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DRAFT SCOPING REPORT FOR THE
PROPOSED GENERAL WASTE LANDFILL
SITE, NEWCASTLE, NEWCASTLE LOCAL
MUNICIPALITY

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DRAFT SCOPING REPORT FOR THE PROPOSED NEWCASTLE GENERAL WASTE LANDFILL SITE, NEWCASTLE, NEWCASTLE MUNICIPALITY

1. INTRODUCTION

1.1. BACKGROUND

The Newcastle Municipality is presently considering land for the establishment of a general waste landfill to service the municipal area. A number of "candidate sites" have been considered and a "preferred site" has been selected on account of its preliminary geohydrological and geotechnical suitability.

The Newcastle Municipality is proposing to develop a new landfill site in the area due to the existing landfill site rapidly reaching the end of its design life. This is due to the closure of the Madadeni and Osizweni Landfill Sites by the Department of Water Affairs (DWS, previously known as DWA) as a result of non-compliance to the governing legislation. This event resulted in an influx of solid waste to the existing landfill site, which in turn further reduced its anticipated design life.

Infrastructure that will be constructed as part of the landfill site includes access road, on site roads, perimeter fence, guard house, weighbridge, stormwater management infrastructure, leachate management infrastructure, site offices, staff ablutions, canteen as well as workshop. The landfill will also have monitoring boreholes, it must be noted that recycling of the waste as well as recovery of landfill gas is anticipated when the landfill is fully operational.

During the initial investigation, the waste stream generated within the Newcastle Local Council administered area amounted to some 106 000 m³ / annum, or approximately 290 tonnes / day. This waste comprises domestic, garden, commercial and building waste as well as non-hazardous industrial waste. The current waste volume information was obtained from the "Proposed New Regional Landfill Site Selection Report to Council – Revision 3" as compiled by Knight Piésold Consulting in 2003. A growth rate of 2.5% was applied to determine the amount of waste generated from the envisaged landfill project commencement date. Consequently, the estimated waste load for the new proposed landfill would be approximately 375 tonnes / day.

The proposed site should have sufficient capacity for approximately 40 years, and if an annual growth rate of 2.5% is applied to the estimated daily waste stream of approximately 375 tonnes / day, the air space required for the disposal site, based upon land-filling operations of 260 days / year, will be in the order of 17.772 million m³. At an average height of 35.00 m, the required footprint area would be about 80 ha.

The water balance for the region, based on the seasonal rainfall and evaporation as transcribed by the Minimum Requirements of DWA, indicates a rainfall surplus for the region, such that leachate will be produced. In terms of the above information, the site should be designed and permitted as a General (G), Large (L) site with a positive water balance (B+), or G:L:B+ facility. While according to the DEA National Environmental Management: Waste Act (2008) National Norms and Standards for Disposal of Waste to Landfill, this equates to a Class B landfill.

1.2 PROJECT PROPOSAL

The Newcastle Municipality is under significant pressure to construct a new landfill site in the area due to the existing landfill site rapidly reaching the end of its design life. This is due to the closure of the Madadeni and Osizweni Landfill Sites by the Department of Water and Sanitation (DWS – previously known as DWA) as a result of non-compliance to the Minimum Requirements for Solid

Waste Disposal. This event resulted in an influx of solid waste to the existing landfill site, which in turn further reduced its anticipated design life.

Consequently, a regional site is urgently required for the disposal of domestic, commercial and non-hazardous waste. In light of this, a number of technically suitable candidate 'windows of opportunity' were identified within the greater Newcastle area for further, more detailed investigation and presentation to the authorities and Interested and Affected Parties (I & APs).

Infrastructure that will be constructed as part of the landfill project includes access road, on site roads, perimeter fence, guard house, weighbridge, stormwater management infrastructure, leachate management infrastructure, site offices, staff ablutions, canteen as well as workshop.

