63 Wessel Road, Rivonia, 2128 PO Box 2597, Rivonia, 2128 South Africa
Tel: +27 (0) 11 803 5726 **Fax:** +27 (0) 11 803 5745 **Web:** www.gcs-sa.biz

Environmental Management Programme for the Newcastle Landfill Environmental Authorisations

in terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998), National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)

Draft Report

Version –Draft for Public and Authority Review

18 May to 18 June 2018

GCS Project Number: 17-0212

Client Reference: Newcastle Landfill 17-0212

Environmental Management Programme for the Newcastle Landfill Environmental Authorisations

Draft Report

Version –Draft for Public and Authority Review
May 2018

17-0212

DOCUMENT ISSUE STATUS

Report Issue	**Draft for Public and Authority Review**		
GCS Reference Number	GCS Ref – 17-0212		
Client Reference	Newcastle Landfill Site 17-0212		
Title	**Environmental Management Programme for the Newcastle Landfill Environmental Authorisations**		
	Name	**Signature**	**Date**
Author	Marica Swart		
Document Reviewer	Riana Panaino		
Document Reviewer	Renee Janse van Rensburg		
Director			

DISCLAIMER

Information contained in this report relating to the project description is based on information supplied by the client and other client appointed sources. It is assumed that the information provided to GCS is correct.

Environmental and social data, as well as environmental impact assessment provided in this report is based on information supplied by specialists in their respective fields, as well as existing information pertaining to the area in question (including previous site investigation data). It has been assumed that the information provided to GCS to perform the outcomes of this report is correct.

No responsibility is accepted by GCS for incomplete or inaccurate data supplied by others (the client and external sources). Where gaps have been identified these are listed for consideration by the responsible decision-makers.

GCS's opinions, conclusions and recommendations are based upon information that existed at the time of the start of the production of this Document.

CONTENTS PAGE

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

CONTENT OF THE EMPR

A draft environmental management programme must comply with section 24N of the Act and include -

REQUIREMENT	SECTION
(a) Details of -	
(i) the person who prepared the environmental management programme; and	Section 1.1
(ii) the expertise of that person to prepare an environmental management programme;	Appendix A
(b) information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of-	Section 5
i) planning and design;	Section 5.2
ii) pre-construction and construction activities;	Section 5.2
iii) operation or undertaking of the activity;	Section 5.2
iv) rehabilitation of the environment; and	Section 5.2
v) closure, where relevant.	Section 5.2
(c) a detailed description of the aspects of the activity that are covered by the draft environmental management programme;	Section 5.1
(d) an identification of the persons who will be responsible for the implementation of the measures contemplated in paragraph (b);	Section 5.2
(e) proposed mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon;	Section 6
(f) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development, including, where appropriate, concurrent or progressive rehabilitation measures;	Section 5
(g) a description of the manner in which it intends to-	
i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Section 5
ii) remedy the cause of pollution or degradation and migration of pollutants;	Section 5
iii) comply with any prescribed environmental management standards or practices;	Section 5
iv) comply with any applicable provisions of the Act regarding closure, where applicable;	N/A
v) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	N/A
(h) time periods within which the measures contemplated in the environmental management programme must be implemented;	Section 5 Section 8

REQUIREMENT	SECTION
(i) the process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity;	Section 5
(j) an environmental awareness plan describing the manner in which-	Section 7
i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	Section 7
ii) risks must be dealt with in order to avoid pollution or the degradation of the environment;	Section 7
(k) where appropriate, closure plans, including closure objectives.	N/A

1 INTRODUCTION

1.1 Details of the EAP

GCS Water and Environment (Pty) Ltd (GCS) have been appointed as the independent Environmental Assessment Practitioners (EAP) to undertake the environmental processes required to obtain approval for the proposed listed activities, as requested by the relevant competent authorities. The contact details of the EAP are provided in **Table 1.1**.

Table 1.1: Name and Address of Environmental Assessment Practitioner.

ITEM	COMPANY CONTACT DETAILS
Company Name:	GCS Water and Environment (Pty) Ltd
Company Representative:	Ms Riana Panaino
Telephone No.:	+27 (0)11 803 5726
Facsimile No.:	+27 (0)11 803 5745
E-mail Address:	rianap@gcs-sa.biz
Postal Address:	PO Box 2597, Rivonia, 2128

The curriculum vitae (CV) of Ms Riana Panaino is provided for in **Appendix A**.

1.2 Project Description

The proposed Newcastle landfill site would have sufficient capacity for approximately 42 years, and if an annual growth rate of 3% is applied to the estimated daily waste stream of approximately 375 tpd, the air space required for the disposal site, based upon land-filling operations of 260 days/year (d/y), will be in the order of 17 772 million m^3. At an average height of 35 metres (m), the required footprint area would be approximately 55 hectares (ha).

The site will be designed and licensed as a General (G), Large (L) site with a positive water balance (B+), or G:L:B+ facility, or a Class B Landfill as per the NEM:WA National Norms and Standards for Disposal of Waste to Landfill, Government Notice R636 (GN R636). .

Infrastructure that will be constructed as part of the landfill site includes an access road, on-site roads, perimeter fence, guard house, weighbridge, stormwater management infrastructure, leachate management infrastructure, site offices, staff ablutions, a canteen, a workshop and monitoring boreholes. When fully operational, there is a possibility of the recovery of landfill gas, which would require separate authorisation if pursued.

The height of landfill will be limited to a proposed height of 40 m above natural ground level. The area to be developed for landfilling will be subdivided into seven (7) cells as shown in **Figure 1.1**. The construction of these cells will be in seven (7) distinct phases with each cell being constructed, landfilled and covered separately, starting with the construction and operation of Cell No. 1. Each cell has been sized to have airspace for approximately 6 years taking into consideration the anticipated annual growth rate. Cell No.1 will be landfilled to a height of approximately 20 m, at which time construction and landfilling will need to commence in Cell No. 2 to allow for landfilling to the final height of 40 m. This is needed to maintain the required side slopes of 1V:3H.

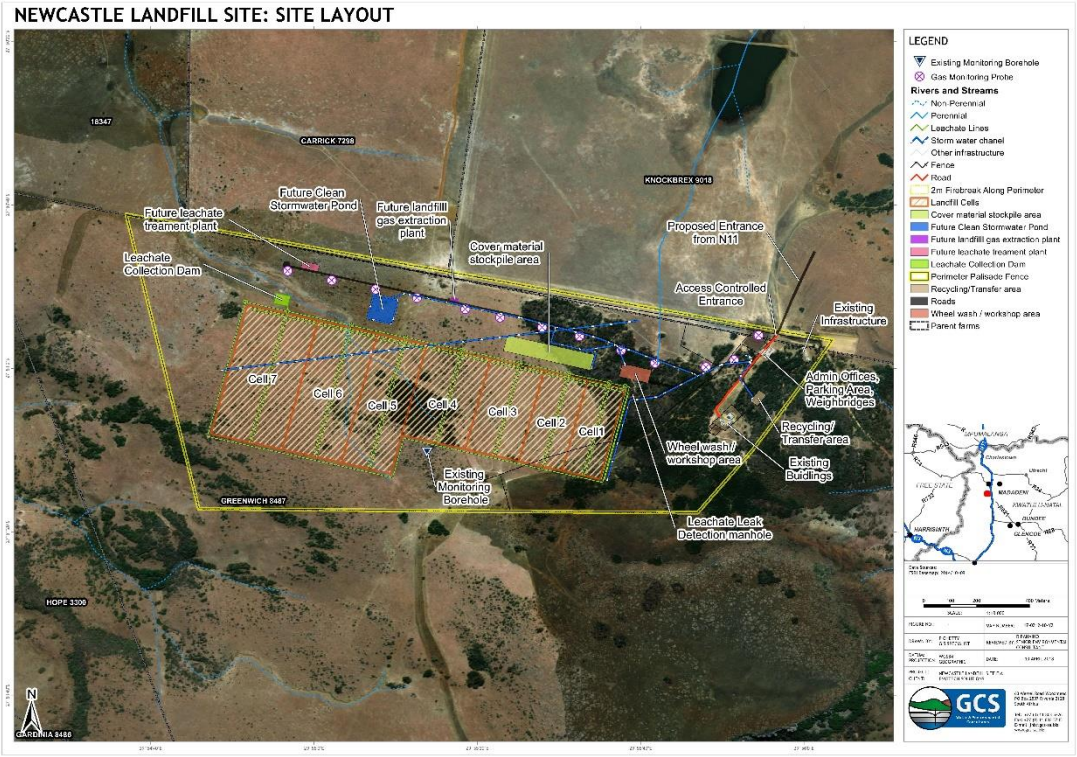

Figure 1.1: Layout of the Proposed Newcastle Local Municipality Landfill Site.

2 LEGAL REQUIREMENTS

2.1 Legislative Background

For the purposes of this application, various environmental authorisations will be required. A summary of the relevant and applicable legislative structures are provided herewith.

2.1.1 The Constitution of the Republic of South Africa

The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) is the supreme act to which all other acts must speak to. The Constitution sets out the rights for every citizen of South Africa and aims to address past social injustices. With respect to the environment, Section 24 of the constitution states that:

"Everyone has the right:

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

All companies are thus duty-bound to constitutional, legislative, and other measures to prevent pollution and ecological degradation, promote conservation and to develop in a sustainable manner.

Two particular judgments deserve consideration in that they contain a comprehensive analysis of the nature and content of the environmental right within the sustainability context. Firstly, the court in BP Southern Africa (Pty) Ltd v MEC for Agriculture, Conservation and Land Affairs 2004 5 SA 124 (WLD) confirmed that environmental interests should be balanced with justifiable economic and social development well beyond the interests of the present living generation.

The court justified the latter with Section 24(b), since this Section requires the environment to be protected for the benefit of present and future generations. The court confirmed the importance of sustainable development and predicted that it will "…play a major role in determining important environmental disputes in the future".

The court in Fuel Retailers Association of Southern Africa v Director General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province 2007 6 SA 4 (CC) attempted to balance these social, environmental and economic concerns by recognising the importance of economic and social development for the well-being of human beings. However, the court emphasised that development and the environment are inexorably linked and development cannot exist upon a weakening

environmental base. Consequently, the promotion of development requires the protection of the environment.

The constitutional environmental right elevates the importance of environmental protection and conservation, and emphasises the significance that South Africans attach to a sound and healthy environment.

The constitution also establishes the idea of the Polluter Pays Principal (which is later discussed) and is simply that the party responsible for pollution of the environment remains responsible for financial reparations of the impacts from their activities.

2.1.2 National Environmental Management Act (Act No. 107 of 1998)

2.1.2.1 NEMA Principles

The NEMA provides the framework environmental legislation and establishes an integrated environmental management system for South Africa. It aims to prevent pollution and degradation of South Africa's natural environments while promoting sustainable economic and social development.

Central to NEMA is the idea of Integrated Environmental Management (IEM). IEM seeks to:

- Promote the integration of the principles of environmental management into the making of all decisions;
- Identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with section 2 principles; and
- Ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them.

Any decision taken in respect of the proposed application for environmental authorisation should take into account the principles as set out in Section 2 of NEMA. The principles include:

- The Polluter Pays Principle: The Polluter Pays Principle means that "polluters and users of natural resources (should) bear the full environmental and social costs of their activities". The Polluter Pays Principle can also be described as an economic principle that requires the polluter to be held liable to compensate or pay for pollution prevention, minimisation and remediation. Therefore, the crux of the principle is to impose economic obligations when environmental damage is caused by

a polluter and this is achieved by setting minimum rules on liability for environmental damage.

- The Precautionary Principle: The Precautionary Principle provides guidance during development or when anything occurs which might harm the environment and where there is scientific uncertainty. NEMA stipulates and requires "a risk averse and cautious approach" to be applied and that decision-makers should take into account the limits of current knowledge about the consequences of decisions and actions".
- The Preventative Principle: The Preventive Principle is reflected in the concept that the disturbance of ecosystems and loss of biological diversity are to be "…avoided, or…minimised and remedied". Furthermore, the principle prescribes that the disturbance of the landscape and the nation's cultural heritage is to be avoided, and where it cannot be altogether avoided, must be minimised and remedied. The principle aims to minimise environmental damage by requiring that action be taken at an early stage of the process, and if possible, before such damage actually occurs. Broadly stated, it prohibits any activity which causes or may cause damage to the environment in violation of the duty of care established under environmental law.
- Cradle-to-grave: A Cradle-to-Grave stewardship perspective indicates the adoption of a comprehensive ecological view of the impacts of a process on the environment, commencing with research, development and design through the extraction and use of raw materials, production and processing, storage, distribution and use, to the final disposal of the product and the waste generated as a by-product. The "cradle-to-grave" principle advocates liability as a result of, or caused by, policies, programmes, projects, products, processes, services and activities. Given the general purpose of NEMA, together with the other sustainability principles, this legal liability may include to rectify, remedy or compensate for environmental damage or degradation.

GCS acknowledge that these principles serve as guiding principles because they are binding, enforceable and justiciable. By adhering to these principles, GCS promotes a cautious approach when advising on the activities, processes and daily operations of the Puma Filling Stations and advocates compliance with environmental regulatory measures.

2.1.2.2 NEMA Duty of Care

Chapter 7 of NEMA contains essential provisions dealing with liability for environmental damage in South Africa and two key elements form part thereof; namely: pollution prevention and remediation. A duty of care is contained in Section 28, which encompasses the main liability provision which applies retrospectively and therefore also to historical pollution.

Section 28(1) applies to all forms of pollution and is formulated generally by providing a duty of care to avoid, minimise and/or remedy pollution or environmental degradation.

In terms of this subsection, the duty imposes liability on an almost non-exhaustive category of persons, because it refers to "every person". Section 28(2) goes even further and imposes the duty on a range of people including owners or people in control of land or premises and people who have the right to use the land or premises on which, or in which, an activity or process is, or was, performed or undertaken, or any other situation exists which causes, or is likely to cause, significant pollution or degradation to the environment.

