhondo Local Municipality:</u> • Mr Maqhawe Kunene (Municipal Manager); 063 540 8125; • Mr Ntando Bhembe (Town Planner), 084 674 5802; • Mr Vusiwe Dube (Environmental & Waste Manager), 082 065 4597; vusih.dube@gmail.com • Ms Happy Mdluli (Ward Councillor Office); 087 630 0180; ayandav@gmail.com • Mr DM Ntshakala (Ward 3 Councillor); 082 534 3506

Gert Sibande District Municipality: • Mr CA Habile (Municipal Manager) & Ms Marinda Booth (PA), 017 801 7008, marinda@gsibande.gov.za • Mr Phiwo Nkosi (Town Planner), 017 801 7064, PhiwoBN@gsibande.gov.za • There are plenty of EO's (Env Officer), so you send your communication to records and an EO gets assigned according to which area/department is connected to the project., 017 801 7000, records@gsibande.gov.za
Any organ of state having jurisdiction in respect of any aspect of the activity: DEA: • Shiba Sebone (Case Officer); 0123999783; Ssebone@environment.gov.za DWS (IUCMA): • Tanganedzani Makhanthisa, 0618246608 /0765187761, makhanthisat@iucma.co.za • Thandi Rollet Dzhangi (WULA Officer); 064 757 9246; dzhangit@iucma.co.za DARDLEA: • Mr Mashudu Mposi, 082 590 7759, mmposi@mpg.gov.za • Mr Surgeon Marebane; 082 406 7118; stmarebane@mpg.gov.za DAFF: • Zinzile Mthotywa, 082 317 7581, ZinzileM@daff.gov.za
Any other party as required by the competent authority/EAP: SAHRA: • Load onto SAHRIS website. EWT: • Ursula Franke; 017 811 2817; ursulaf@ewt.org.za

c. placing an advertisement in –
   i. one local newspaper; or
   ii. any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations
   iii. one provincial newspaper or national newspaper if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken

An advertisement (**Appendix C: Annexure F**) was placed in a local newspaper, the Excelsior News, on the 18th October 2019 (**Appendix C: Annexure G**). No official Gazette existed at the time of the application. The proposed activity shall not have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it will be undertaken.

d. using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person desires of but unable to participate in the process due to illiteracy, disability or any other disadvantage.

Alternative methods were not required given the affected and interested parties that registered.

In terms of regulation 55(1), all organs of state which have jurisdiction in respect of the proposed activity and all persons who submitted written comments, attended the site meeting or requested, in writing, to be registered were placed on the register.

4.2 Proof of notification
Please refer to **Appendix C**, **Annexure E** for Proof of Notification via email & registered mail.

5. Notification of interested and affected parties of reports and other studies
Please refer to **Appendix C**, **Annexure K**.

6. Interested and affected parties
Refer to **Appendix C**, **Annexure H** for the list of Interested and Affected Parties.

6.1 Access and opportunity to comment on all written submissions
All communication, including but not limited to reports is disseminated to registered interested and affected parties for a 30-day commenting period.

6.2 Response to comments received: feedback to interested and affected parties
Please refer to **Appendix C**, **Annexure I** for the Comments and Response sheet.

6.3 Disclosure of interested and affected parties' interests
Please refer to **Appendix C**, **Annexure I** for the Comments and Response sheet.

6.4 Notifying interested and affected parties of the decision
Once a decision has been made, all registered interested and affected parties will be notified.

7. Record of issues raised
Please refer to **Appendix C**, **Annexure J** for the Copies of received comments.

8. Addressing the comments and concerns raised by the interested and affected parties
Please refer to **Appendix C**, **Annexure I** for the Comments and Response sheet.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

The Environmental Attributes Associated with the Alternatives.

(iv) The environmental attributes associated with the development footprint alternatives focusing on geographical, physical, biological, social, economic, heritage and cultural aspects.

Geographical Aspects

The Mkhondo Local Municipality is in the Gert Sibande District Municipality and is one of seven local municipalities located in the District. It is bordered by Pixley Ka Seme to the west, eDumbe Municipality to the south and Pongola Municipality to the west in KwaZulu Natal, Msukaligwa and Albert Luthuli to the north, and Swaziland to the east. The east of the Mkhondo Local Municipality is in eMkhondo town in the central part of the municipal area.

The first order urban area in Mkhondo LM is eMkhondo and eThandakukhanya. The town of eMkhondo (formally known as Piet Retief) is located on the N2 where the R543 (Volksrust-Swaziland) and R33 (Vryheid-Amsterdam) intersect. It is surrounded by forestry plantations and much of its economy originated from this source. There are several timber producing companies located within the municipality, including Mpact, Tafibra and PG Bison and Normandien which are national businesses. It boasts a well-diversified economy, including components from all sectors, from manufacturing to personal services, real estate, and tourism. It is also strategically situated in respect of rail and road freight transport as well as tourism hence it taps from several sources of revenue. The town is fully serviced and contains tertiary social services which meet local, municipal as well as regional needs. (eMkhondo Local Municipality, Integrated Development Plan 2016 – 2017).

The E&T Abattoir is an existing facility located on Portion 10 of Farm Potgietershoop 151HT, on the outskirts of eMkhondo, Mpumalanga Province (GPS coordinates 27° 1'47.91"S, 30°49'54.12"E).

Physical Aspects

Climate

Early summer rainfall, with Mean Annual Precipitation (MAP) of 910 mm, ranging between 800 and 1 250 mm. This unit has a wide range of frost frequency (3 – 20 days per year), with most frost days occurring in the western regions.

Regional climate

The climate here is mild, generally warm, and temperate. The summers are much wetter than the winters in Piet Retief. According to Köppen and Geiger, this climate is classified as Cwb. In eMkhondo, the average annual temperature is 16.6 °C. About 920 mm of precipitation falls annually.