The landfill will also have groundwater monitoring Boreholes. It must be noted that recycling of the waste as well as recovery of landfill gas is anticipated when the landfill is fully operational.

During the initial investigation, the waste stream generated within the Newcastle Local Council administered area amounted to some 106 000 m³ / annum, or approximately 290 tonnes / day. This waste comprises domestic, garden, commercial and building waste as well as non-hazardous industrial waste. The current waste loads information was obtained from the "Proposed New Regional Landfill Site Selection Report to Council – Revision 3" as compiled by Knight Piésold Consulting in 2003. A growth rate of 2.5% was applied to determine the amount of waste generated from the envisaged landfill project commencement date. Consequently, the estimated waste load for the new proposed landfill would be approximately 375 tonnes / day.

The proposed site should have sufficient capacity for approximately 40 years, and if an annual growth rate of 2.5% is applied to the estimated daily waste stream of approximately 375 tonnes / day, the air space required for the disposal site, based upon land-filling operations of 260 days / year, will be in the order of 17.772 million m³. At an average height of 35.00 m, the required footprint area would be about 80 ha.

1.3 PROPOSED LANDFILL SITE LOCATION

The proposed general waste landfill site is to be established within the province of KwaZulu Natal on vacant land in the area of Newcastle. The preferred site is located on a portion of the Farm Greenwich 8784 and the proposed footprint area of the site is 80 hectares. The site is accessible via a gravel road off the N11 main road located away to the east.

Site coordinates are 27° 50'53.6" S and 29° 55' 12.2" E and the site is located approximately 11 km south of Newcastle Local Municipality in the Amajuba District Municipality of KwaZulu Natal (KZN) (see Figure 1) and Figure 2.