The duty of care imposes strict liability since Section 28(1) requires reasonable persons to take reasonable measures. Subsection (3) provides an indicative range of measures that can be considered as “reasonable measures” and these may include measures to investigate, assess and evaluate the impact on the environment; inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation, contain or prevent the movement of pollutants or the causing of degradation, eliminate any source of the pollution or degradation and to remedy the effects of the pollution or degradation.

One can identify from the wording an obligation to prevent and minimise pollution or degradation and this indicates that remediation is clearly part of South African law. Where a company fails to take reasonable measures to prevent or minimise pollution, it can be directed to do so by the relevant authority and if it does not comply with the directive, measures will be taken by government on its behalf, but at the company’s expense. Under Section 34(7), liability is specifically extended to the director of the company concerned in his or her personal capacity, in other words, the director is personally liable.

Furthermore, Section 43 provides that if directors failed to take all reasonable steps to prevent the offence being committed, and monetary advantage was gained, they may be personally liable for damages or compensation, have to pay a fine, or have to comply with remedial measures determined by the Court, and may even have to pay the State’s investigative costs.

2.1.2.3 NEMA 2014 Environmental Impact Assessment (EIA) Regulations GN R982

The Department of Environmental Affairs (DEA) has developed a list of activities which are likely to have an impact on the environment. The list of activities were published in 2014 (GN 982) and were separated into three listing notices (GN R983, GN R984 and GN R985) and were

amended by the Department in 2017. The amended list of activities (GN R.324, GN R.325 and GN R327) are still referred to as GN R983, GN R984 and GN R985.

Any activity which is listed under these notices requires an environmental assessment to be conducted and approved before the activity can proceed. Activities falling under Listing Notice 1 (GN R983) or Listing Notice 3 (GN R985) require a Basic Assessment (BA) to be conducted while any activity falling under Listing Notice 2 (GN R984) requires a full Scoping and Environmental Impact Reporting (S&EIR) process to be conducted.

2.1.2.4 NEMA 2010 Environmental Impact Assessment (EIA) Regulations GN R543

The Department of Environmental Affairs (DEA) as the governing body for environmental authorisations in South Africa developed a list of activities which are likely to have an impact on the environment. The concept of "listed activities" was first noted in The Environmental Conservation Act, 1989 (Act No. 73 of 1989) (ECA) which pre-dated the NEMA. ECA Notices (GN R1182, GN R448 and GN R670) were the first promulgated listed activities in South African environmental law. Although the ECA has been largely replaced by the NEMA, certain provisions thereof still remain in force. Under NEMA, the DEA first identified and promulgated listed activities in the 2006 NEMA EIA Regulations (GN R385) and NEMA Notices (GN R386 and GN R 387). The 2006 NEMA EIA Regulations have since been mostly replaced by the 2010 NEMA EIA Regulations (GN R543) and NEMA Notices (GN R544, GN R545 and GN R546).

In line with the transitional arrangements of the NEMA 2014 EIA Regulations, as amended in April 2017, where an application submitted in terms of the previous NEMA regulations, is pending in relation to an activity of which a component of the same activity was not identified under the previous NEMA notices, but is now identified in terms of section 24(2) of the Act, the competent authority must dispense of such application in terms of the previous NEMA regulations and may authorise the activity identified in terms of section 24(2) as if it was applied for, on condition that all impacts of the newly identified activity and requirements of these Regulations have also been considered and adequately assessed.

It is for this reason that this application is still subject to the NEMA 2010 EIA Regulations and associated process timeframes.

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

The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) fundamentally reformed the law regulating waste management, and for the first time provides a coherent and integrated legislative framework addressing all the steps in the waste management hierarchy. The objectives of the NEM:WA are to protect health, well-being and

the environment by providing reasonable measures for, inter alia, remediating land where contamination presents, or may present, a significant risk of harm to health or the environment. The objectives of the NEM:WA are structured around the steps in the waste management hierarchy, which is the overall approach that informs waste management in South Africa. The waste management hierarchy consists of options for waste management during the lifecycle of waste, arranged in descending order of priority; i.e. waste avoidance, reduction, re-use, recycling, recovery, treatment, and safe disposal as a last resort.

NEMA, as previously mentioned, introduced a number of additional guiding principles into South African environmental legislation, including the life-cycle approach to waste management, producer responsibility, the precautionary principle and the polluter pays principle (i.e. the sustainability principles as contained in Section 2 of NEMA). Section 5(2) of the NEM:WA stipulates that the Act should be interpreted and guided in accordance with these sustainability principles. The NEM:WA, furthermore, echoes the duty of care provision, in terms of Section 28 of NEMA, by obliging holders of waste to take reasonable measures to implement the waste management hierarchy. Section 16(1) of the NEM:WA provides that:

> "A holder of waste must, within the holder's power, take all reasonable measures to –
>
> a) avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;
> b) reduce, re-use, recycle and recover waste;
> c) where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;
> d) manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;
> e) prevent any employee or any person under his or her supervision from contravening this Act; and
> f) prevent the waste from being used for an unauthorised purpose."

While the NEM:WA creates a comprehensive legal framework for waste management, its provisions will be meaningless without measures to monitor and, where necessary, enforce compliance. Compliance monitoring is supported by a range of reporting provisions contained in the NEM:WA. In addition to compliance reports for waste management licences and norms and standards, the NEM:WA has provisions for annual performance reports on the implementation of provincial and local Integrated Waste Management Plans. Industry Waste Management Plans are subject to review at intervals to be determined by the authority that mandated the plan. Furthermore, Environmental Management Inspectors and Waste

Management Officers can request a Waste Impact Report where they suspect a contravention of the Act, licence conditions or exemption conditions.

The NEM:WA provides for a licensing regime specific to waste management activities. It replaces the historical system of permits issued in terms of the repealed Section 20 of the ECA. Transitional arrangements allow existing permits granted in terms of ECA to be regarded as licences in terms of the NEM:WA until the Minister requires a licence application as per the NEM:WA category of the waste management activity (i.e. category A or B). The NEM:WA waste management categories determine the environmental assessment procedure (which is the equivalent of the NEMA EIA regulations' requirements) required to obtain a licence.

Category A activities require a BA process to be undertaken, whilst Category B activities require a S&EIR process to be undertaken.

The recently amended legislation concerning EIAs makes reference to the development of norms and standards which may guide EIA applications and Environmental Authorisations in the future. The production of appropriate norms and standards for specific forms of developments is ongoing and it is anticipated that this will eventually provide the opportunity to further streamline the EIA procedures in relation to particular forms of developments. Depending on the location of developments, it is important to note that applicable Norms and Standards are no different from regulations in law in that they are both equally binding.

The NEM:WA norms and standards have been specified as follows:

- National Norms and Standards (2013) for the (i) Storage of Waste; (ii) Extraction, Flaring or Recovery of Landfill Gas; (iii) Scrapping & Recovery of Motor Vehicles; (iv) Remediation of Contaminated Land;
- Waste Information (WIS) Regulations;
- Waste Classification and Management Regulations, and Norms & Standards for
- Assessment and Disposal of Waste to Landfill (2013); and
- Industry Waste Management Plans.

2.1.3.1 Standards for Extraction, Flaring or Recovery of Landfill Gas, 2013

The standards aim at controlling the extraction, flaring or recovery of landfill gas at facilities in order to prevent or minimise potential negative impacts on the bio-physical and socio-economic environments.

These standards apply to a landfill gas extraction, flaring or recovery facility initiated, constructed or upgraded after the coming into operation of the standards. The standards are

applicable throughout the Republic of South Africa and specify requirements for landfill gas extraction, flaring and recovery during the planning, construction, operation and decommissioning phases of the landfill.

This Standard is only applicable if the applicant chooses to undertaken extraction, flaring or recovery of landfill gas which, to GCSs' knowledge, is not planned at this stage in the project development. Should this change the applicant will need to comply with the Standards and obtain any associated environmental authorisations required prior to initiating the extraction, flaring or recovery of landfill gas.

2.1.3.2 Minimum Requirements for Waste Disposal by Landfill Second Edition, 1998

There have been a number of waste management regulations and policies that have been published recently in order to promote better management of waste and facilities used to manage it. The construction and operation of any facility for the handling, storage or disposal of waste must comply with the following:

- National Norms and Standards for Disposal of Waste to Landfill;
- National Norms and Standards for the Storage of Waste;
- Waste Classification and Management Regulations, Norms and Standards for Assessment and Disposal of Waste to Landfil;
- National Policy in Thermal Treatment of General and Hazardous Waste (where incinerators may be used); and
- National Domestic Waste Collection Standards.

Landfill facilities must also comply with the Minimum Requirements for Waste Disposal by Landfill, (Second Edition 1998) as published by the Department of Water Affairs and Forestry (DWAF) as some of the requirements in the Minimum Requirements are still applicable though there has been new standards published.

The objectives of the Minimum Requirements for Waste Disposal by Landfill can be summarised as follows:

- To improve the standard of waste disposal in South Africa;
- To set guidelines for environmentally acceptable waste disposal for a spectrum of landfill sizes and types; and
- To provide a framework of minimum waste disposal standards within which to work and upon which to build.

The approach to the Minimum Requirements is based on the IEM approach. This promotes, inter alia, the proactive control of pollution, by integrating environmental aspects into the planning of developments.

This approach has been dovetailed with the Environmental Impact Regulations, the required processes and activities must meet the 'Best Practicable Environmental Option' (BPEO). This is the option which provides the most benefit and least damage to the environment as a whole, in both the long and the short term. It is arrived at by the due consideration of alternatives and costs. The methods and practices used to implement the above processes and activities must be the 'Best Available Technology Not Entailing Excessive Cost' (BATNEEC), where 'excessive costs determined by a cost benefit analysis.

2.1.4 National Environmental Management Air Quality Act, 2004 (Act No. 39 of 2004)

The National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA), as amended, has shifted the approach of air quality management from source-based control to receptor-based control. The main objectives of the Act are to:

- Give effect to everyone's right 'to an environment that is not harmful to their health and well-being'; and
- Protect the environment by providing reasonable legislative and other measures that (i) prevent pollution and ecological degradation, (ii) promote conservation and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

The Act makes provision for the setting and formulation of National Ambient Air Quality Standards for 'substances or mixtures of substances which present a threat to health, well-being or the environment'. More stringent standards can be established at the provincial and local levels.

The control and management of emissions in the NEM:AQA relates to the listing of activities that are sources of emissions and the issuing of emission licences. Listed activities are defined as activities which 'result in atmospheric emissions and are regarded as having a significant detrimental effect on the environment, including human health'. Listed activities have been identified by the Minister of the DEA and atmospheric emission standards have been established for each of these activities. These listed activities now require an Atmospheric Emission Licence (AEL) to operate. The issuing of AELs for Listed Activities will be the responsibility of the Metropolitan and District Municipalities.

In addition, the Minister may declare any substance contributing to air pollution as a priority pollutant. Any industries or industrial sectors that emit these priority pollutants will be required to implement a Pollution Prevention Plan. Municipalities are required to 'designate an air quality officer to be responsible for co-ordinating matters pertaining to air quality management in the Municipality'. The appointed Air Quality Officer is responsible for the issuing of atmospheric emission licences.

This Act is only applicable if it is found that any of the activities taking place at the landfill site trigger any of the identified listed activities requiring issuance of an AEL. This can only be determined once the landfill site has been established and is operational so is not applicable at this stage.

2.1.5 National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)

The National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEM:PAA) provides for the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes, for the management of those areas in accordance to national norms and standards, as well as for the intergovernmental co-operation and public consultation in matters concerning protected areas. Protected areas are to be conserved for their biodiversity and ecological integrity.

This Act is only applicable if activities fall within any conservancy or protected area, which is not the case with the proposed landfill site development.

2.1.6 National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute (SANBI); and for matters connected therewith.

This Act is only applicable if red data fauna or flora species are identified in the study area.

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

One of the main and ever-continuing concerns in South Africa is the sustainability of water management, and the costs associated with the prevention and remediation of pollution in a country with an average rainfall far below international standards. The National Water Act, 1998 (Act No. 36 of 1998) (NWA) is one of the government's answers to some of these challenges and functions as sectoral legislation within the framework of NEMA.

The NWA aims to ensure the protection and sustainable use of South Africa's water resources. The three main pillars of the NWA are sustainability, equity and efficiency. The NWA provides for a Section 21 Water Use License (WUL) which a company will have to apply for, before commencing with any water use related activities. Various conditions may be attached to these licenses and a breach thereof will result in criminal and civil liability. The conditions attached to water use authorisations will function alongside the additional protective measures, duty of care and statutory liability provisions provided by the NWA and other legislation to regulate a whole array of water issues.

According to NWA, water may not be used without prior authorisation from the leading authority, in this case the Department of Water and Sanitation (DWS). Due to the requirements of the NWA, an Integrated Water Use License (IWUL) Application and Integrated Water and Waste Management Plan (IWWMP) needs to be compiled and handed in at the DWS to ensure the legality of the proposed water uses. GCS will be undertaking the development of the required water use licenses as per the NWA.

2.1.8 The National Heritage Resources Act, (Act No. 25 of 1999)

The National Heritage Resources Act, (Act No. 25 of 1999) (NHRA) requires Heritage Resources Impact Assessments for various categories of development stipulated in Section 38 of the Act. It also provides for the grading of heritage resources and the implementation of a three-tier level of responsibilities and functions for heritage resources to be undertaken by the national and Provincial Authorities, depending on the grade of the heritage resource. The Act defines cultural significance, archaeological and paleontological sites and materials (Section 35), historical sites and structures (Section 34), and graves and burial sites (Section 36) that fall under its jurisdiction. Archaeological sites and material are generally those resources older than a hundred years, including gravestones and grave dressing. Procedures for managing graves and burial grounds are set out in Section 36 of the NHRA. Graves older than 100 years are legislated as archaeological sites and must be dealt with accordingly. Section 38 of the NHRA makes provision for application by developers for permits before any heritage resource may be damaged or destroyed.