Rainfall data

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

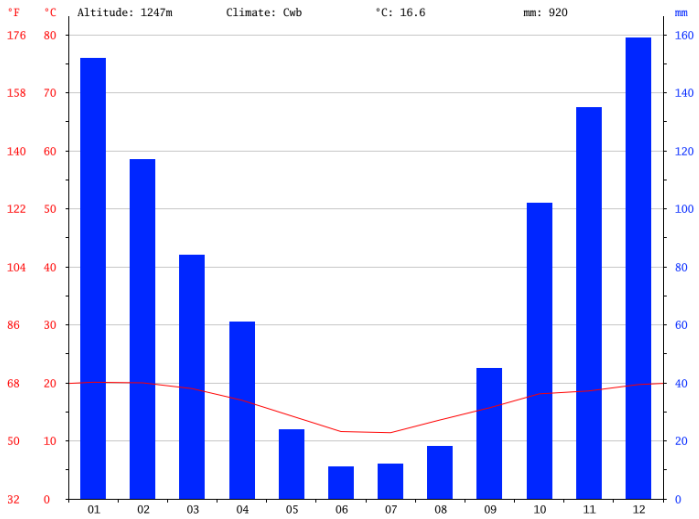


Figure 9. Precipitation is the lowest in June, with an average of 11 mm. The greatest amount of precipitation occurs in December, with an average of 159 mm. (Sourced from Climate-Data.org website).

Temperature data

Table 11. Temperature data for proposed project area.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	20.1	20	19	17	14.3	11.6	11.4	13.6	15.7	18.1	18.6	19.7
Min. Temperature (°C)	14.7	14.6	13.4	10.8	7.2	4.2	3.9	6.1	8.5	11.6	12.9	14.1
Max. Temperature (°C)	25.6	25.5	24.6	23.2	21.4	19	19	21.2	23	24.6	24.4	25.3
Avg. Temperature (°F)	68.2	68.0	66.2	62.6	57.7	52.9	52.5	56.5	60.3	64.6	65.5	67.5
Min. Temperature (°F)	58.5	58.3	56.1	51.4	45.0	39.6	39.0	43.0	47.3	52.9	55.2	57.4
Max. Temperature (°F)	78.1	77.9	76.3	73.8	70.5	66.2	66.2	70.2	73.4	76.3	75.9	77.5
Precipitation / Rainfall (mm)	152	117	84	61	24	11	12	18	45	102	135	159

At an average temperature of 20.1 °C, January is the hottest month of the year. The lowest average temperatures in the year occur in July, when it is around 11.4 °C. (*Sourced from Climate-Data.org website*)

Any extreme weather conditions prevalent (e.g. snow, frost, hails, etc.)

This unit has a wide range of frost frequency (3 – 20 days per year), with most frost days occurring in the western regions.

Topography

Largely comprised of undulating hills and plains that occur on the eastern edge of the escarpment. This unit is transitional between Highveld and Escarpment and contains elements of both. The vegetation structure is comprised of a short-closed grassland layer with many forbs, and a few scattered shrubs on the rocky outcrops.

Natural vegetation and plant life

The property Potgietershoop falls within the KaNgwane Montane Grassland described in Mucina and Rutherford, 2006. However, the property on which E&T Abattoir is located has largely been transformed from a natural landscape due to intensive farming practices including but not limited to, cattle feedlots and grazing, *Eucalyptus* sp. afforestation and associated farming or processing infrastructure. There are only small remnants of natural vegetation left on the property mostly associated with rocky ridges and watercourses that cannot be used for farming practices.

Sensitive landscapes

In terms of conservation the area is classified as Vulnerable. The conservation target 27% with only 0.4% protected with any formally proclaimed nature reserves. Several private conservation areas protect small patches of this unit. It is suited well for afforestation and 30% has already been converted to plantations of alien trees. A further 6% is under cultivation. Erosion potential very low (55%) and low (7%).
Mpumalanga Tourism and Parks Agency (MTPA), as the authority mandated to conserve biodiversity in Mpumalanga, have developed the Mpumalanga Biodiversity Sector Plan (MBSP). All site perspective biodiversity assessments therefore need to be contextualised within this provincial biodiversity plan including mapping of the Terrestrial and Aquatic Biodiversity classes and vegetation units.

The Terrestrial and Aquatic sensitivity classes for the E&T Abattoir site computed “Heavily modified”. See **Appendix A**: **Annexure B** for the Site Sensitivity Plan.

Several South African Heritage Sites are found in this municipality. These include the following:

- The Athole Nature Reserve
- Entombe Battlefield
- Rooikraal
- Confidence
- Kalkoenvlakte
- Heyshope Dam

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

The Mpumalanga Parks Board manages the Witbad Nature Reserve, while there are also a number of Private Nature Reserves and Conservancies which include:

- Morgenstond Nature Reserve
- Amsterdam Conservancy (which incorporates the Athole Nature Reserve).

It should also be noted that the Enkangala Grassland Biosphere Reserve starts in the south western corner of the municipality and spreads in a westerly direction. This initiative is vital towards the conservation of the valuable grassland biome in the area.

The mountains south of Dirkiesdorp and high grassland escarpment to the west in the region hold high bio and scenic diversity. The potential could be realized via appropriate sustainable private sector or corporate investment. Facilities associated with Heyshope dam (compared to the Jerico Dam) appear limited. Significant potential exists for community investor partnerships on (traditional) land adjacent to the dam.

Geology

General geology of the area-presence of dyke's sills and faults. Mostly on granite on the Mpuluzi Granite, Archaen Gneiss giving rise to melanic soils, with intrusions of diabase.

Soil

Mostly on granite of the Mpuluzi Granite (Randian Erathem), Archaean gneiss giving rise to melanic soils, with intrusions of diabase. Land types Ac, Fa and Ba.