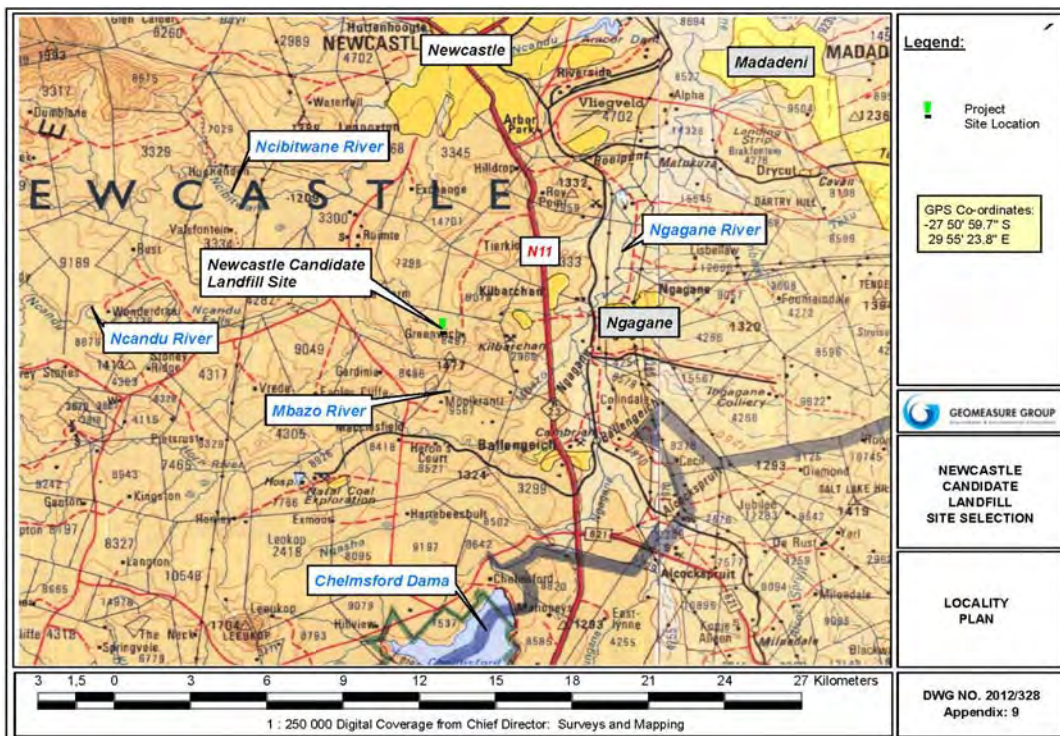


Figure 1 Locality plan

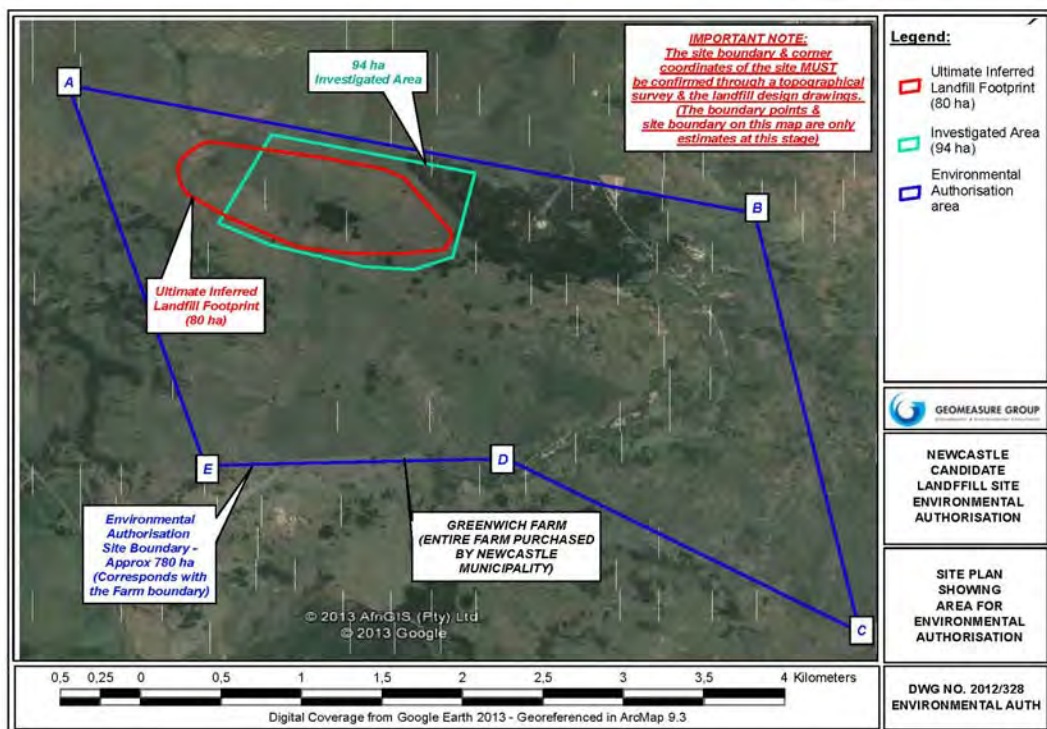


Figure 2 Site Plan

2. PROPONENT, PROJECT MANAGER AND ENVIRONMENTAL ASSESSMENT PRACTITIONER

Geomeasure Group (Pty) Ltd has been appointed by Envitech Solutions (representing Newcastle Local Municipality, which is the project applicant). As the appointed independent environmental consulting company, Geomeasure Group will assess the environmental impacts of the proposed development.

Envitech Solutions provides specialist environmental technology solutions to industry and the public sector, and has expertise in project management, geotechnical, civil and hydrological engineering.

- **Newcastle Municipality** Newcastle Local Municipality falls within the Amajuba District Municipality. It is located in the inland region on the north-west corner of KwaZulu-Natal, a few kilometres south of the Free State, Mpumalanga and Gauteng provincial borders, in the foothills of the Drakensberg. Newcastle is the third-largest urban centre in KwaZulu-Natal, is categorised as a secondary city and is the biggest municipality within the Amajuba District.
- **Geomeasure Group** (www.geomeasuregroup.co.za) is a groundwater and environmental consulting company committed to the principle of responsible and sustainable development and management of the environment and groundwater resources of Southern Africa without compromising our natural environment.