This Act is only applicable if any heritage resources such as sites of cultural significance, archaeological and paleontological sites and materials; historical sites and structures; and/or and graves and burial sites are determined to be within the proposed landfill development area.

2.1.9 Penalties Owing to Offences and/or Non-Compliance

Penalties owing to offences or non-compliances under the various environmental legislation is summarised in **Table 2.1**. The applicant should be aware of the penalties associated with offences and/or non-compliances for the proposed landfill site.

Table 2.1: Penalties for Offences and/or Non-compliance.

LEGISLATION	SECTION	FINE
NEMA	Section 24, 31	Fine not exceeding R 5,000,000.00, or imprisonment for a period not exceeding 10 years, or both such fine and such imprisonment.
	Section 28, 30	Fine not exceeding R 1,000,000.00, or imprisonment for a period not exceeding 1 year, or both such a fine and such imprisonment.
	Section 34	Fine not exceeding R 10,000.00, or imprisonment for a period not exceeding 1 year, or both such fine and such imprisonment
NWA	Section 15 and Item 31 of Schedule 4	First Conviction: Fine not exceeding R 100,000.00, or imprisonment for a period not exceeding 5 years, or both such fine and such imprisonment. Second or Subsequent Conviction: Fine not exceeding R 200,000.00, or imprisonment for a period not exceeding 10 years, or both such fine and such imprisonment.
NEM:WA	Section 67 and 68	Liable to a fine up to R 10,000,000.00, or imprisonment up to 10 years, or both, in addition to other penalties that may be imposed in terms of NEMA.

2.2 Environmental Processes

2.2.1 Environmental Process Objectives

In order to mitigate potentially negative impacts and to identify any potential fatal flaws which may render the project environmentally unacceptable, GCS has adopted an integrated, step-by-step process to identify issues of concern and to thoroughly investigate these issues. To ensure that the negative impacts are identified and mitigated in the early stages of the project, and that the positive impacts are maximised, it will be necessary for the environmental study to meet the following aims:

- Follow the guideline process as outlined by the NEMA;
- Provide input in the feasibility phases to ensure that the most technically feasible, and environmentally sound options are selected;
- Ensure that impacts are identified early through investigations to minimize environmental damage and maximise benefits;
- Conduct thorough special investigations that will allow the project team to develop an adequate understanding of the issues to be dealt with;
- Compile an EIA that will identify, evaluate and address the potential impacts;
- Provide ongoing environmental input into the project planning and development;
- Compile an Environmental Management Plan (EMP) that will limit the significance of the negative impacts and maximise the positive aspects;
- Ensure that all relevant Interested and Affected Parties (I&APs) are consulted and involved throughout the project; and
- Ensure that an open and transparent communication structure is in place during the life of the mine.

The environmental process is being undertaken in accordance with the provisions of NEMA, NEM:WA and NWA. Strong emphasis will be placed on these processes to ensure that the processes will be able to run concurrently, and will easily be comparable with no confusion between the different processes. The various environmental authorisation processes being followed for this project are described in the sections which follow.

2.2.2 The NEMA and NEM:WA

Section 24(1) of NEMA requires that the potential consequences of or impacts on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority. Where EIAs have been identified as the instrument to be utilised in achieving the aforementioned, an application for environmental authorisation needs to be obtained. The identified activities are listed under GN R544, R545, R546 and R547 of the 2010 NEMA EIA Regulations respectively.

The listed activities which are triggered by the proposed landfill site are contained in Listing Notice 1 (GN R544) and Listing Notice 2 (GN R545) of the 2010 NEMA EIA Regulations. Activities contained in Listing Notice 1 require a Basic Assessment (BA) process to be followed whilst activities in Listing Notice 2 require a Scoping and Environmental Impact Reporting (S&EIR) process to be followed. For the purposes of this application all items listed under Listing Notice 1 will be addressed in the required S&EIR process applicable to Listing Notice 2 activities. The KZN Economic Development, Tourism and Environmental Affairs (EDTEA) is regarded as the competent authority and as such a consolidated NEMA and NEM:WA EIR will

be developed for proposed application and submitted to the EDTEA for assessment and authorisation.

S&EIR processes entail a comprehensive EIA process which includes a scoping phase and an EIA phase. In the scoping phase, issues and a plan of study for the EIA phase are identified and an Environmental Scoping Report (ESR) is developed. The EIA phase assesses issues identified during the scoping phase and includes development of an EMP. The EMP provides information on the proposed activity and the manner in which potential impacts will be minimised or mitigated. This process is required for all listed activities.

Table 2.2 presents the potential listed activities which may be triggered by the proposed waste landfill facility. When GCS came on board to complete the project, it was found that some listed activities were omitted which should have been included. All activities, including omitted activities, triggered in terms of the NEMA 2010 EIA Regulations are listed in **Table 2.2**. Furthermore, the correlating activities in terms of the NEMA 2014 EIA Regulations have been included in **Table 2.2** for comparative purposes. An updated application form will be submitted to the EDTEA with the Final EIR to align the application form with the activities anticipated on site.

Table 2.2: Listed Activities in terms of NEMA.

PROPOSED PROJECT ACTIVITY	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2010 REGULATIONS	DESCRIPTION OF LISTED ACTIVITY (2010)	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2014 REGULATIONS	DESCRIPTION OF SIMILARLY LISTED ACTIVITY (2014)
Effluent and storm water management system of the landfill site	GNR 544 Activity 9	The construction of facilities or infrastructure exceeding 1 000 metres in length for the bulk transportation of water, sewage or storm water – (i) with an internal diameter of 0.36 metres or more; or (ii) with a peak throughput of 120 litres per second or more, excluding where: a) such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or b) where such construction will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.	GNR 983 Activity 9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water- (i) with an internal diameter of 0.36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or b) where such development will occur within an urban area.
			GNR 983 Activity 10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste

PROPOSED PROJECT ACTIVITY	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2010 REGULATIONS	DESCRIPTION OF LISTED ACTIVITY (2010)	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2014 REGULATIONS	DESCRIPTION OF SIMILARLY LISTED ACTIVITY (2014)
				water, return water, industrial discharge or slimes- (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or b) where such development will occur within an urban area.
The development of some landfill infrastructure within wetlands and watercourses	GNR 544 Activity 11	The construction of: (i) canals; (ii) channels; (iii) bridges; (iv) dams; (v) weirs; (vi) bulk storm water outlet structures;	GNR 983 Activity 12	The development of- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or

PROPOSED PROJECT ACTIVITY	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2010 REGULATIONS	DESCRIPTION OF LISTED ACTIVITY (2010)	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2014 REGULATIONS	DESCRIPTION OF SIMILARLY LISTED ACTIVITY (2014)
		(vii) marinas; (viii) jetties exceeding 50 square metres in size; (ix) slipways exceeding 50 square metres in size; (x) buildings exceeding 50 square metres in size; or (xi) infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.		(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- a) within a watercourse; b) in front of a development setback; or c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;- excluding- (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in

PROPOSED PROJECT ACTIVITY	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2010 REGULATIONS	DESCRIPTION OF LISTED ACTIVITY (2010)	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2014 REGULATIONS	DESCRIPTION OF SIMILARLY LISTED ACTIVITY (2014)
				Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.
The development of some landfill infrastructure within wetlands and watercourses	GNR 544 Activity 18	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from- (i) a watercourse; (ii) the sea; (iii) the seashore;	GNR 983 Activity 19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving-

PROPOSED PROJECT ACTIVITY	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2010 REGULATIONS	DESCRIPTION OF LISTED ACTIVITY (2010)	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2014 REGULATIONS	DESCRIPTION OF SIMILARLY LISTED ACTIVITY (2014)
		(iv) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater but excluding where such infilling, depositing, dredging, excavation, removal or moving i. is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or ii. occurs behind the development setback line.		a) will occur behind a development setback; b) is for maintenance purposes undertaken in accordance with a maintenance management plan; c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.
Construction of the landfill access road with an estimated width of 7 m and length of 3.5 km	GNR 544 Activity 22	The construction of a road, outside urban areas, (i) with a reserve wider than 13.5m; (ii) where no reserve exists where the road is wider than 8 metres, or	GNR 983 Activity 24	The development of a road- (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387

PROPOSED PROJECT ACTIVITY	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2010 REGULATIONS	DESCRIPTION OF LISTED ACTIVITY (2010)	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2014 REGULATIONS	DESCRIPTION OF SIMILARLY LISTED ACTIVITY (2014)
		(iii) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.		of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road- a) which is identified and included in activity 27 in Listing Notice 2 of 2014; b) where the entire road falls within an urban area; or c) which is 1 kilometre or shorter.
The establishment of a public landfill site	GNR 544 Activity 24	The transformation of land bigger than 1 000 square metres in size, to residential, retail, commercial, industrial or institutional use, where, at the time of the coming into effect of this Schedule such land was zoned open space, conservation or had an equivalent zoning.	-	-
The establishment of a public landfill site	GNR 545 Activity 15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational,	GNR 984 Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding

PROPOSED PROJECT ACTIVITY	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2010 REGULATIONS	DESCRIPTION OF LISTED ACTIVITY (2010)	NOTICE AND ACTIVITY NUMBER IN TERMS OF 2014 REGULATIONS	DESCRIPTION OF SIMILARLY LISTED ACTIVITY (2014)
		industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for: (i) linear development activities; or (ii) agriculture or afforestation where activity 16 in this Schedule will apply.		where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

Table 2.3: Listed Activities in terms of NEM:WA

PROPOSED PROJECT ACTIVITY	GNR 921 of 2013	DESCRIPTION OF ACTIVITY (2013)	GNR 921 of 2013 (as amended in 2017)	DESCRIPTION OF SIMILARLY LISTED ACTIVITY (2017)
It is proposed that recycling be undertaken as part of the landfill's operational activities, as it is highlighted as one of the goals of the National Waste Management Strategy (NWMS), which is to promote waste minimisation, reuse, recycling and recovery of waste. The recycling facility will be established in future once the waste volumes are being received.	Category A, Activity 3	The recycling of general waste at a facility that has an operational area in excess of 500 m^2, excluding recycling that takes place as an integral part of an integral part of an internal manufacturing process within the same premises	Category A, Activity 3	The recycling of general waste at a facility that has an operational area in excess of 500 m^2, excluding recycling that takes place as an integral part of an internal manufacturing process within the same premises.
As part of the operation at the landfill site, there will be leachate and/or wastewater treatment on site	Category B, Activity 6	The treatment of general waste in excess of 100 tons per day calculated as a monthly average, using any form of treatment	Category B, Activity 6	The treatment of general waste in excess of 100 tons per day calculated as a monthly average, using any form of treatment.

PROPOSED PROJECT ACTIVITY	GNR 921 of 2013	DESCRIPTION OF ACTIVITY (2013)	GNR 921 of 2013 (as amended in 2017)	DESCRIPTION OF SIMILARLY LISTED ACTIVITY (2017)
The Newcastle Municipality wishes to establish a waste management (landfill) site for the disposal of general waste and it is estimated that 375 tonnes of domestic waste will be handled on a daily basis at the proposed landfill site	Category B, Activity 8	The disposal of general waste to land covering an area in excess of 200 m^2 and with a total capacity not exceeding 25 000 tons	Category B, Activity 8	The disposal of general waste to land covering an area in excess of 200 m^2 and with a total capacity exceeding 25 000 tons
The proposed landfill site will include the construction of associated infrastructure including an access road, on site roads, perimeter fence, guard house, weighbridge, stormwater management infrastructure, leachate management infrastructure, site offices, staff ablutions, recycling/transfer area, canteen as well as workshop.	Category B, Activity 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)	Category B, Activity 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)

PROPOSED PROJECT ACTIVITY	GNR 921 of 2013	DESCRIPTION OF ACTIVITY (2013)	GNR 921 of 2013 (as amended in 2017)	DESCRIPTION OF SIMILARLY LISTED ACTIVITY (2017)
There is a possibility for landfill gas recovery as soon as the landfill site is fully operational and given that sufficient waste is landfilled to allow for considerable gas recovery	Category C, Activity 5	The extraction, recovery or flaring of landfill gas	Category C, Activity 5	The extraction, recovery or flaring of landfill gas
There is a possibility that sorting will be undertaken at the landfill facility	-	-	Category C, Activity 6	The sorting, shredding, grinding, crushing, screening or baling of general waste at a waste facility that has an operational area that is 1000 m^2 and more

2.2.3 The NWA

The NWA stipulates that activities which have the potential to impact on a water resource require that an Integrated Water Use License (IWUL) be issued by the DWS. In accordance with the requirements of the NWA, an IWUL application will be compiled for the proposed NLM landfill site and submitted to the DWS to ensure the legality of the identified water uses associated with the proposed operation.

In addition to the IWUL an Integrated Water and Waste Management Plan (IWWMP) will also be developed and submitted to the DWS for assessment and authorisation. An IWWMP serves as the technical report to motivate the authorisation of the water uses triggered by the proposed general waste landfill site. As there are waste related uses associated with the proposed development, this report will be structured in line with the approved Integrated Water and Waste Management Plan (IWWMP) Operational Guideline compiled by the DWS.