-Hydrology
Catchment description provided below;

Surface water

- *name of nearest watercourse, water quality - pH, conductivity etc;*
- *surface water use (domestic, industrial, agricultural, recreational, or natural environment);*
- *water authority; and*
- *presence of wetlands.*

The drainage line in the study area is in the Assegaai River catchment within the W51D quaternary catchment and part of the Inkomati-U Catchment Management Agency (IUCMA). The water course implicated in the project area is an unnamed drainage line which originates in the forestry area north-west of the project area and runs for 2.5 km through the farm. In this stretch it is dammed by two reservoirs (Instream Dam 1 and 2) in the drainage line. From the second reservoir, which is at the boundary of the farm, it continues to run for a further 4.5 km to the confluence of the Assegaai River. Please see the attached Present Ecological State Report within **Appendix E: Annexure A**.

The most recent results obtained from the laboratory (Regen Waters) gives the following pre-treated effluent quality parameters: pH = 7.69, EC = 1288, COD = 5591, E. coli = >1000 & SAR = 8.00.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Please refer to the recent water quality monitoring results within **Appendix B: Annexure C.**

Groundwater

Based on the characteristics of the underlying aquifer, it is anticipated that:

- Groundwater movement through the area is slow (range from 0.01 to 0.25 metres (m)/day); and
- Based on the pump test conducted, groundwater velocities in the order of 0.38 to 0.42 m/day can be expected for fractured zones.

Based on the Intermediate Groundwater Reserve Determination conducted for the site, the groundwater balance indicates a surplus value in the order of + 3 258.6 cubic metres (m^3)/day available for abstraction on a sub-catchment scale.

- The impact on the groundwater reserve can be considered low, based on the average water use of 24 m^3/day. Pumping for long periods increases the dewatering impact. However, a surplus amount of groundwater is still available. Hence the overall impact on the aquifer safe yield, for the abstraction scenarios calculated, can be considered low to moderately low.

Based on available data, the groundwater resource can be considered unstressed or at a low level of for Scenario 1 to 3 (24 to 455 m^3/day) - Category A and B.

- If the borehole is pumped for 24 hours per day the stress index will move up to Category C - moderate levels of stress.

- *ground water use*

There are four (4) boreholes on site and the main abstraction is from borehole four which is then stored within six (6) storage tanks with a capacity of 215 000 litres. The abstracted groundwater is used within the abattoir operation and includes the slaughterhouse activities and the associated offices and ablution facilities.

- *ground water quality (pH, conductivity, nitrate)*

The groundwater quality data indicates good water quality, with only calcium above DWAF 1996 Target Water Quality Range (TWQR). No faecal or other contamination is evident.

Please refer to the water quality monitoring results in **Appendix B: Annexure C**.

Sites of archaeological interest

In terms of Section 38 of the National Heritage Resources Act, 1999, SAHRA must be notified of developments on areas that are larger than 5000m^2. SAHRA has been informed of the proposed development during the notification process, which formed part of the public participation process. A desktop heritage assessment was completed to determine if a full heritage resource impact assessment is required. The risk was determined low resulting in a motivation for exemption being submitted to SAHRA. SAHRA accepted the motivational letter of exemption from the Act on the 13th of December 2019.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Visual aspects

A visual buffer or screening will not be required for the preferred location of the WWTW as it within the existing footprint of the abattoir buildings and will have limited or no visual impact to adjacent properties, due to the visual buffering of existing buildings and vegetation on the property.

Regional socio-economic structure *(Short description)*

Population, economic activities, unemployment rate, housing demand, social infrastructure, water supply and sanitation, power supply

eMkhondo is in the south-eastern part of Mpumalanga province, next to Swaziland. eMkhondo is a centrally placed town that services not only the formal towns but surrounding smaller towns and rural villages as well.

-Population

Table 12. Population per Local and District Municipality from 2001 to 2011.

Description	Census 2001	Census 2011
Mpumalanga	3 365 554	4,039,939
Gert Sibande DM	900 007	1,043,194
Albert Luthuli Municipality	187 751	186,010
Msukalikwa Local Municipality	124 812	149,377
Mkhondo Local Municipality	143 077	171,982
Seme Local Municipality	80 737	83,235
Lekwa Local Municipality	103 265	115,662
Dipaleseng Local Municipality	38 618	42,390
Govan Mbeki Local Municipality	221 747	294,538

Based on these figures the Mkhondo Municipality has an estimated population of 171 982 people. It is estimated that about 54% of this population reside in the rural parts of the Mkhondo municipality, and about 46% in the urban parts.

The 171 982-people residing in the Mkhondo Municipality represent about 37 433 households at an average household size of 4, 6. The main socio-economic facts are presented below;

- An estimated 59% of the population is in the age bracket 15-65, while there was an increase in the number of children of school-going age during this period.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

- The percentage male residents in the municipality decreased slightly, while the number of residents with tertiary qualifications (diplomas and degrees) increased significantly which is positive. The percentage of the population with no schooling background also reduced drastically.
- Unemployment figures are relatively low at 36%, but it did show a 9.9% reduction from 2001.
- The number of households with access to piped water inside the dwelling/yard also increased drastically from 20 169 in 2007 to 21 927 in 2011 which represents about 67% of all households in the area.
- Reliance on the community services sector is also high, and thus indicative of the social needs provision in the region.

The urban / rural occupational split seemingly coincides with the general income profile of the municipal area, where as much as 96% of households earn less than R3500.00 per month. These household qualify for government's housing subsidy schemes.

Although the area has a large economically active population (56%), a total of 43% of the economically active population is unemployed. This indicates that the economy is unable to accommodate these people, which will either lead to the out migration of youngsters and/or an increase in domestic poverty.

Industrial activity

In terms of Gross Geographical Product, the two most important employment sectors are agriculture at 26.7% and community services at 21.1%. These sectors are followed by trade at 14, 9% and manufacturing at 8.9%. It shows that the economy is not very diversified still being highly reliant on the agricultural sector.