This study has been undertaken by Ms. N. Gasa of Geomeasure Group who holds a BSoc Sciences in Geography and Environmental Management and has 5 years' experience in the field of environmental management. The study was reviewed by Mrs. Vicki King, an environmental consultant with 25 years of experience.

3. TERMS OF REFERENCE

3.1 TRIGGER ACTIVITIES AS PER THE LIST OF WASTE MANAGEMENT ACTIVITIES AND THE 2010 EIA REGULATIONS

The establishment of the proposed general waste landfill site is subject to the submission of a Scoping and Environmental Impact Assessment (EIA) Report to the KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA), in terms of the National Environmental Management: Waste Act (Act No. 59 of 2008), Section 20(b), Category A, activity 3, Category B (Activity 6, 8 and 10) and Category C Activity 5.

Category A:

(3) *“the recycling of general waste at a facility that has an operational area in excess of 500 m², excluding recycling that takes place as an integral part of an internal manufacturing process within the same premises”*

Category B:

(6) *“The treatment of general waste in excess of 100 tons per day calculated as a monthly average, suing any form of treatment”.*

(8) *“The disposal of general waste to land covering an area in excess of 200m² and with a total capacity exceeding 25 000 ”*

(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 C

(5) "The extraction, recovery or flaring of landfill gas"

In addition to the requirement of a waste management licence, the proposed development also requires environmental authorization in terms of the 2010 EIA Regulations as the establishment of the landfill access road triggers activity 22 of Listing Notice 1 (R544).

(22) "The construction of an access road with a maximum width of 12 meters"

Detail designs for the proposed access road will be provided in the Draft EIA Report when the necessary route investigations have been completed and communication with the KZN Department of Transport has been achieved.

The Scoping and EIA process is being conducted as set out in the Environmental Impact Regulations (2010) made under section 24 (5) of the National Environmental Management Act, (Act No.107 of 1998) as part of a waste management licence application contemplated in Section 45 read with section 20 (b) of the Waste Act and the EIA Regulations for environmental authorisation.

3.2 AIMS AND OBJECTIVES OF THE STUDY

The primary aim of the Scoping process is to assess the potential impacts of the proposed development, both positive and negative, from an environmental perspective, through professional studies, comments received during the public participation process and through the investigations of the Environmental Assessment Practitioner (EAP), as well as to ensure that all Interested and Affected Parties (I&APs) are made aware of the potential impacts that are likely to occur as a result of the proposed development.

3.3 NEED AND DESIRABILITY OF THE PROJECT

The Newcastle Municipality is under significant pressure to develop a new landfill site in the area due to the existing landfill site rapidly reaching the end of its design life. This is due to the closure of the Madadeni and Osizweni Landfill Sites by the Department of Water Affairs (DWA, previously known as DWAF) as a result of non-compliance to the governing legislation. This event resulted in an influx of solid waste to the existing landfill site, which in turn further reduced its anticipated design life.

According to the 2014/2015 Newcastle Municipality IDP, the municipality's refuse removal service caters for Newcastle West and Madadeni/Osizweni area but there is however been a backlog of 25.6% affecting mainly the informal and rural settlements. According to Amajuba Integrated Waste Management Plan (IWMP), Newcastle west and Newcastle east generates about 113 tons and 87.9 tons per day, and this is projected to increase to 123.9 tons and 97 tons per day in 2015 respectively. The projected growth is linked to projected population growth, and emphasizes a need for environmentally friendly waste management practices.

To avoid the occurrence of illegal dumping and poor management of domestic waste, the establishment of a new landfill site will greatly benefit the community and ensure that pollution issues associated with uncontrolled dumping are avoided. The landfill's design in accordance to the requirements of applicable standards and regulations will ensure that modern design

technology is used to manage the quantities of domestic waste that is generated in the area of Newcastle.