The purpose of the IWWMP includes:

- Compilation of a site specific, implementable, management plan addressing all the identified water use and waste management relates aspects of a specific activity, in order to meet set goals and objectives in accordance with Integrated Water Resource Management (IWRM) principles;
- Provision of a management plan to guide the water user regarding the water and waste related measures which must be implemented on site in a progressive, structured manner in the short, medium and long term;
- Documentation of all the relevant information, as specified in the IWWMP Guideline as compiled by the DWS, to enable DWS to make a decision regarding the authorisation of a water use;
- Clarification of the content of the IWWMP for DWS officials and the water users, as the various regional offices of DWS might have different interpretations regarding the contents of the IWWMP;
- Standardisation of the format of supporting documentation which DWS requires during the submission of an IWUL application;
- Provision of guidance on the content of information required in an IWWMP as part of the water use authorisation process and level of detail that DWS requires to enable them to evaluate the supporting documentation to make a decision on authorising a water use; and;
- Ensuring that a consistent approach is adopted by DWS and the various Regional Offices and CMAs with regards to IWWMPs.

3 PURPOSE OF THE EMPR

Newcastle Local Municipality (NLM) is applying for the Environmental Authorisations for a proposed new Landfill site. NLM will be responsible for implementing the EMPr during all phases of the operation.

The purpose of the EMPr is as follows:

- To describe how potential negative environmental impacts will be managed through appropriate mitigation measures;
- To describe actions that could be taken to rehabilitate the affected areas especially during the construction phase;
- To prescribe monitoring actions that will ensure that the environmental management programme is adhered to; and
- To describe how potential positive environmental impacts will be maximised.

During an environmental evaluation and assessment process, various impacts were identified and mitigation measures developed for these impacts. These mitigation measures have been organised and co-ordinated into the EMPr, which will guide the construction, operation and decommissioning and closure of the landfill site. The EMPr will remain in force for the whole duration of the project and will be subject to various audits. The EMPr is a living document which may be subject to necessary updates in the interest of best practices.

3.1 General Objectives of the EMPr

Through the development of this EMPr, NLM wants to achieve the following objectives:

- Identify all possible impacts that may arise from the development;
- Have detailed mitigating measures in place that the contractors and sub-contractors have to adhere to in order to avoid or minimise identified impacts;
- Define corrective measures that need to be implemented should non-conformances occur;
- Propose measures to eliminate possible negative long term impacts that may result from the construction phase;
- Propose measures to eliminate possible negative long term impacts that may result from the operational phase;
- Propose the best practice rehabilitation measures;
- Ensure the health and safety of all relevant role players; and
- Ensure the successful handover of the EMPr to the responsible party during operation.

The overall objective of the EMPr is to reduce or mitigate negative environmental consequences resulting from the construction and operational process and to limit negative impacts as far as possible. The EMPr also aims to enhance positive impacts. The environmental objectives of the EMPr are to ensure that all necessary steps will be taken to ensure the following with regard to the identified impacts:

- That appropriate pollution control and other environmental protection measures are taken by the applicant, in accordance with all applicable laws and regulations;
- That the applicant will not degrade the degree of environmental impact beyond existing environmental conditions; and
- That, socio-economic and bio-physical conditions will be addressed in order to ensure that minimal negative impacts are caused by the landfill operation.

3.2 Approval and Implementation of the EMPr

The Department Economic Development, Tourism and Environmental Affairs (EDTEA) must approve the EMPr before it can be used as a legal binding document. The EMPr must ensure that the conditions of the Environmental Authorisation (EA) are implemented and adhered to. Copies of the approved EMPr must be made available to the following persons at all times:

- The applicant;
- The employees and contractors on site who participate in the construction and operation of the proposed facility; and
- All Interested and Affected Parties (I&APs), stakeholders and Non-governmental Organisations (NGOs).

The EMPr must be explained to the applicant, contractors and all employees who will participate in the construction and operation process.

It remains the responsibility of the applicant to ensure that regular internal audits are performed before, during and after construction and during the operation to ensure that the enhancement and mitigation measures are implemented.

4 ROLES AND RESPONSIBILITIES

In order to ensure the success of the EMPr, it is important to assign definite roles and responsibilities. Compulsory adherence is to be made to the EMPr. The obligations of the EMPr create a legally binding document in terms of environmental legislation and civil law. It is important that contractors and sub-contractors ensure that all relevant aspects of the EMPr are communicated to all of their employees. It is the duty of the contractors, sub-contractors and their employees to fulfil the project objectives with specific reference to

the prevention and mitigation of impacts caused by the construction and operation. It is the responsibility of the EDTEA to ensure that the development takes place according to the relevant legislation.

4.1 Government Departments

As the responsibility for the protection of our natural heritage lies with the government departments, they have the power to conduct site inspections to ensure that the development complies with all legislation, regulations and standards. They may enforce penalties where non-compliance occurs.

4.2 Manager Technical Services

The Manager Technical Services will oversee all of the construction activities. He/she will be responsible for the activities on site and see to the implementation of the EMPr. He/she will establish a communication network between the different components conducting the work. All incidents and reports will be made to the Project/Site Manager. Ultimate responsibility in terms of compliance to the EMPr lies with the Project /Site Manager.

The responsibilities of the Manager Technical Services will be:

- To monitor the construction activities through regular site inspections to ensure compliance to the EMPr;
- To assess the EMPr as to its effectiveness in mitigating and preventing impacts;
- To assess compliance to the EA;
- To advise the Main Contractor in respect to the activities and its impact on the environment;
- To identify any non-compliances and to advise to the immediate action and remediation;
- To ensure monthly project meetings are undertaken with the contractors and the Project Manager to discuss the findings made during the site visits;
- To ensure that the best environmental options are followed throughout;
- To ensure that a proper training, awareness and competence training programme is implemented; and
- To, where necessary, update the EMPr as new issues may arise.

4.3 Main Contractor

The ultimate on-site responsibility for environmental matters lies with the Main Contractor Engineer. They will be responsible for day to day direction and management on the site throughout the construction phase of the project.

It will be the responsibility of the Main Contractor to:

- Oversee that the day to day activities that will take place on site comply with the EMPr and the relevant legislation;
- To prepare a detailed communication strategy for liaison with I&APs, stakeholders and contractors;
- Manage and document forward and backward information flows between the Main Contractor/Engineer and the I&APs and NLM. This includes information pertaining to monitoring and evaluation;
- Assist NLM upon request, with daily project communication with I&APs;
- Ensure meaningful participation with the I&APs, including capacity building exercises where the need is identified;
- Give induction and environmental awareness training;
- Ensure that a record keeping system is maintained; and
- Promote co-regulation, shared responsibility and a sense of ownership amongst all parties involved.

4.4 Superintendent for Newcastle Inner

The Superintendent for Newcastle Inner will oversee all of the Operational activities. He/she will be responsible for the activities on site and see to the implementation of the EMPr. He/she will maintain a communication network between the different components conducting the work. All incidents and reports will be made to the Project/Site Manager.

The responsibilities of the Superintendent for Newcastle Inner will be:

- To monitor the operational activities through regular site inspections to ensure compliance to the EMPr;
- To assess the EMPr as to its effectiveness in mitigating and preventing impacts;
- To assess compliance to the EA;
- To identify any non-compliances and to advise to the immediate action and remediation;
- To ensure monthly project meetings are undertaken with the staff to discuss the findings made during the site visits;
- To ensure that the best environmental options are followed throughout;
- To ensure that a proper training, awareness and competence training programme is implemented; and
- To, where necessary, update the EMPr as new issues may arise.

5 ENVIRONMENTAL OBJECTIVES, MITIGATION AND MANAGEMENT MEASURES

5.1 Activities

This EMPr has been compiled for the Proposed Landfill site. The activities associated with the Project can be divided into the following activities:

- Construction activities:
    - Chemical spills
    - Earth Excavation
    - Heavy machinery and vehicle movement
    - Hydrocarbon spills
    - Infrastructure establishment
    - Infrastructure removal
    - Removal of vegetation and land preparation
    - Site clearing / preparation
- Operational activities:
    - Chemical spills
    - Dirty landfill stormflow and leachate seepage
    - Heavy machinery and vehicle movement
    - Hydrocarbon spills
    - Waste site operation
- Closure Phase
    - Revegetation
    - Chemical spills
    - Heavy machinery and vehicle movement
    - Hydrocarbon spills
- Residual Impacts
    - After closure rehabilitation

5.2 Environmental Management Measures

In terms of The Constitution of the Republic of South Africa everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for benefit of present and future generations, though reasonable legislation and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while prompting justifiable economic and social development. The needs of the environment, as well as I&APs

should thus be integrated into overall project management. This EMPr provides a tool for meeting this objective by providing detailed mitigation and management commitments by Newcastle Municipality for the construction and operation of the proposed project

The management measures have been organised in the following project phases:

- Construction Phase;
- Operational Phase; and
- Closure Phase.

Table 5.1 provides the management measures recommended to manage the potential impacts rated during the different phases. In addition to the management measures provided the tables indicates the person responsible to ensure that these commitments are adhered to and implemented as well as specifies the priority of these commitments (either prior a phase, during a phase and/or ongoing).

The responsible persons at NLM any have assessed these commitments in detail and have committed to the specific management measures where indicated in the **Table 5.1**.

5.3 Impact Management Objectives and Outcome

The identified mitigation measures and action plans will have certain objectives and outcomes to achieve, as detailed in Table 5.1.

Table 5.1: Management and Mitigation Measures with objectives and outcomes.

POTENTIAL ENVIRONMENTAL IMPACT	OBJECTIVE	MITIGATION MEASURE	ACTION PLAN (AVOID, MODIFY, REMEDY, CONTROL OR STOP)	OUTCOME	RESPONSIBLE PERSON
Visual change to the Landscape	Minimise the Visual Impact to surrounding areas	Minimise activity (construction/operations) duration. Minimise dust fallout. Minimise light intrusion.	Implement dust suppression. Restrict activity to the working hours of 7h00 to 17h00, with the exception of approved emergency disposal. Ensure lighting is directed inward and downward, toward the site after hours.	Effectively lowered visual intrusion onto surrounding areas	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
Groundwater contamination	Avoid spills	Containment of all fuel stored on site; Avoid spills of any contaminants Implementation of a groundwater monitoring programme.	Ensure all contaminant areas are lined or bunded. Accurate oil records must be kept (purchased, disposal, and recycled). Ensure that clean-up protocols are in place and adhered to. Adhere to monitoring schedule.	Little to no spills, effective clean-up	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
Sedimentation/Siltation of nearby watercourses	Minimal to no sedimentation	Reduce and prevent sedimentation of downstream water courses	Install silt traps below construction site and within preferential flow paths Restrict area to be cleared at any one time for construction.	Little to no sedimentation impact	**Construction: Contracted Site Manager**
Hydrocarbon pollution of nearby watercourses	Minimal to no pollution of surrounding environment	Conduct quick clean-ups after spills; Prevent dirty water runoff from site.	Oil recovered from vehicles and machinery should be collected, stored and disposed of by accredited vendors for recycling. Implement the SWMP	Little to no spills, effective clean-up	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
Reduction of runoff at downstream reaches by approximately 0.5 % of MAR.	Avoid Water quantity reduction to catchment	Treating dirty water from the PCD and then discharge clean treated water into the natural environment to recoup a fraction of the water lost	Implement SWMP	Minimal nett loss of catchment yield	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
Soil exposure	Limit areas of exposed soil at one time	Minimize footprint of impact	Limit vegetation clearing to necessary construction taking place at that time	Smaller areas of exposed soil contributing to impacts	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
Soil compaction	Avoid compacting soils outside of the construction footprint and designated infrastructure areas.	Limit movement of heavy machinery to designated areas	Demarcate clear no go areas and restrict movement to designated area only.	No compaction of soils outside construction footprint.	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
temp job creation	Provide job oppertunities for locally unemployed	Employ local labour	Recruit from within local municipality; up-skilling during construction works	Decrease in unemployment	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
decline in local safety -	Prevent increase in crime	Use local labour as far possible and avoid appointing opportunists who are looking for Peace jobs.	Prevent construction of informal settlements at the site; supervision of construction workers; construction within normal hours 7am -5pm	No increase in crime	**Construction: Contracted Site Manager** **Operation:**

POTENTIAL ENVIRONMENTAL IMPACT	OBJECTIVE	MITIGATION MEASURE	ACTION PLAN (AVOID, MODIFY, REMEDY, CONTROL OR STOP)	OUTCOME	RESPONSIBLE PERSON
					Superintendent for Newcastle Inner
nuisance/decline in human health (dust and noise) -	Minimise dust and noise impact	Avoid excessive dust fallout near Indian village	Strict speed limits should be implemented on the access road; Dust suppression on unsurfaced roads and ungrassed or unpaved areas;	No increase in health problems in the area.	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
Loss of faunal and floral species and habitat	To obtain no net loss of species	Minimise construction within natural habitats and in particularly undisturbed grasslands.	Demarcate no-go ecological areas and restrict access to those areas. Rehabilitate a nearby impacted area and relocate all indigenous vegetation from the landfill site to the rehabilitated area (as per offset or similar strategy).	Net increase in species and habitat	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
Loss of high biodiversity and important CBA Loss of habitat functionality and connectivity including servicing of Irreplaceable CBA situated to the south of the site	Avoid development in CBA and natural areas as far as possible	Stay out of CBA Optimal areas here possible, and protect natural areas outside of the footprint area.		Little net loss of CBA areas	
Loss of wetland plants and decrease surface roughness	Avoid development in wetland areas	The wetland areas and 28m buffer zones should be avoided as far as possible. Sedimentation runoff from site must be limited.	Laydown yards, camps and storage areas must be beyond the watercourse areas. Where possible, the construction of the crossings must take place from the existing road and not from within the watercourse and associated buffer.	Little net loss of wetlands	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
Erosion within and Sedimentation of wetland areas	Prevent erosion and sedimentation		Compile a wetland Monitoring and Management Plan in conjunction with a wetland specialist.	Little to no erosion and sedimentation impact	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
Loss of wetland area and soils	Avoid development in wetland areas			No net loss of wetlands and associated soils	
Water quality impairment	Avoid decrease in water quality			Optimal water quality with no decrease in quality	
Dust fallout (daily) PM10-daily PM10-annual PM2.5-daily PM2.5-annual	Prevent dust fallout	Implement dust suppression	Compile and adhere to a dust management plan	No dust fallout onto surrounding areas	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
Effect on Human Health due to exceeded gas levels	Effective waste management	Reduce waste disposal quantities through onsite recycling	Implement a waste sorting and recycling programme at the landfill.	Effective waste management	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
Damage to or destruction of fossils and cultural heritage resources	No damage to fossils and cultural heritage resources	Find and remove all fossils on site should there be any. Find and remove artefacts of cultural significance. Buffer zones must be established around the identified heritage resources (LFC-001 and LFC-002) to minimise or avoid further damage.	Development and implementation of a Fossil Finds Procedure (FFP) in conjunction with a heritage specialist. Development and implementation of a Chance Finds Procedure (CFP) in conjunction with a heritage specialist. Demarcate and fence off LFC-001 and LFC-002. Restrict access to these sites	Safely remove and protect all fossils and cultural heritage resources that are present	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
perm job losses	Prevent permanent job losses	Create oppertunities for workers near the end of life of the landfill site.	Deploy workers to new landfill sites	Assist with employment for unemployed.	**Construction: Contracted Site Manager**