Tourism is dominated by guesthouse facilities around the town of eMkhondo which cater for weekend and transit travel, while conservancies and private reserve developments are increasing in the Ngwempisi and Assegai River valley and catchments. The N2 linkage through Mkhondo is the major tourism link connecting northern KZN and the Mpumalanga or Limpopo Lowveld areas to one another.

The above reinforces the fact that forestry is and will remain an important asset in the region. There is little down-stream economic activity and much of the raw timber is exported from the region, which is negative as value-adding opportunities and increased income for the region are lost.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

The Impacts and Risks Identified for each Alternative.

(v) The impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration, and probability of such identified impacts, including the degree to which these impacts-

(aa) can be reversed;
(bb) may cause irreplaceable loss of resources; and
(cc) can be avoided, managed, or mitigated;

Please refer to the Impact Assessment in **Appendix D.**

The Methodology used in identifying and Ranking the Impacts and Risks associated with the Alternatives.

(vi) The methodology used for identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

Please refer to the Impact Assessment in **Appendix D.**

The Positive and Negative Impacts that the Proposed Activity and Alternatives on the Environment and Community.

(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.

Please refer to the Impact Assessment in **Appendix D.**

The Possible Mitigation Measures application and level of Residual Risk.

(viii) The possible mitigation measures that could be applied and the level of residual risk;

Please refer to the Impact Assessment in **Appendix D** and the draft EMPr in **Appendix F.**

The Motivation for no Alternatives, including Alternative Locations.

(ix) If no alternative development footprints for the activity were investigated, the motivation for not considering such and;

Please refer to **Section H**: Alternatives Discussion.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

The Concluding Statement for the Preferred Alternative.

(x) A concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;

Conclusion

The preferred technology alternative is Mortality Tanks which is the most feasible option for the Abattoir, which is both cost effective and has beneficial impacts to the local environment.

The environmental assessment phase has identified the potential positive and negative environmental (biophysical and social) impacts associated with the proposed new mortality tanks and alterative footprints on the same property (Site). Several issues for consideration were identified by the EAP and appointed specialists during the initial assessment process. These have concluded that there is only one preferred footprint and other alternative footprints on the property cannot achieve the desired outcome. Due to no specific no-go areas on the property (Heavily modified) other than the sensitive riparian zones it was considered a full site selection matrix could not be achieved.

The preferred footprint is to use the same area as the existing mortality pit which will be decommissioned in line with the Norms and Standards for disposal of waste GN 636 dated 13th August 2013. The main reasons for the selection by the applicant and the EAP was the following;

- Access and proximity to the abattoir to transport the mortality waste;
- Adequate distance from domestic housing and reduced potential of any odour nuisance;
- The site is already disturbed and heavily modified;
- An existing rocky ridge that screens the waste facility both visually and as a buffer zone between sensitive receptors such as the domestic housing.

In this case there was no other alternative footprints on the farm Potgietershoop that would be suitable for the mortality tanks in regard of the points highlighted above and investigations by the appointed specialists and EAP.

In summary, following the combination of the development footprint selection process, impact assessment and cumulative impact assessment using the specialist findings, Interested and affected parties' comments and the EAP judgement, provided the motivation for preferred development footprint at the existing location of the mortality pit. As this preferred alternative had the least negative impacts when compared to the other alternative footprints for geographical, physical, biological, social, economic, heritage and cultural aspects.

The proposed construction of mortality tanks will enhance the waste management treatment activity on site compared to the current disposal of mortality carcases within an unlined mortality pit. The positive outcomes will not only include reducing the potential environmental risks by upgrading current practices it will also provide the by-product of effluent that can used as a fertiliser during irrigation of the farm fields.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION I: DESCRIPTION OF THE IMPACT ASSESSMENT FOR THE PREFFERED DEVEVELOPMENT FOOTPRINT.

(i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including-

Description of Environmental risks and mitigation measures.

(i) a description of all environmental issues and risks that were identified during the environmental impact assessment: and

(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures:

Please refer to the Impact Assessment in **Appendix D.**

SECTION J: ASSESSMENT OF IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK.

(j) an assessment of each identified potentially significant impact and risk; including-

- *(i)* ***cumulative impacts*** *(page 104 below);*
- *(ii) the nature, significance and consequence of the impact and risk;*
- *(iii) the extent and duration of the impact and risk;*
- *(iv) the probability of the impact and risk occurring;*
- *(v) the degree to which the impact and risk may cause irreplaceable loss of resources*
- *(vi) the degree to which the impact and risk can be mitigated;*

Please refer to the Impact Assessment in **Appendix D.**

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

Cumulative Effects

A guide prepared for the Canadian Environmental Assessment Agency (CEAA) (Hegmann et al. 1999) defined cumulative effects as: *"…changes to the environment that are caused by an action in combination with other past, present and future human actions."*

Cumulative effects are commonly understood as the impacts which combine from different projects and which result in significant change, which is larger than the sum of all the impacts. (DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria).

Cumulative effects can then occur when impacts are:
(1) additive (incremental);
(2) interactive;
(3) sequential; or
(4) synergistic.

Eccles *et al*. (1994) summarises the essence of cumulative environmental change as follows:

"Where the intensity of development remains low, the impacts can be assimilated by the environment over time, and cumulative effects do not become a significant issue. However, when development reaches a high level of intensity, impacts cannot be assimilated rapidly enough by the environment to prevent an incremental build-up of these impacts over time. Changes over time and space accumulate and compound so that in aggregate the effect exceeds the simple sum of previous changes. This temporal and spatial accumulation gradually alters the structure and functioning of environmental systems, and subsequently affects human activities."