4. APPROACH AND METHODOLOGY

4.1 DEA GUIDELINES

The approach and methodology used in this study follow both the requirements of the EIA Regulations promulgated in terms of NEMA, and the guidelines published in terms of the NEMA Regulations namely Guideline on public participation (October 2011), Guideline on alternatives (October 2011), Guideline on need and desirability (October 2011) and Guideline on interpretation of Listed activities (June 2010) (see Figure 3) below.

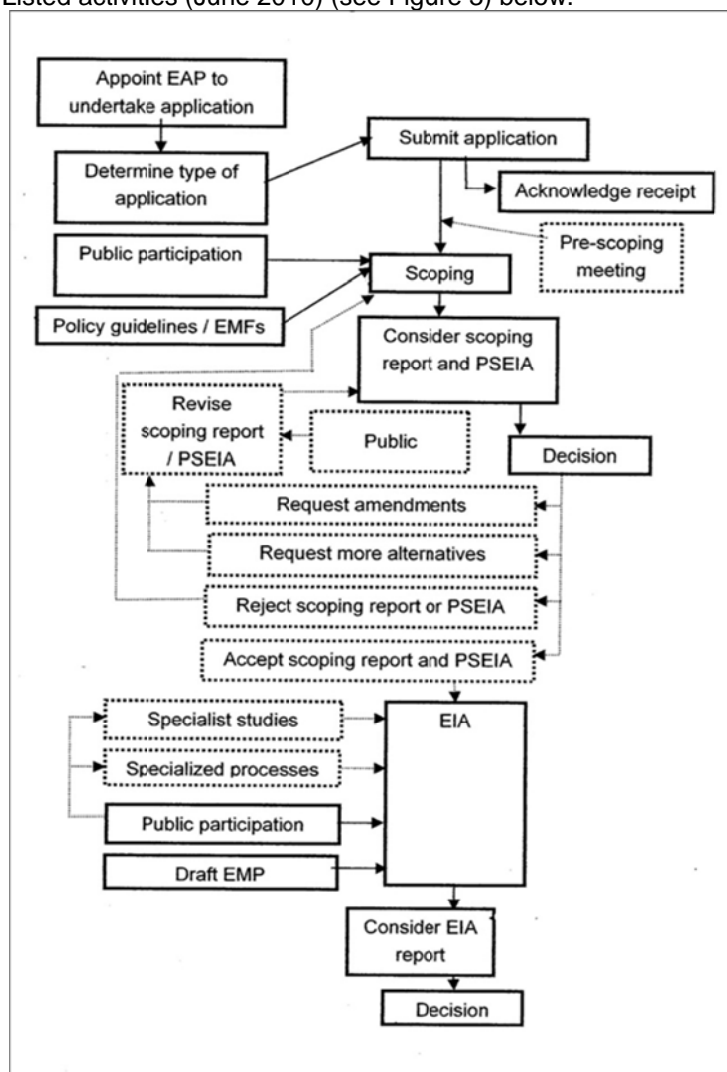


Figure 3 Scoping and EIA Process

4.2 SUBMISSION OF APPLICATION FORM

The integrated application form in terms of S24L of NEMA was completed and submitted to the KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA) on the 26th September 2014. The application form combined both the application for a waste

management licence as well as for environmental authorization. Two separate reference numbers were received for the application and are as follows:

EIA Reference: DC25/0007/2014

WML Reference: DC25/WML/0002/2014

4.3 AUTHORITY CONSULTATION

Mr Poovi Moodley of the KZN Economic Development, Tourism and Environmental Affairs (EDTEA) was initially assigned as the assessing officer for the proposed development. Further correspondence from EDTEA has been received and the project now has two assigned officers, namely Ms. Ngobese (from the Waste Management section) as well as Ms. N. Mabaso (EIA section). Project information was also forwarded through to Ms. Ntombethu Makwabasa of the Department of Water and Sanitation (DWS), Mr. B. Margot of the Department of Health, Ms. Nothile Mthimkhulu of Amajuba District Municipality, Mr. Dominic Wieners of Ezemvelo KZN Wildlife, Ms. Karen Moodley of the Department of Agriculture, Forestry and Fisheries, Mr. Roy Ryan of the KZN Department of Transport and Mr Shadrack Kubheka who is the area's ward councillor.