POTENTIAL ENVIRONMENTAL IMPACT	OBJECTIVE	MITIGATION MEASURE	ACTION PLAN (AVOID, MODIFY, REMEDY, CONTROL OR STOP)	OUTCOME	RESPONSIBLE PERSON
					Operation: Superintendent for Newcastle Inner
Altered topography of the project area, and decreased faunal and floral diversity	To obtain ecological status as close to pre-development status.	Ensure that a rehabilitation plan is in place prior to commencement.	Compile and implement a Closure and Rehabilitation Plan	Effective rehabilitation, and re-established biodiversity.	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
additional job creation	Provide job oppertunities for locally unemployed	Employ local labour	Vacant and/or additional jobs to be filled from the local municipality, local suppliers and service providers as far possible from local community	Decrease in unemployment	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
decline in local safety	Prevent increase in crime	Waste reclamation from non-employees and squatting should be discouraged; strict access control, after hours security	Construct security fencing around site. Install CCTV systems and the entrance along with 24hr security to react quickly to unwanted visitors.	No increase in crime	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
decline in local safety	No runaway fires	prevent runaway fires	No burning of waste at landfill sites; fire monitoring and management plan (adhere to Envirnmental Awareness Plan) construct fire breaks	No runaway or uncontrolled fires	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
decline in human and animal health	Prevent windblown debris	Avoid excessive windblown waste creation	Daily waste compaction: litter fences where high winds are present; windblown litter must be picked up and removed from vegetation and fences on daily basis; waste trucks must be closed	No spreading of waste debris beyond the Landfill cells	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
decline in human and animal health	Only permit authorised general waste	No dumping of waste other than the authorised general waste.	Strict control of prohibited articles on the landfill; daily compaction and covering of waste; appropriate measures to minimise disease vectors (e.g. rats and flies)	No dumping of unauthorised waste	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
devaluation of adjacent properties	prevent devaluation of adjacent properties	Minimise waste impacts as much as possible	on-going air quality monitoring; strict access control; daily waste compaction; effective rodent and vector control; fire management and control plan; litter control; noise management; dust suppression; odour control	Little devaluation in properties.	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
increased noise	Limit noise impact to surrounding areas	Prevent excessive noise levels during operating hours and prevent noise impact after hours.	In the absence of by-laws, national regulations on noise control must be complied with Limit operations to between 7h00 and 17h00 as far as possible. Enforce speed limit on Access road.	Little change in surrounding noise levels.	**Construction: Contracted Site Manager**

POTENTIAL ENVIRONMENTAL IMPACT	OBJECTIVE	MITIGATION MEASURE	ACTION PLAN (AVOID, MODIFY, REMEDY, CONTROL OR STOP)	OUTCOME	RESPONSIBLE PERSON
					Operation: Superintendent for Newcastle Inner
Increased presence of alien invasive species due to increased vehicle traffic, dumping of garden refuge	Prevent increase in alien vegetation	Put alien invasive management plan in place before start of construction.	Implement Alien Invasives Management Plan. Conduct auditing twice a year of alien invasive management plan	No increase in in alien vegetation and effective alien species management	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**
Benzene- annual Toluene-hourly Toluene-daily Ethylbenzene- hourly Xylene-hourly Xylene-daily hydrogen sulphide-hourly hydrogen sulphide-daily	Avoid long term of exposure of large quantities of waste to open air	Reduce waste disposal quantities through onsite recycling	Implement a waste sorting and recycling programme at landfill.	Effective waste handling	**Construction: Contracted Site Manager** **Operation: Superintendent for Newcastle Inner**

6 MONITORING AND MANAGEMANT PLAN

Table 6.1 details the monitoring and management plan for the management measures and actions identified in the impact assessment. Where specific monitoring and management plans are required, these are detailed in **Section 6.1**.

Table 6.1: Monitoring and Management Plan (All Phases).

Field	Aspect	Parametres	Frequency
Hydrogeology (Groundwater)	Quality	Sulphate as SO4	Quarterly
		Sodium as Na	
		Magnesium (Mg)	
		Fluoride as F	
		Calcium (Ca)	
		Alkalinity (Total Alkalinity)	
		Ammonia (NH3) as N	
		Chemical Oxygen Demand (COD)	
		Chloride as Cl	
		Electrical Conductivity	
		Nitrate (NO_3) as N	
		Nitrite (NO2) as N	
		pH – Value	
		Potassium (K)	
		Total Dissolved Solids	
Hydrology (Surface Water)	Quality	pH at 22°C	Monthly
		Conductivity mS/m	
		Total Dissolved Solids (TDS)	
		Calcium, Ca	
		Magnesium, Mg (mg/l)	
		Sodium, Na	
		Potassium, K	
		Total Alkalinity as CaCO3	
		Bicarbonate, HCO3	
		Chloride, Cl	
		Sulphate, SO4	
		Nitrate, NO3	
		Fluoride, F	
		Aluminium, Al	
		Manganese, Mn	
		Iron, Fe	
		Zinc, Zn	
		Antimony as Sb	twice a year

Field	Aspect	Parametres	Frequency
		Arsenic as As	
		Barium as Ba	
		Beryllium as Be	
		Bismuth as Bi	
		Cadmium as Cd	
		Cobalt as Co	
		Lithium as Li	
		Mercury as Hg	
		Molybdenum as Mo	
		Nickel as Ni	
		Selenium as Se	
		Silicon as Si	
		Silver as Ag	
		Strontium as Sr	
		Tin as Sn	
		Titanium as Ti	
		Vanadium as V	
		Zirconium as Zr	
Noise	Noise disturbance		Quarterly
Air Quality	Dust fallout		Quarterly
	Particulate matter	PM10	Quarterly
		PM2.5	Quarterly
	Gaseous compound	H2S and BTEX* Compounds	Monthly
		Methane	Monthly
	Field Odour Surveys		Twice a year
* - Benzene, Ethylbenzene, Toluene, Xylene.			

6.1 Specific Monitoring and Management plans

6.1.1 Noise Management Plan

The following noise management plan as illustrated in Figure 6.1 must be used to identify any new noise sources which may have an impact on the abutting noise sensitive areas.

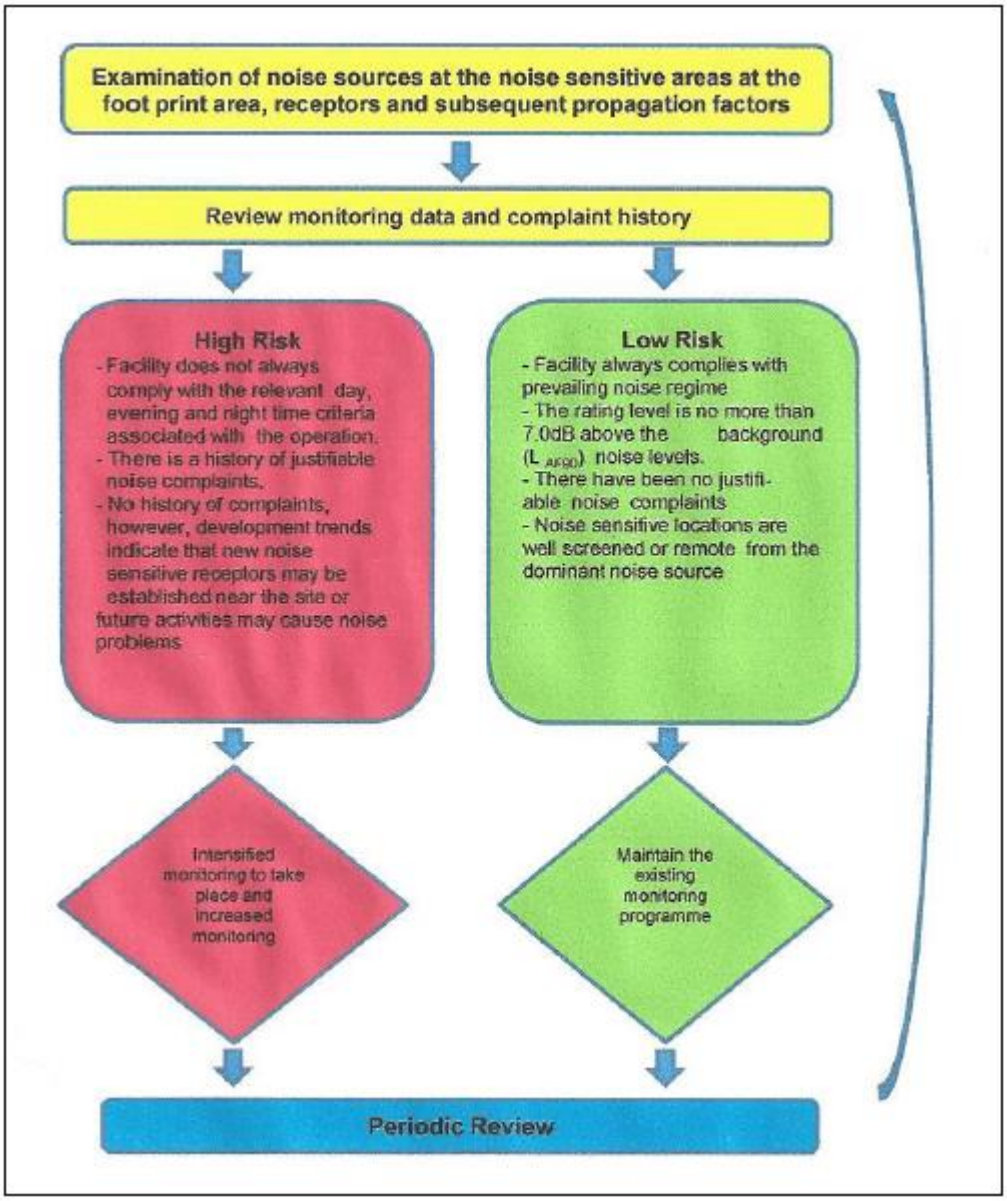

Figure 6.1: Noise Monitoring and Management Plan

6.1.2 Stormwater Management Plan

A conceptual Stormwater Management Plan (SWMP) was developed for the Newcastle Greenwich landfill site to manage stormflow from clean and dirty water sub-catchments on site. Three (3) dirty water catchments were determined and comprise the proposed landfill cells area, workshop/wheel wash area and the overburden dump site, while the rest of the site was determined to be clean (**Figure 6-2**). The overburden dump is classified as a dirty water area since exposure of subsurface material to rain and oxygen in the atmosphere results in the occurrence of redox reactions with subsequent precipitation of toxic chemicals. The workshop/wheel wash area is also considered a dirty water area since this is where oils and

grease from washed vehicles together with dirty refuse remnants are deposited during the washing process. All these dirty substances need to be managed so that they do not end up in clean water catchments and proximal watercourses.

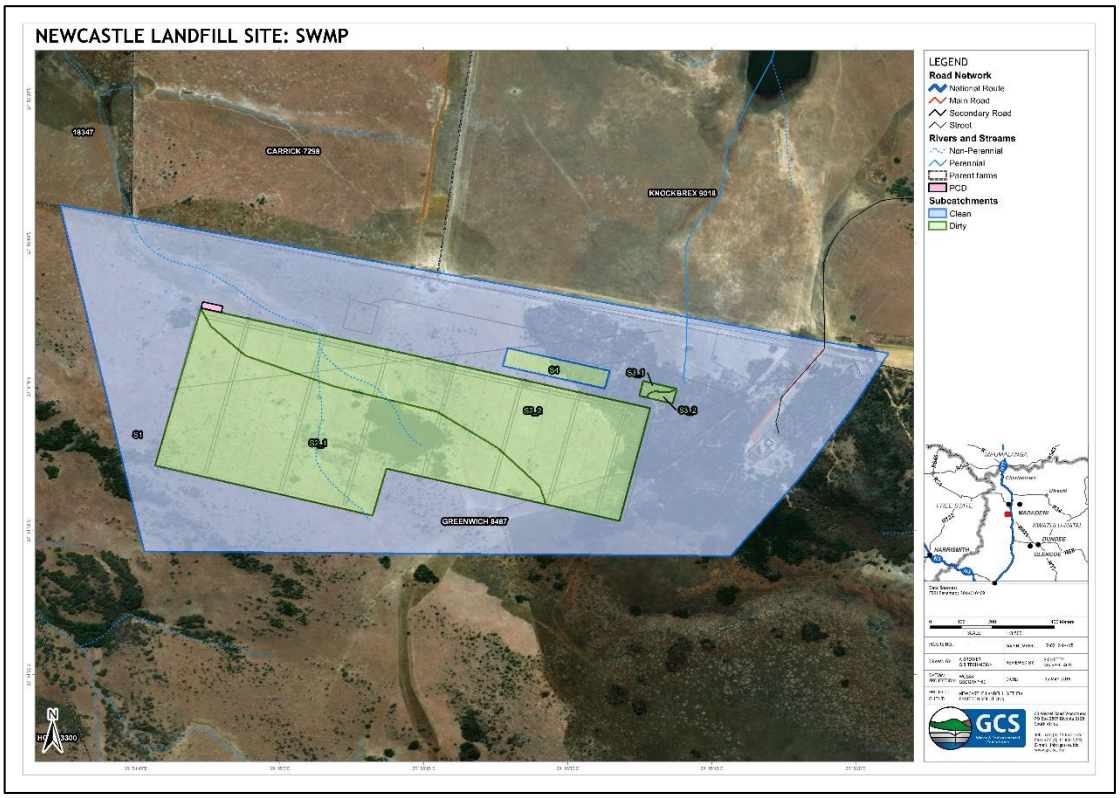

Figure 6-2: Identified dirty and clean water areas within the proposed site.