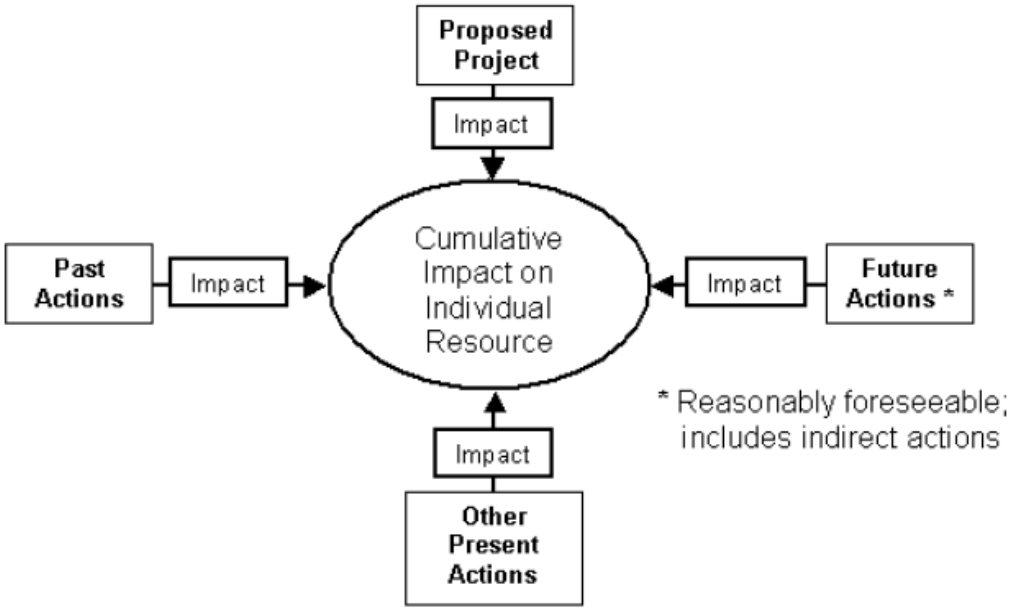


Figure 10. A flow diagram showing the compounding effects of cumulative impacts on a resource.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

The EIA process needs to identify and investigate the potential cumulative effects of the proposed development taking into consideration the types and characteristics of aggregate effects. These can be fragmentation, compounding effects, indirect effects, triggers, and thresholds.

Planning to address cumulative effects involves delineating spatial and temporal boundaries, determining future development, and determining the significance of cumulative impacts. The selected method to identify and assess cumulative effects for this EIA was primarily based on Geographic Information Systems (GIS). This computer tool uses powerful mapping and spatial information for capturing, displaying, and analysing digital data. Map overlays have been used to identify areas where effects are likely to be greatest.

The following sensitivity map below has been produced by overlying all specialists GIS shapefiles or Google Earth. kml files using the sensitive receptor information to form a consolidated “no-go” area map from a geographical, physical, biological, social, economic, heritage and cultural aspects.

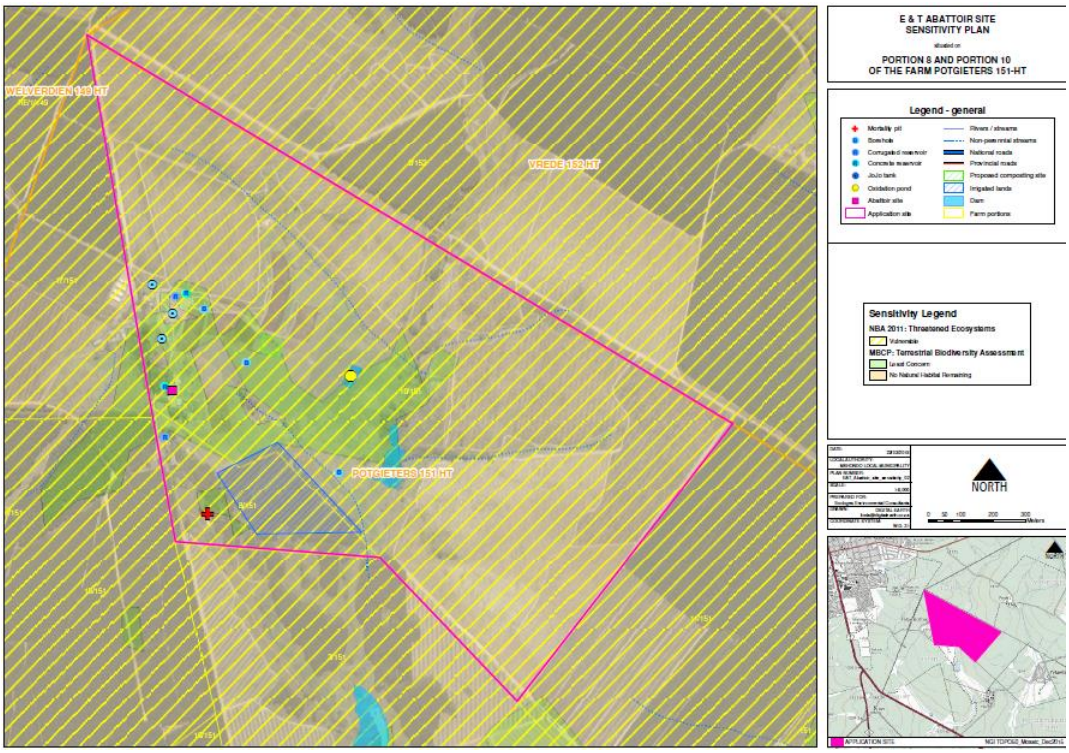


Figure 11. The site development footprint alternatives sensitivity map.

This exercise used the method of bio-geographical analysis, including landscape analysis looking at patterns, structure, and ecological process within a spatial unit (i.e. the project development footprint alternatives within the approved site).

The additional method to identify the potential cumulative impacts included the checklist technique in which potential cumulative impacts can be identified by using a list of common or likely effects. This was undertaken within the completion of the impact assessment within **Appendix D**.