4.4 PUBLIC PARTICIPATION PROCESS

4.4.1 Identification of Interested and Affected Parties

Site notices were placed around site and advertisements were placed in the Daily News dated 21 October 2014, Isolezwe dated 21 October 2014 as well the Newcastle Advertiser dated 24 October 2014 giving rise to a list of Interested and Affected Parties (I&APs). The Background Information Document was distributed to the landowners in the proximity of the site as well as authorities.

A complete list of all of the registered I&APs and their contact details, is contained in Appendix C.

4.4.2 Background Information Document

A Background Information Document (see Appendix C) was compiled in IsiZulu as well as English and sent to the relevant authorities and stakeholders, including Department of Water and Sanitation, the Department of Health, Amajuba District Municipality, Ezemvelo KZN Wildlife, Department of Economic Development, Tourism and Environmental Affairs, Department of Transport and the Department of Agriculture, Forestry and Fisheries.

The BID was also hand delivered to the landowners within the Greenwich Farm, due to the unclear access to the adjacent farm; copies of the BID were left with one of the landowners to share with the farmers. The BIDs were also emailed to the individuals that requested to be registered as interested and affected parties for the proposed development.

The BID was posted via registered mail to interested and affected parties where no email addresses were available, proof of the letters posted is attached in Appendix C.

4.4.3 Advertisements and Site Notices

Site notices were placed at the Greenwich Farm entrance on the 21st October 2014 (see Appendix C for photos). Advertisements were placed in the Daily News, Isolezwe as well as the Newcastle Advertiser newspapers as stated in Section 3.4.1 above, please refer to Appendix C for copies of the adverts.

4.4.4 Meeting with I&APs

A public meeting for the proposed development was held on the 25th November 2014 at the Newcastle Town Hall (Scott Street) where all stakeholders and registered I&APs were invited to attend. The EAP prepared a PowerPoint presentation in order to:

- Give an overview of the proposed development;
- Describe the need of the proposed landfill;
- Give I&APs an opportunity to raise their concerns/comments;
- Describe the Scoping and EIA process;

Please refer to Appendix C for the copy of the PowerPoint presentation, meeting minutes as well as the signed copy of the attendance register.

4.4.5 Issues and Comments Raised

Requests for registration as interested and affected parties were received from the I&APs, the requests were accompanied by concerns and comments that the I&APs identified to be potentially possible with the development of the landfill. Comments included some of the following:

- Contamination of the surface water resources
- Odour impacts
- Scattering of waste disposed
- Negative health impacts on the community
- Decrease in property values
- Traffic impacts
- Exposure of local people to methane gas

During the public meeting held, a number of issues/concerns were raised by the Interested and Affected Parties for further discussion in the Scoping Report, including;

- Development of firebreaks to deal with fires during the operation of the landfill
- Alternatives sites considered for the development of the landfill
- Elevation of the proposed landfill site
- Wind pollution and odour impacts
- Rehabilitation of existing landfill sites at Osizweni and Madadeni rather than establishing a new landfill site.
- Daily covering of landfilled waste
- Access road to the landfill

During the public meeting, a major issue relating to the purchase of the Greenwich site to which the landfill is being proposed was raised, however the EAP mentioned that land purchase is not directly related to EIA process and recommended that it is taken up directly between the community and the Newcastle Municipality.