6.1.2.1 Stormwater Drainage

A network of stormwater drains/conduits were defined to channel stormwater from inlet outlet points. All stormwater infrastructure was conceptually sized to prevent flooding resulting from the 1:50-year design rainfall event. All dirty stormwater drains were defined to have a trapezoidal cross section with side slopes of 1V:1H, while clean water diversion channel have slopes of 1V:2H (**Table 6.3**). Clean water channels were conceptually designed to be grassed earth channels since clean water, which does not contaminate groundwater resources, will be conveyed therein. Stormflow velocities within the clean water earth channels slightly exceed 3 metres per second (m/s) implying potential erosion risks. These stormwater drains should be protected against erosion through use of riprap and/or allowing brush and grass vegetation to grow within them.

Dirty water channels should have a 200 mm HDPE lining (n = 0.011) in order to prevent pollution of groundwater aquifers through seepage as well as to allow fast stormflow to

containment structures. Adjoining perimeter berms should be constructed on the periphery of the landfill cells and around the wash bay area. A perimeter berm should be constructed around the cover material stockpile area to prevent possible redox precipitates to nearby watercourses as well as erosion of the cover material stockpile. The stormwater infrastructure should allow for a minimum freeboard of 500 mm. The conceptual design of a typical stormwater drain adjoined to a berm is indicated in **Figure 6-3**.

Table 6.2: Peak flows and runoff volumes for modelled stormwater sub-catchments.

SUB-CATCHMENT	CLASSIFICATION	X-COORDINATE	Y-COORDINATE	AREA (ha)	PRECIPITATION (mm)	INFILTRATION (mm)	RUNOFF DEPTH (mm)	RUNOFF VOLUME (ML)	PEAK RUNOFF (m^3/s)	RUNOFF COEFFICIENT
S1	Clean	29,92173	-27,850312	120,0	148,1	111,82	51,6	30,9	10,56	0,3
S2_1	Dirty	29,917689	-27,851382	32,6	148,1	64,46	9,5	3,1	0,43	0,1
S2_2	Dirty	29,922321	-27,850638	26,4	148,1	64,46	9,5	2,5	0,35	0,1
S3_1	Dirty	29,927479	-27,850057	0,3	148,1	0	134,0	0,4	0,17	0,9
S3_2	Dirty	29,927762	-27,850271	0,2	148,1	0	133,1	0,3	0,14	0,9
S4	Dirty	29,92466	-27,849463	1,8	148,1	64,46	10,6	0,2	0,02	0,1

Table 6.3: Stormwater drains at the proposed site.

DRAIN/ CONDUIT	CLASSIFICATION	LENGTH (m)	CROSS-SECTION	MAX DEPTH (m)	BOTTOM WIDTH (m)	LEFT SLOPE (m/m)	RIGHT SLOPE (m/m)	SLOPE (m/m)	MAX. FLOW (m^3/s)	MAX. VELOCITY (m/s)	MAX. UNIT FLOW ($m^3/s/ha$)
C1	Dirty	1774	TRAPEZOIDAL	1	1	1	1	0,030	0,31	3,20	0,01
C2	Dirty	1888	TRAPEZOIDAL	1	1	1	1	0,028	0,24	2,72	0,01
C3	Dirty	34	TRAPEZOIDAL	1	1	1	1	0,051	0,47	2,92	0,01
C4	Dirty	168	TRAPEZOIDAL	1	1	1	1	0,025	0,17	2,00	0,65
C5	Dirty	124	TRAPEZOIDAL	1	1	1	1	0,041	0,14	1,92	0,64
C6	Dirty	2	TRAPEZOIDAL	1	1	1	1	0,072	0,30	3,52	0,63
C7	Clean	762	TRAPEZOIDAL	1	2	2	2	0,046	3,91	3,26	0,08
C8	Clean	2061	TRAPEZOIDAL	1	2	2	2	0,034	4,59	3,07	0,06

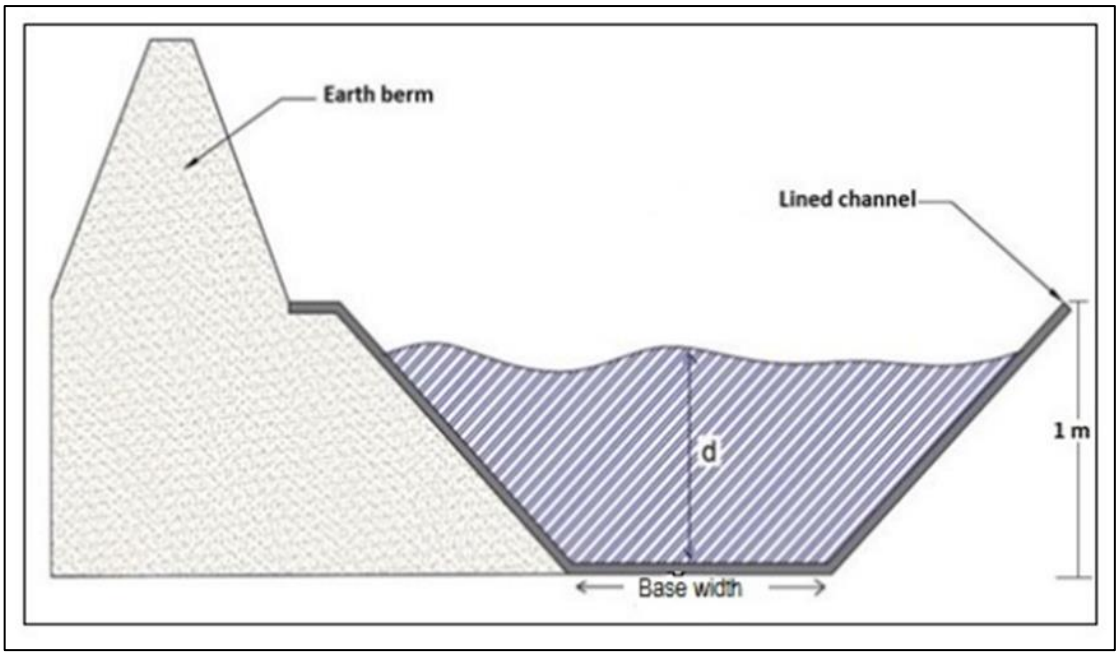

Figure 6-3: Conceptual design of storm water drain with an adjoining berm.

6.1.2.2 Dirty Water Containment Facilities

Dirty stormwater from the proposed landfill site should be contained in a PCD, whilst dirty water from the workshop/wheel wash bay area should temporarily be contained in a sump and be allowed to evaporate or should be pumped directly to the PCD. The storage volumes of the PCD and the sump were modelled to be 5 565 cubic metres (m^3) and 643 m^3, respectively (**Table 6.4**). All the contaminated water in the PCD should be managed by either evaporation or by treatment before being discharged into the natural environment. This dirty water should not be discharged into proximal natural watercourses unless it is treated to an agreed acceptable quality.

Table 6.4: Contaminated water storage structures.

STRUCTURE	LOCATION		CLASSIFICATION	STORAGE VOLUME (m^3)
	X-COORDINATE	Y-COORDINATE		
PCD (OF1)	29.914444	-27.847402	Dirty	5 565
Sump (Optional) (OF2)	29.928171	-27.850046	Dirty	643

The conceptual SWMP indicating proposed stormwater management infrastructure such as berms, drains, sumps and PCDs, together with water flow directions and classification of clean and dirty water areas is presented in **Figure 6-4**.

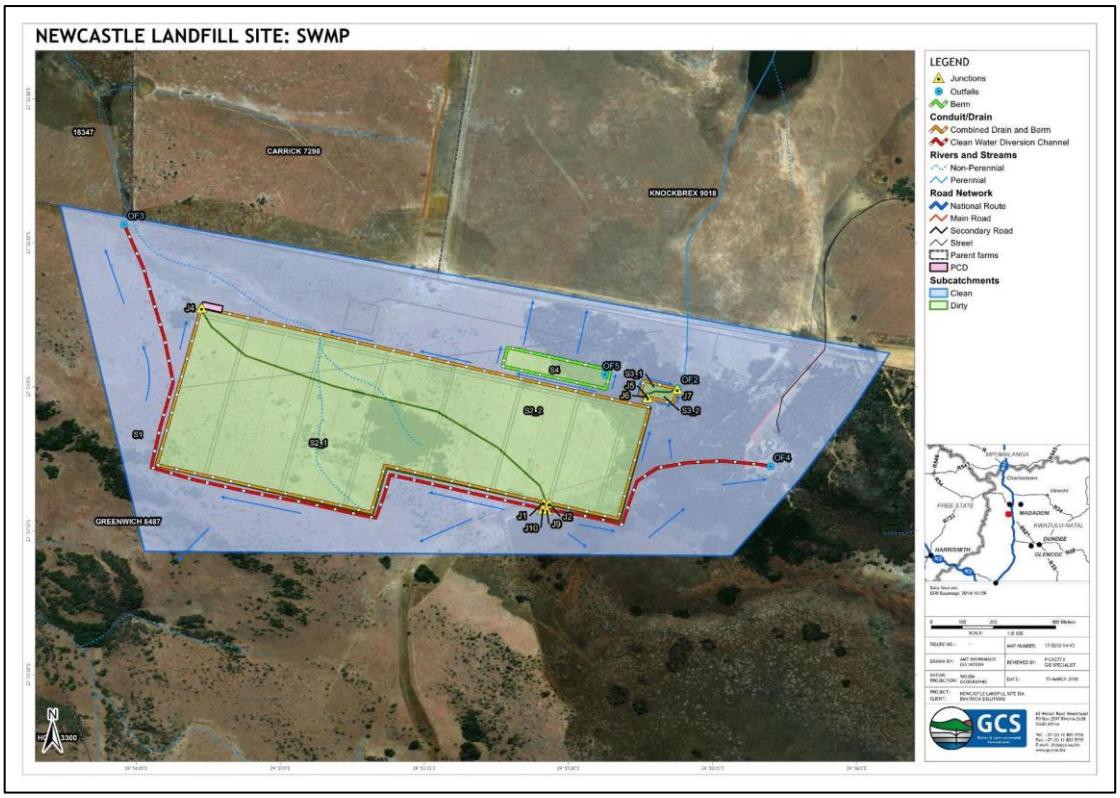

Figure 6-4: Conceptual SWMP for the proposed site.

6.1.3 Surface Water Quality Monitoring Plan

A surface water monitoring programme is recommended at the proposed Newcastle Greenwich Landfill site in terms of the Best Practice Guidelines G3: Water Monitoring Systems (DWAF, 2006). The monitoring programme will assist with overall water management at the site, including but not limited to:

- Preventing pollution and thereby protecting the receiving water environment;
- Developing an understanding of the current water quality on site and monitoring how it changes over time; and
- Assessing performance of pollution prevention measures, i.e. compliance with license conditions.

The monitoring programme should be amended according to on-site operations including any future permit requirements.

6.1.3.1 Proposed Monitoring Locations

It is recommended that any water containment facilities on site be monitored for water quality and quantity on a monthly basis. The water quality results should meet applicable standards or ensure that water released into the environment, either intentionally or

unintentionally, is of appropriate quality and that associated risks are well understood. Points on the Ncandu River and its tributaries (See Figure 6.5 and Table 6.5) and water within the PCD should be monitored on a monthly basis.