The consideration of different spatial configurations of the proposed development footprint alternatives were directed by the GIS sensitivity impact maps and the findings of the impact assessment process and

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

development footprint selection investigation. These guided the EAP to establish the preferred development footprint that that would avoid areas that have a higher cumulative impact if they were to be developed. The appointed specialists' findings have directed decisions and the identified the potential for cumulative impacts from the proposed development. These findings are summarised below in **Section K**.

The other pathway within cumulative impacts of a proposed development could be the compounding effect from one or more processes. The method of interactive matrices involves analysis of the additive and interactive effects of various configurations of multiple similar projects in the same geographic area. There have not been any similar developments identified in the broader area, there is limited potential for cumulative impact to generate additional impacts on broad-scale ecological processes and the regions ability to meet conservation targets.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION K: SUMMARY OF SPECIALIST REPORT FINDINGS AND RECOMMENDATIONS.

(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;

Table 4: Summary of Specialist Findings and Recommendations.

***Appendix E: Annexure A: Aquatic Ecology and* Present Ecological State**
Summary of Findings and Recommendations • Morphology (physical structure): The outcome of the in-stream and riparian IHI evaluated for the drainage line resulted in an in-stream IHI of 50.9 (D) and a riparian IHI of 26.9 (E). The in-stream IHI has thus been classified as "Largely modified" and the riparian IHI as "Seriously modified" according to the Habitat Integrity Categories. Despite the low IHI scores for the system, the large seepage wetland below Dam 2 appears to be in a better state, perhaps due to constant seepage from the dam. • According to the VEGRAI model, the riparian vegetation integrity score of the drainage line is 51.1% which represents an Ecological Class D (40-59%). This score reflects a "Largely modified" status. The drainage line below Dam 2 spreads out into a wide valley with multiple channels, creating a proper seepage wetland however, adjacent forestry also impacts on the riparian zone of this wetland. • Biota – Habitat: During the April 2017 survey, the IHAS and HQI scores between the two dam sites were similar, but the drainage line Site 1 was more natural and thus different. The IHAS for the dam sites was 27% and the drainage line site was 42%, while the HQI scores for the dam sites were both 18% and the drainage line site was 27%. • Aquatic invertebrate assessment: The habitat scores at the drainage lines are extremely low at all the sites and are all categorized as "Very Poor" to "Poor". The lack of running water habitats, such as riffles and rapids, also reflected in the macro-invertebrate scores, resulting in "Poor" to "Fair" SASS scores and low number of families. During the April 2017 assessment the relative MIRAI score for the drainage line in the project area was placed within the limits of an ecological state category Class E (19.5%), which means this reach is "Seriously modified", but according to the finer detailed EcoStatus classification it is categorised as a E/F. • Fish Response Assessment Index (FRAI): The relative FRAI score of this stretch of the drainage line falls within the limits of an ecological state category Class F (15.7%), which means this reach is in a "Critically modified" state. • The Ecological Importance and Sensitivity (EI&S) for the drainage line: Ecological Importance and Sensitivity Category (EISC) = Low; Instream ecological category = 18.6 (E/F); Riparian vegetation ecological category = 51.0% (D); Ecostatus = E (Seriously modified). PES Overall = E (Seriously modified). • Because the drainage line below Dam 2 represents a wetland with a wide valley and multiple channels, this area is perceived as having higher ecological and sensitivity values than the single channel drainage line upstream of Dam 2. Therefore, an additional EISC determination

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

was done for this reach and it was found that the EISC has an improved median of determinants (1.0 to the 0.5 of the upstream reach), but the EISC category remains "Low".

Appendix E-Annexure B: Geo-hydrological Assessment Report

Summary of Findings

Considering the methodological approach and principles outlined in the Best Practice Guidelines for Impact Prediction, it is concluded that there are existing impacts and risks associated with the E&T abattoir. The existing impacts associated with the site, in terms of groundwater, were considered and deemed to be moderate to low. Groundwater and surface water risk can further be reduced by routine monitoring and implementation of mitigation measures (as outlined in Section 4.2 of the actual report).

Recommendations

- It is recommended that monitoring is implemented according to the monitoring plan.
- It is recommended that flow meters be installed on all the active groundwater abstraction boreholes to ensure that quantity data and water usage is logged. It is good practice to keep record of groundwater usage quantities, to ensure that the data is available in the event where borehole performance issues are noted. .

Appendix E-Annexure C: Heritage Impact Assessment Report

Summary of Findings

No sites of heritage or archaeological significance were identified in the proposed project area. The proposed project will impact on an exceedingly small part of Portions 8 of the farm Potgietershoop 151 HT where established infrastructure and farming activity has impacted on the area.

From a heritage perspective due to the disturbed character of the site and as evidenced on historical maps the area has been utilised in the past by agricultural activities since at least 1965. Progression in development on the farm as evidenced by the sequence of historical maps, show that most structures and buildings have been either demolished or ruined over time. In light of the available information as presented, the study area does not warrant a full Phase 1 Heritage Impact study as it is anticipated that there are no archaeological sites, cultural heritage sites, historic structures, burial grounds or isolated artefacts likely to be present on the affected landscape.

Recommendations

The project is exempted from any heritage further assessment. In the unlikely event that any sites might occur within the proposed site the following recommendations are to be included in the EMP and are the responsibility of the ECO of the project to implement these:

- If during construction any possible finds such as stone tool scatters, artefacts, or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION I: ENVIRONMENTAL IMPACT STATEMENT.

(l) an environmental impact statement which contains-
(i) a summary of the key findings of the environmental impact assessment:
*(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers (**Appendix A: Annexure B**); and*
(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

Please refer to the Impact Assessment in **Appendix D.**

SECTION M: IMPACT MANAGEMENT OBJECTIVES AND IMPACT MANAGEMENT OUTCOMES (EMPR).

(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;

Please refer to the Impact Assessment **(Appendix D)** and EMPr **(Appendix F).**

SECTION N: FINAL PROPOSED ALTERNATIVES AND MITIGATION MEASURES.