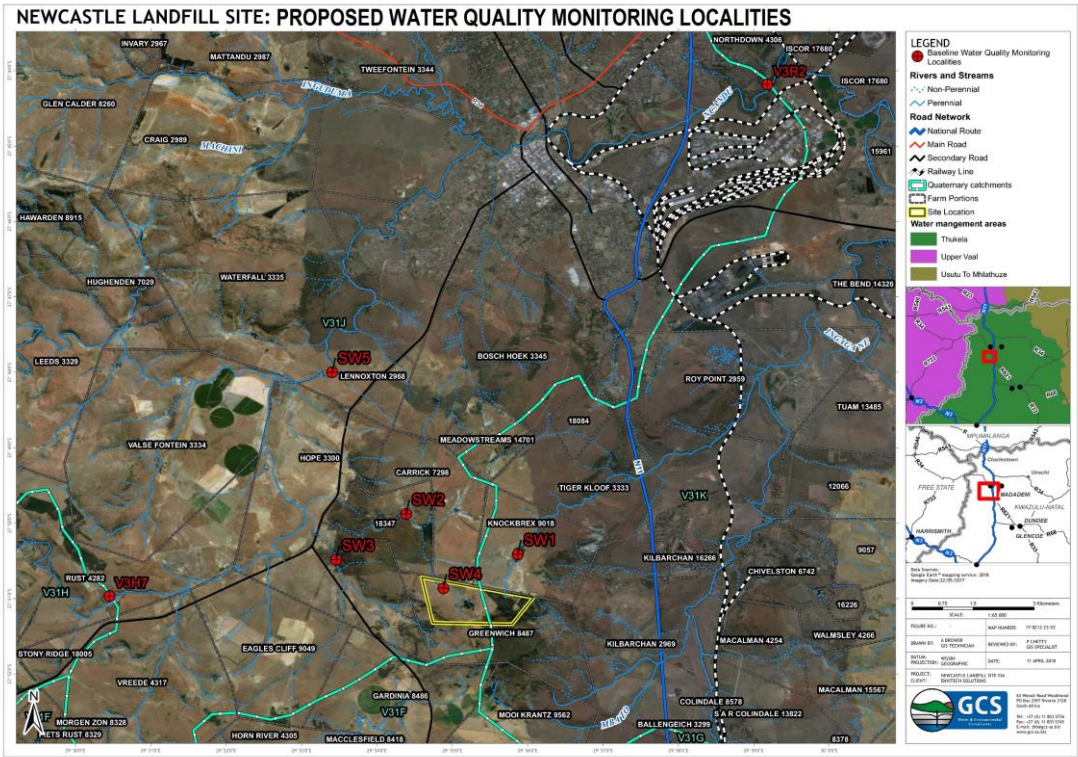

Figure 6.5: Proposed water quality monitoring localities

Table 6.5: Proposed monitoring programme

SAMPLE POINT	COORDINATES		MONITORING FREQUENCY
	Latitude	Longitude	
SW1	-27.840197°	29.931174°	Monthly water samples
SW2	-27.831302°	29.906490°	
SW3	-27.841388°	29.890989°	
SW4 (PCD)	-27.847863°	29.915124°	
SW5	-27.799958°	29.890094°	
V3H7	-27.850399°	29.841783°	
V3R2	-27.739791°	29.983201°	

6.1.3.2 Applicable Parameters and Standards

The water samples should be analysed for the parameters listed in Table 6.6 on a monthly basis, and on a bi-annual basis all samples should additionally be submitted for a full ICP-MS metal scan, as specified in Table 6.7. This list of parameters should be amended annually to ensure all priority parameters are analysed monthly and lower-priority parameters are only analysed on a bi-annual basis.

Table 6.6: List of parameters for monthly analysis

PARAMETERS	
pH at 22°C	Chloride, Cl
Conductivity mS/m	Sulphate, SO_4
Total Dissolved Solids (TDS)	Nitrate, NO_3
Calcium, Ca	Fluoride, F
Magnesium, Mg (mg/l)	Aluminium, Al
Sodium, Na	Manganese, Mn
Potassium, K	Iron, Fe
Total Alkalinity as $CaCO_3$	Zinc, Zn
Bicarbonate, HCO_3	

Table 6.7: List of parameters for bi-annual analysis

PARAMETERS	
Antimony as Sb	Nickel as Ni
Arsenic as As	Selenium as Se
Barium as Ba	Silicon as Si
Beryllium as Be	Silver as Ag
Bismuth as Bi	Strontium as Sr
Cadmium as Cd	Tin as Sn
Cobalt as Co	Titanium as Ti
Lithium as Li	Vanadium as V
Mercury as Hg	Zirconium as Zr
Molybdenum as Mo	

6.1.3.3 Sampling Methodology

The sampling procedure should be in accordance with the following publications:

- SABS ISO 5667 – 1:1980 Guidance on the design of sampling programs;

- SABS ISO 5667 – 2:1991 Guidance on sampling techniques; and
- SABS ISO 5667 – 3:1994 Guidance on the preservation and handling of samples.

Samples should be submitted to a South African National Accreditation System (SANAS) accredited laboratory for analysis.

Field observations including the following should be recorded on field data sheets:

- Coordinates of each surface water sampling point;
- In-situ Electrical Conductivity (EC), pH, Temperature and redox potential (Eh) are measured and recorded for each sampling point;
- Documenting general characteristics of the water samples such as colour, turbidity and smell;
- Any potential sources of contamination at the sampling points; and
- Annual photographs of each sampling point.

It is further recommended that a Chain of Custody (CoC) be filled in at the time of sampling recording the following information:

- Date and time of sampling;
- Coordinates of each sample point (at first sampling event only);
- In-situ measurements for each sampling point, namely pH, EC, TDS and temperature.
- General characteristics of the water samples such as colour, turbidity (murky/clear) and smell, as well as visual observations of the sample site.

The CoC form is completed when the samples are transported and transferred to the laboratory for analysis.

Care should be taken to ensure that the samples taken are sufficiently large enough, at least one (1) litre (l), as to allow the laboratory to run duplicate analyses if required. Samples should be kept cool when stored and transported. Samples for metal analysis should be filtered through a 0.45 micrometre (µm) pore size membrane in the field and preserved with nitric acid (HNO_3).

6.1.3.4 Data Storage and Processing

It is essential that all data relating to the monitoring programme be maintained in a reliable and secure database. This database should be updated as monthly data becomes available in order to identify any immediate problems and to identify any trends that are of concern.

6.1.3.5 Monitoring Reports

The following reports should be prepared by relevant bodies:

- Monthly reports; and
- Bi-annual/annual reports.

The following should be included in the reports in terms of data interpretation and trend analysis:

- Summary of the analytical results, including a comparison with relevant DWS standards;
- Map of the monitoring points showing their level of compliance;
- Brief discussion of any problem areas;
- Time series graphs showing fluctuations or trends in constituents of concern over time; and
- Recommendations and mitigations measures where applicable.

6.1.4 Groundwater Quality Monitoring Program

It is recommended that groundwater quality monitoring be implemented once the site is operational to ensure water remains compliant with the DWAF Minimum Requirements for Waste Disposal by Landfill (2nd Edition, 1998) (listed in Table 6.9). Boreholes to be monitored includes BH1, BH2, BH3, BH NL1 and BH NL2, as per Table 6.8.

Table 6.8: Monitoring Borehole Details

BH ID	Latitude	Longitude	Monitoring Frequency
BH1	-27.845718	29.910433	Quarterly
BH2	-27.851088	29.910946	
BH3	-27.849137	29.932111	
BH NL1	-27.853010	29.922917	
BH NL2	-27.846924	29.920811	

Table 6.9: Suggested Parameters for Detection Monitoring (DWAF, 1998)

Alkalinity (Total Alkalinity)	Calcium (Ca)
Ammonia (NH_3) as N	Fluoride as F
Chemical Oxygen Demand (COD)	Magnesium (Mg)
Chloride as Cl	Sodium as Na
Electrical Conductivity	Sulphate as SO_4
Nitrate (NO_3) as N	
Nitrite (NO_2) as N	

pH – Value	
Potassium (K)	
Total Dissolved Solids	

These results will be used for comparison purposes during all future monitoring events, in an effort to determine any effects on the environment as a result of the landfill construction and the operational activities of the landfill site.

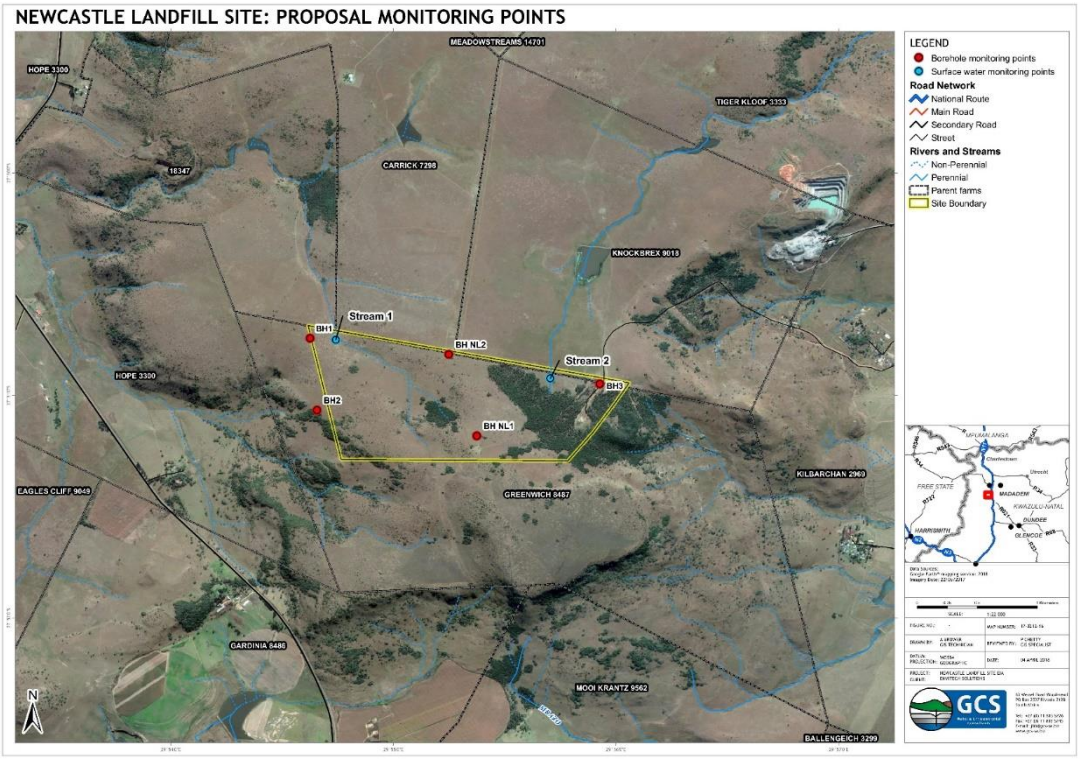

Figure 6-6: Proposed Monitoring Points Map

6.1.5 Heritage/Archaeology Management Plan

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, 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 and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated

procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

The impacts on identified heritage resources in the study area resulting from this project can be mitigated to an acceptable level with the correct mitigation measures and management actions. Furthermore, the socio-economic benefits derived from this project outweigh the impact on heritage resources with the correct mitigation measures in place. It is therefore recommended the project is authorised from a heritage perspective on the condition that the recommendations as made in this report are implemented as part of the EMPr and based on approval from SAHRA.

7 ENVIRONMENTAL AWARENESS PLAN

7.1 Communication chain

The communication of the environmental risks for each phase of the project will take place for the management, administrative and worker sectors of the project, as well as contractors.

7.1.1 Management Sector

A workshop will be conducted to inform all management of the risks associated with the facility. The risks for all aspects will be explained and the appropriate management options discussed. The workshop will also elaborate on the monitoring programmes that will be implemented to identify and monitor the level of impact on the environment and discuss various remediation actions, should there be deterioration.

The evaluation process is integral in the assurance that the facility reduces any possible environmental risks associated with the project. The workshop will be conducted prior to the

construction phase to ensure that all risks are discussed before there is any chance of the impacts occurring.

The workshop may be repeated at certain stages during the construction phase, in the case of new employees.

7.1.2 Construction Workers Sector

The workers associated with the construction activities will attend a half day induction course to ensure that each person is aware of the environmental risks associated with the project. This induction will form part of the health and safety induction. The environmental risks of each aspect as well as the mitigation will be elaborated on.

7.1.3 Contractors

An environmental awareness section will be added to the contractor's health and safety induction programme. The environmental induction will focus on activities that carry an environmental risk, actions to be taken to reduce these risks, and procedures to be followed in the event of an incident.

7.2 Method of communication

7.2.1 On the Job Training

On the job training is an essential tool in environmental awareness. Employees will be given details of the expected environmental issues and concerns specifically related to their occupation. Employees will be trained on how to respond if an environmental problem or source of environmental pollution arises. The training will be on-going, and all new employees will be provided with the same standard of training as existing employees.

The records of all individuals receiving on the job training to be kept; the records to be kept include names, employee number contact details, designation and signature.

7.2.1.1 General Training and Skills Development

Human Resources Development Programmes (HRDPs) will include appropriate training and skills development programmes as required by the workforce in support of operation specific business plans. Training will be offered in portable skills, being competencies that will enable employees to find jobs elsewhere within the industry. Basic environmental and pollution control skills will be included in this training.

7.2.1.2 Hazardous substances

Individuals dealing with potential hazardous situations and risks that could lead to hazardous spills, pollution incidents, excessive dust or other forms of environmental damage to receive appropriate job specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation. All these actions will be done in accordance to standard operating procedures on management of hazardous substances

7.2.1.3 Delivery of hazardous substances

Personnel responsible for the supervision of delivery, collection and transport of hazardous substances to receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation. This all makes part of competency declaration for use. Material Safety Data Sheets (MSDSs) of each hazardous substance delivered must be kept on site at point of distribution. Prior to any use of a new chemical, the Material Safety Data Sheet of each substance must be delivered to the SHEC department of NLM for approval of use by the Environmental Department.

7.2.1.4 Fire incidents

Individuals dealing with potential hazardous situations and risks that could lead to fire incidents or emergencies to receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.

7.2.1.5 Pollution incidents or forms of environmental damage

Any incident or form of environmental damage must be dealt with in accordance with an incident management procedure.

Individuals dealing with potential situations and risks that could lead pollution incidents or other forms of environmental damage to receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.

7.2.1.6 Water Consumption and Use

All staff will receive training on minimising water consumption and how to use water sparingly.

7.3 Environmental Communication Strategies

Site management has established procedures for the internal communication between the various levels and functions of the organisation, and receiving, documenting and responding to environmental risks for each phase of the project will take place for the management and worker sectors of the project, as well as contractors. The organisation shall conduct processes for external communication on its significant environmental aspects and record its decision in line with the NLM communication policy as well as conditions stated in any authorisation.