(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;

Please refer to the Impact Assessment and EMPr in **Appendix D & F.**

SECTION O: CONDITIONAL FINDINGS OF EAP AND SPECIALISTS.

(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.

Please refer to **Appendix D, Appendix E and Appendix F.**

SECTION P: ASSUMPTIONS AND UNCERTAINTIES.

(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;

Please refer to the Impact Assessment in **Appendix D and Appendix F.**

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION Q: REASONED OPINION.

(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;

In consideration of the investigated cumulative impacts, the nature and extent of the proposed development, compliance with the relevant legal, policy and planning documentation (i.e. "need and desirability") and the findings of the specialist studies, it is the opinion of Ecoleges that the proposed mortality tanks project is supported from an environmental perspective and should be considered for a Waste Management Licence, subject to the implementation of the identified recommendations.

The reasoned opinions of the appointed specialists are summarised below;

Recommended conditions within the Waste Management Licence

1. The holder of the licence must appoint an experienced independent Environmental Control Officer (ECO) for the construction phase of the development that will have the responsibility to ensure that the mitigation/rehabilitation measures and recommendations referred to in this environmental authorisation are implemented and to ensure compliance with the provisions of the approved EMPr.
2. Vegetation clearing must be kept to an absolute minimum. Mitigation measures must be implemented to reduce the risk of erosion and the invasion of alien species.
3. An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate avoidance, reduction, recycling, re-use, and disposal where appropriate. Any solid waste, which will not be recycled, must be disposed of at a landfill licensed in terms of section 20 (b) of the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008).

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION R: OPERATIONAL ASPECTS AND POST CONSTRUCTION MONITORING.

(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised;

N/A.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION S: UNDERTAKING BY APPOINTED INDEPENDENT EAP

(s) *an undertaking under oath or affirmation by the EAP in relation to-*

(i) the correctness of the information provided in the report;
(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and
(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and
(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;

Appendix 2 Section 2 (j) of the Environmental Impact Assessment (EIA) Regulations, 2014 (promulgated in terms of the National Environmental Management Act 107 of 1998, as amended - NEMA), requires:

EAP AFFIRMATION.

I, **Philip John Radford**, on behalf of Ecoleges, hereby affirm the correctness of the information provided in the report; including comments and inputs from stakeholders and interested and affected parties; and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties. That all comments and inputs received from stakeholders and interested and affected parties have been accurately recorded herein and, insofar as comments are relevant and practicable, and have been included in the final Scoping Report submitted to the Competent Authority.

Signature of the EAP

22/07/2020
DATE:

Stakeholder and Interested and Affected Parties Feedback.

(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and

Please refer to the Public Participation Process in **Appendix C.**

Specialist Report findings and recommendations.

(iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and

Please refer to the Public Participation Process in **Appendix C.**

Comments and Response between EAP and Interested and Affected Parties.

(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;

Please refer to the Public Participation Process in **Appendix C.**

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION T: FINANCIAL PROVISION[S] FOR REHABILITAION, CLOSURE AND DECOMMISSIONING.

(t) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;

N/A

SECTION U: ANY DEVIATION FROM THE SCOPING REPORT.

(u) an indication of any deviation from the approved scoping report, including the plan of study, including-

(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and

(ii) a motivation for the deviation;

N/A

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION V: COMPETENT AUTHORITY SPECIFIC INFORMATION

(i) any specific information required by the competent authority; and

N/A.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

SECTION W: OTHER INFORMATION REQUIRED BY REGULATIONS

(w) any other matters required in terms of section 24(4)(a) and (b) of the Act.

N/A

(2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to an environmental impact assessment report the requirements as indicated in such notice will apply.

Noted.

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

BIBLIOGRAPHY

Conservation of Agricultural Resources Act (No 43 of 1983) and the regulations dealing with declared weeds and invader plants as amended from time to time.

Deacon, A (2017) The Present Ecological State of the River Reaches of the Project Area: Water Use Applications: E&T Abattoir, Piet Retief, Mpumalanga. Dated April 2017.

DEA (2011), National list of ecosystems that are threatened and in need of protection. GN 1002, GG 34809, 9 December 2011.

DEA (2010), Guideline on Need and Desirability, Integrated Management Guideline Series 9, Department of Environmental Affairs (DEA), Pretoria, South Africa.

DEA (2010), Public Participation 2010, Integrated Environmental Management Guideline Series 7, Department of Environmental Affairs, Pretoria, South Africa.

DEA (2009), National Policy on Thermal Treatment of General and Hazardous Waste, Government Gazette No. 32439, Government Notice No. 777, 24 July 2009.

DEA (2013), 3110: National Organic Waste Composting Strategy: Draft Guideline Document for Composting February 2013.

DEA&DP (2010), Guideline on Alternatives, EIA Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning (DEA&DP).

DEAT (2002), Specialist Studies, Information Series 4, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria).

DWAF (2004), General Authorisation in GN No. 399 published in Government Gazette No. 26187 dated 26 March 2004.

DWAF (1998), Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, 2nd Edit. 1998.

DWA (2001), Guidelines for the Handling, Treatment and Disposal of Abattoir Waste, First Draft, published on 29th August 2001.

DWA (2007), Guideline for Developments within a Flood line (Edition 1), Department of Water Affairs and Forestry, Pretoria, South Africa.

DWAF (2009), General Authorisation in GN No. 1199 published in Government Gazette No. 32805 dated 18th December 2009.

DWAS (2016), General Authorisation in GN No. 509 published in Government Gazette No. 40229 dated 26 August 2016.

DWAS (2016), General Authorisation in GN No. 538 published in Government Gazette No. 40243 dated 2 September 2016.

EC (2001): Determination of the Impacts of Waste Management Activities on Greenhouse Emission. Submitted by ICF Consulting, Tonic-Smith Associates and Environs – RIS.

eMkhondo Local Municipality. Integrated Development Plan 2016 – 2017.

eMkhondo Local Municipality. Final Integrated Development Plan 2017 – 2022.

Environment Conservation Act (No 73 of 1989), including Schedules 4 and 5 of the National Regulations regarding Noise Control made under Section 25 of the Environment Conservation Act, 1989 (Act 73 of 1989) in GN No. R 154 of Government Gazette No. 13717 dated 10 January 1992. (Note that this section of the Environment Conservation Act is not repealed by NEMA (107 of 1998)). Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983), as amended.

GCS Water & Environmental Consults (2018) Desktop Geohydrological Assessment of the E&T Abattoir Report (GCS Project No: 17-0986). Dated 12th June 2018.

Gert Sibande District Municipality Final Integrated Development Plan, 2016-2017.

McCarthy, J.J. (2001): Climate Change (2001): Impacts, Adaptation, and Vulnerability. IPCC. Cambridge University Press. pp. 9 – 13.

Minerals and Petroleum Resources Development Act, 2002 (No 28 of 2002).

National Environmental Management Act, 1998 (No 107 of 1998) including EIA Regulations, 2014 published in Government Notice No. R. 982, R. 983, R. 984 and R. 985 in Government Gazette No. 38282 dated 04 December 2014.

National Environmental Management Act, 1998 (No 107 of 1998) including amended EIA Regulations, 2017 published in Government Notice No. R. 324, R. 325, R. 327 and R. 328 in Government Gazette No. 40772 dated 07 April 2017.

National Environmental Management: Air Quality Act, 2003 (No 57 of 2003) including the list of activities which result in atmospheric emissions published in GN No. 248 of Government Gazette No. 33064 dated 31 March 2010.

National Environmental Management: Biodiversity Act, 2004 (No 10 of 2004).

National Environmental Management: Waste Act, 2009 (Act No. 59 of 2009) ("NEM: WA").

National Forest Act, 1998 (No 84 of 1998).

National Heritage Resources Act, 1999 (No 25 of 1999).

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

National Veld and Forest Fire Act, 1998 (No 101 of 1998).

National Water Act, 1998 (Act No. 36 of 1998), Sections 27, 28,29,30,31 and 39 (Sections dealing with General Authorisations and Water Use Licenses).

SANS 10234. Classification and Labelling of Chemicals in accordance with the Globally Harmonized System.

SEWTREAT, (2017) Mortality Pits Design Report (Ref SSQ1A221), Dated 30th March 2017.

APPENDICES

APPENDIX A: SITE PLAN(S)

Annexure A: Site Layout Map
Annexure B Site Sensitivity Map

APPENDIX B: TECHNICAL REPORT

Annexure A: Mortality Pits Design Report
Annexure B: Abattoir Waste Analysis Results
Annexure C: Water quality monitoring results

APPENDIX C: PUBLIC PARTICIPATION PROCESS

Annexure A: Level of public participation
Annexure B: Site notice text
Annexure C: Proof of displayed notice boards
Annexure D: Background Information Document (BID) text
Annexure E: Proof of distributed BID, Draft Scoping Report (DSR) & Final Scoping Report (FSR)
Annexure F: Advertisement text
Annexure G: Proof of placed advertisement
Annexure H: List of Registered Interested and Affected Parties
Annexure I: Comment and Response Sheet
Annexure J: Copies of Comments Received

APPENDIX D: IMPACT ASSESSMENT

Annexure A: Impact Assessment
Annexure B: Impact Score Sheet

APPENDIX E: SPECIALIST REPORTS

Annexure A: Aquatic Assessment & PES Study
Annexure B: Geo-hydrological Assessment
Annexure C: Heritage Exemption Motivation & Acceptance

APPENDIX F: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT (EMPR)

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX A: SITE PLAN(S)

Annexure A:

Site Layout Map

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX A: SITE PLAN(S)

Annexure B:

Site Sensitivity Map

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX B: TECHNICAL REPORT

Annexure A:

Mortality Pits Design Report

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX B: TECHNICAL REPORT

Annexure B:

Abattoir Waste Analysis Results

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX B: TECHNICAL REPORT

Annexure C:

Water quality monitoring results

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX C: PUBLIC PARTICIPATION PROCESS

Annexure A:

Level of public participation

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX C: PUBLIC PARTICIPATION PROCESS

Annexure B:

Site notice text

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX C: PUBLIC PARTICIPATION PROCESS

Annexure C:

Proof of displayed notice boards

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX C: PUBLIC PARTICIPATION PROCESS

Annexure D:

Background Information Document (BID) text

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX C: PUBLIC PARTICIPATION PROCESS

Annexure E:

Proof of distributed BID, Draft Scoping Report (DSR) & Final Scoping Report (FSR)

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX C: PUBLIC PARTICIPATION PROCESS

Annexure F:

Advertisement text

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX C: PUBLIC PARTICIPATION PROCESS

Annexure G:

Proof of placed advertisement

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX C: PUBLIC PARTICIPATION PROCESS

Annexure H:

List of Registered Interested and Affected Parties

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX C: PUBLIC PARTICIPATION PROCESS

Annexure I:

Comment and Response Sheet

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX C: PUBLIC PARTICIPATION PROCESS

Annexure J:

Copies of Comments Received

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX D: IMPACT ASSESSMENT

Annexure A:

Impact Assessment

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX D: IMPACT ASSESSMENT

Annexure B:

Impact Score Sheet

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX E: SPECIALIST REPORTS

Annexure A:

Aquatic Assessment & PES Study

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX E: SPECIALIST REPORTS

Annexure B:

Geo-hydrological Assessment

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX E: SPECIALIST REPORTS

Annexure C:

Heritage Exemption Motivation & Acceptance

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23

APPENDIX F:

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT (EMPR)

MEMBERS: J.A. Bowers (M Tech, Pr.Sci.Nat., MGSSA) & S.D. MacGregor (MSc., Pr.Sci.Nat.)
Reg: 2006/023163/23