7.3.1 External Communication Strategies

The following communication channels and media will/can be used to communicate environmental issues to individuals who are not employed by NLM or their subcontractors:

- Environmental Stakeholder engagement meeting: An Environmental Stakeholder engagement meeting has been established and used as a forum to keep interested and affected parties informed of the significant environmental aspects identified through the Environmental Impact Assessments and Management Plans. This is also the forum where interested and affected parties get the opportunity to raise environmental concerns. Records are kept of all decisions and concerns. The Environmental Stakeholder engagement meeting is chaired by the Superintendent, or another appropriately appointed competent individual.
- Publications: Selected publications should be produced and used to communicate environmental issues to outside parties. Examples include newsletters and Annual Reports.
- Communication from External Parties: Communication from external interested and affected parties may be received by email, fax, telephonically or by mail. Where required, a written response will be sent, on receiving such communication, by the appropriately appointed individual under signature of the Superintendent, to the respective interested and/or affected party. All telephonic or facsimile correspondence received on the site must be forwarded to the relevant department for action. All events or concerns will be captured and actioned on an existing and/or future database.
- E-mail: E-mail communication received must be stored, with replies, in an appropriate folder on a server. E-mail messages, relevant to environmental management, should be kept for a minimum of two years before deletion.
- Telephone: A register of telephonic environmental queries should be kept by the relevant department detailing caller, contact details, date, query, action taken and response. Furthermore, the person answering the call will be responsible for logging

their particulars against the call, as well as ensuring that all communication that leads to an aspect or an impact, is entered on the database.

- Storage of Correspondence: All original correspondence must be retained by the Superintendent for a minimum period of two years.
- Environmental Reports: Copies of relevant specialist study reports and Environmental Impact Assessments will be available on request.
- Queries from Interested and Affected Parties: Response to queries about environmental impacts and aspects will be addressed by the relevant department, and approved by the Superintendent.

7.4 Evaluation of the Environmental Awareness Plan

The evaluation of the environmental awareness and training plan will be conducted by NLM. This evaluation will entail the auditing of the operation and construction phase once activity has commenced. The environmental awareness and training plan described above is sufficient to make all those involved in the project aware of those risks that may occur as well as the necessary mitigation required to minimise these risks.

The environmental awareness and training plan indicates that the NLM is serious about the environments well-being and empowerment of the local people. Environmental issue will be highlighted at monthly meetings scheduled at the Municipality.

7.5 Emergency Incident Reporting

Environmental incident reporting is a vital part of communication at the NLM operations. Employees are required to report any and all environmentally related problems, incidents and pollution, so that the appropriate litigator action can be implemented timeously. In the event of an Environmental Incident, the incident must be reported according to the Incident Reporting Procedure.

8 ENVIRONMENTAL EMERGENCY PREPAREDNESS AND RESPONSE PLAN

The purpose of this Environmental Emergency Preparedness and Response Plan (EEPRP) is to provide guidance to all relevant employees and contractors, in terms of the identification, reporting and handling of an environmental emergency incident or accident at the site. The EEPRP will also provide guidance to ensure that:

- Danger to the environment is minimised;
- Legal liability is managed and minimised; and

- Public relations are effectively managed during and following an environmental emergency situation and accident.

8.1 Objective of the Environmental Emergency Preparedness and Response Plan

The objective of the EEPRP is to allow rapid and efficient response to environmental emergencies and to manage environmental contamination through pollution source control, containment and/or remedial action. This will be done through appropriate effective response as per the procedures developed for dealing with the environmental emergencies and/or accidents.

8.2 Requirements of the Environmental Emergency Preparedness and Response Plan

The following will apply for the EEPRP:

- The EEPRP to be disseminated to all employees related to the Landfill and Waste Department and appointed contractors.
- The coordinated EEPRP must be in place at all times.
- In the event of an emergency; the EEPRP will be consulted.
- The relevant specific environmental emergency and response procedures are to be placed around the site where they will be easily viewed along with the Municipalities standard operating procedures (SOP's).
- Interactive and hands on competency training to be provided for individuals responsible for emergency response.
- Regular drills and reviews of these emergency procedures are required and to involve, where appropriate, all affected parties.
- The names and contact details of the personnel responsible for the Greenwhich Landfill Site at the Waste Management Department, and to be clearly displayed on notice boards.
- Contact details of emergency services, including firefighting service, ambulance/paramedics, police and spills response are to be clearly displayed where they will be easily viewed/accessed by employees and contractors.
- All accidental spillages to be immediately cleaned up in accordance with spill prevention and response procedures
- Address unplanned on-site and, where appropriate, off-site releases of hazardous substances in accordance with the hazardous substance storage and handling procedure

- Pollution incidents must be dealt with immediately, and in the correct manner, using the appropriate procedure in order to limit any negative impact on the environment.
- All Environmental Emergencies and accidents should be recorded and followed up according to Incident Reporting and Management Procedure.
- If the emergency has the potential to affect surrounding communities, they should be contacted in person in accordance to the public and community communication and liaison strategy.
- The Municipality will test the specific Environmental Emergency Preparedness and Response Procedures in order to identify any areas for improvement.
- Communication is vital in an emergency and thus communication devices, such as mobile phones, two-way radios, pagers or telephones, must be placed around the site.
- A checklist of emergency response units must be consulted and the relevant units notified.
- The checklist includes:
    - Fire department;
    - Police;
    - Emergency health services such as ambulances, paramedic teams, poisons centres;
    - Hospitals, both local and further afield, for specialist care;
    - Public health authorities;
    - Environmental agencies, especially those responsible for air, water and waste issues;
    - Other industrial facilities in the vicinity with emergency response facilities; and
    - Public works and highways departments.
- Prevention is better than cure - it is every person’s duty to prevent negligence and carelessness since this may lead to a catastrophe.
- All equipment intended to be used to respond to any emergency situation at the site is to be installed diligently and maintained.
- Staff must be trained on the use of the emergency response equipment in order to obtain maximum benefit during an emergency situation.
- Staff must undergo environmental awareness training in order to be environmentally conscious whilst carrying out their daily tasks.
- Emergency contact numbers to be updated and distributed by the Superintendent on a regular basis.
- It is the responsibility of the section head to ensure that these numbers are displayed at relevant places.

- Current site telephone directories must be kept on hand at all telephones and offices.
- Appropriate 'no entry' signage to be in place at all required areas.

8.3 Superintendent for Newcastle Inner

- The Superintendent for Newcastle Inner is responsible to update the environmental emergency and response procedure as required.
- The Superintendent for Newcastle Inner is to provide copies of EMP procedures (and all revisions) to Contractors appointed by NLM, if the procedures apply to the nature of their activities and contract.
- The Superintendent for Newcastle Inner is to keep proof that documentation has been provided to the Contractor.
- S/he must ensure that the relevant persons, who have responsibilities under the relevant procedures, follow the instructions laid out in the respective procedures.
- Where necessary, the Superintendent for Newcastle Inner will address and correct non-compliances to the Environmental Emergency Preparedness and response procedures.
- The Superintendent for Newcastle Inner is to report environmental incidents and major EMP non-compliances (that could result in significant environmental damage or pollution) to the competent authorities.
- The Superintendent for Newcastle Inner is to manage environmental incidents in accordance with the formal incident response and reporting procedure.
- The Superintendent for Newcastle Inner to put in place an incident reporting procedure and to keep this up to date at all times.
- Superintendent for Newcastle Inner to arrange regular submission of monitoring and compliance reports (performance assessments and other audits) to competent authorities as required by the various authorisations issued.

8.4 Contractors

- Contractors to carry out the environmental emergency preparedness and response procedure issued to them by the Superintendent for Newcastle Inner.
- Contractors not to deviate from the environmental emergency preparedness and response procedure and/or instruction issued by the Superintendent for Newcastle Inner without written approval by the him/her.
- Contractors to be responsible for rectifying and rehabilitating, at their own expense, any environmental damage caused by their activities on surroundings.
- Measures to repair damage and rehabilitate the affected area to be approved and signed off by the Superintendent for Newcastle Inner.

- Contractors shall nominate a capable and suitably qualified staff member as SHE officer to supervise implementation of the EMP as it applies to the nature of the contract.
- The SHE officer shall mean a staff member that has attended an environmental management system or environmental audit course or has a proven track record of managing site environmental matters.

8.5 Environmental Emergency Response Procedure

Environmental emergencies occur over the short term and require an immediate response.

There are six main steps in managing an environmental emergency, from the identification of the situation to final close off. These are as follows:

1. Find and identify;
2. Ensure human safety;
3. Reporting;
4. Containment and clean-up;
5. Corrective action; and
6. Monitoring.

8.5.1 Find and Identify

In handling any emergency remember to assess the situation. Take into consideration all factors, including:

- Is there a fire, a spill or a leak?
- What are the weather conditions?
- What is the terrain like?
- Who/what is at risk: people, property and/or the environment?
- What actions should be taken: Is an evacuation necessary?
- What resources (human and equipment) are required and are they readily available?
- What can be done immediately?

8.5.2 Ensure Human Safety

- Remain calm and do not panic.
- No person, other than those persons directly involved, is to interfere with the situation on hand.
- During an emergency response, access to hazardous areas is to be restricted.
- When investigating the incident, priority must be given to safety.

8.5.3 Reporting

- Environmental incident reporting is integral. Employees are required to report any and all environmentally related problems, incidents and pollution, so that the appropriate corrective and preventative actions can be implemented timeously.
- The observer will as soon as possible verbally report the occurrence to the Site Manager and the SHE Representative.
- All Environmental Emergency incidents are to be reported as soon as possible and in person or telephonically to the Superintendent for Newcastle Inner, and thereafter in writing as per the incident reporting procedure.
- All environmental incidents will be captured in the incident reporting procedure as soon as possible, but at least within 48 hours.
- Under no circumstances must any person, other than the designated person, communicate with the news media during an emergency.
- The Superintendent for Newcastle Inner is to report environmental incidents and major EMP non-compliances (that could result in significant environmental damage or pollution) to the Authorities as per applicable legislation and regulatory requirements.

8.5.4 Containment and Clean-up

The Environmental Specialist will assess the situation from the information provided, and set up an investigation team of relevant personnel.

8.5.5 Corrective and Preventative Actions

All incidents are to be investigated and appropriate corrective actions to be implemented, including measures to prevent recurring incidents.

The Superintendent for Newcastle Inner will register all environmental incidents, and ensure investigation, follow-up and close out of all incidents.

8.5.6 Monitoring/Evaluation of Corrective and Preventative Actions

Where applicable, monitoring will take place once the corrective and preventative action has been implemented.

When the monitoring shows that the incident has been corrected, the incident can be closed out. If the monitoring results show that the corrective action was not successful then further investigation and corrective action will be required. Preventative measures needs to be put in place to ensure that the emergency incident will not be repeated. This will then be followed by monitoring. This will repeat until the incident is closed out.

The type of monitoring needed will depend on the environmental emergency which occurred. Monitoring procedures include:

- Surface water monitoring procedure;
- Noise monitoring procedure;
- Air quality monitoring procedure;
- Alien vegetation monitoring procedure.

8.6 Fire Response Procedure

8.6.1 Landfill cell fire

- Raise the alarm by shouting "Fire" and location of the fire in the two way communication radio to announce the emergency.
- Activate the fire alarm.
- Only attempt to extinguish the fire:
    - If it has not yet spread to any of the landfill cells in the area and the fire is still localized; or
    - You have been trained on how to respond to waste fires; and
    - You are aware of the nature of the waste types disposed; and
    - You are aware of what is contained in the MSDS's for the applicable waste types; and
    - You are wearing the requisite PPE.
- If you are unable to extinguish the fire within 30 seconds, immediately vacate the area, contact:
    1. emergency services (provide details of the type of fire); then
    2. the fire marshal; then
    3. site supervisor or Superintendent
- Ensure all staff to the emergency assembly point.

8.6.2 Other Areas / General

- Raise the alarm by shouting "Fire" and location of fire in the two way communication radio to announce the emergency.
- Activate the fire alarm.
- If you can identify the type of fire, and are competent in the use of fire extinguishers, use the appropriate fire extinguisher to douse the flames. Direct the nozzle of the fire extinguisher towards the base of the flames.
- Blanket fire using the heap of soil next to the cell

- If fire cannot be extinguished within 30 Seconds, or you are unaware of the type of fire, immediately vacate the area**.** Locate the site's fire marshal, if safe to do so.

8.6.3 Precautions

- If the fire rages out of control, evacuate as per the **Evacuation Procedure during a Fire**.
- **Smoke and gas are dangerous.** Avoid all smoke filled areas.
- If you must move through smoke filled areas stay close to the ground and cover your nose and mouth with a wet cloth. Move as close to the ground as possible.

8.6.4 Procedure for Evacuation during Fire

- Proceed to the emergency assembly point in an orderly fashion, as per the General Evacuation Procedure.
- If you are not in your office/ a building:
    - Do not go back if the evacuation is underway;
    - Do not switch off electrical supplies;
    - Close doors and windows but do not lock them.

8.6.4.1 If Trapped

- Close all and/or seal all doors and air vents (if possible wet material).
- If you are trying to escape the fire, **never open a closed door without feeling it first.** Use the back of your hand to prevent the burning of your palm. If door is hot try another exit. If none exists, seal the cracks around the doors with anything available.
- Move to a window and try attracting attention.
- Place an article of clothing (shirt, coat, etc.) outside the window as a marker for emergency personnel. If necessary use a chair or other heavy items to break the window.
- Do not throw furniture or heavy equipment outside the window.
- If there is no window **stay near the floor** where the air will be more breathable.
- **Shout at regular intervals** to alert emergency personnel to your location.

8.6.4.2 Flash Over

- Never open a door when a fire is raging in that specific area.
- The sudden influx of oxygen can result in a flash over (A fire ball type explosion, which can engulf you and the area you are in).

8.6.4.3 If Someone Catches on Fire

- If you catch on fire: **STOP** where you are – **DROP** to the floor – **ROLL** around on the ground.
- If a co-worker catches on fire, smother the flames by grabbing a blanket, rug or jacket and wrap them into it. Make them drop to the ground and roll.

9 REPORT DISTRIBUTION RECORD

Project Title: New Environmental Management Programme, Environmental Awareness Plan and Environmental Emergency Response Plan

Project Number: 17-0212

Report Status: Draft

COPIES	PERSON	COMPANY	DATE	AUTHORISED BY

Authorised Signature:

APPENDIX A: CURRICULUM VITAE OF THE EAP