Copies of the registration and comment sheets, the meeting minutes as well as the responses to the comments raised are included in Appendix C.

5. LEGISLATION AND POLICY

The landfill will need to comply with all relevant South African policy and legislation governing environmental and waste management. The principles of the key pieces of legislation relevant to the proposed development are outlined below, and are important in creating the environmental management guidelines for the establishment of this development.

Below are the applicable pieces of legislation that are relevant to the proposed development and the requirements which need to be complied with at all phases of the development.

5.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA (NO. 108 OF 1996)

The proposed establishment of the landfill site must comply with the requirements of the Constitution of the Republic of South Africa (Act No. 108 of 1996), with special reference to Section 24 of Chapter 2, i.e.;

Everyone has the right to;

- (a) an environment that is not harmful to their health or well-being, and*
- (b) have the environment protected, for the benefit of future and present generations, through reasonable legislative and other measures that –*
 - (i) prevent pollution and ecological degradation,*
 - (ii) promote conservation, and,*
 - (iii) secure ecological sustainable development and use of natural resources while promoting justifiable economic and social development.*

The EIA and the environmental management programme will consider the provisions of Section 24 as the development should not result in negative impacts to the natural and social environments.

5.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 107 OF 1998)

The National Environmental Management Act (Act No. 107 of 1998) is the key overarching environmental legislation in South Africa. The objective of the Act is to provide for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith. The National Environmental Management Act (NEMA) has given rise to a number of relevant subsidiary Acts, including the National Environmental Management: Air Quality Act (Act No. 34 of 2004), the National Environmental Management: Waste Act (No. 59 of 2008). The 2010 EIA Regulations are also promulgated in terms of this Act.

NEMA puts forward a number of principles for environmental management, to be considered during the EIA process and the establishment and operation of the landfill site, these include;

- 1. The principles set out in this section shall apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and -*
 - (a) shall apply alongside all other appropriate and relevant considerations, including the state's responsibility to respect, protect, promote and fulfill the social and economic rights of Chapter 2 of the Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discrimination,*
 - (b) serve as the general framework within which environmental management and*

implementation plans must be formulated,

- (c) *serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act or any statutory provision concerning the protection of the environment,*
 - (d) *serve as principles by reference to which a conciliator appointed under this Act may make recommendations; and*
 - (e) *guide the interpretation, administration and implementation of this Act, and any other law concerned with the protection or management of the environment.*
2. *Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.*
 3. *Development must be socially, environmentally and economically sustainable.*
 4. (a) *Sustainable development requires the consideration of all relevant factors, including the following;*
 - *the disturbance of ecosystems and loss of biological diversity are avoided or, where they cannot be avoided, are minimized and remedied*
 - *that pollution and degradation of the environment are avoided, or where they cannot be altogether avoided, are minimized and remedied*
 - *that the disturbance of landscapes and sites that continue the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimized and remedied*
 - *that waste is avoided, or where it cannot be altogether avoided, minimized and re-used or recycled where possible and otherwise disposed of in a responsible manner*
 - *that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the depletion of the resource*
 - *that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardized*
 - *that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge and the consequences of decisions and actions, and*
 - *that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot altogether be prevented, are minimized and remedied.*
 - (b) *Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.*
 - (c) *Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.*
 - (d) *Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.*
 - (e) *Responsibility for the environmental health and safety consequences of a policy, programme, project, process, service or activity exists throughout its lifecycle.*

(f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.

(g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge.

(h) Community well-being and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.

(i) The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.

(j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.

(k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.

(l) There must be an intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment.

(m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.

(n) Global and international responsibilities relating to the environment must be discharged in the national interest

(o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.

(p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.

(q) The vital role of women and youth in environmental management and development must be recognized and their full participation therein must be promoted.

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

Section 28 provides for duty of care and remediation of environmental damage. It provides that every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring to minimise and rectify such pollution or degradation of the

environment. This includes an owner of land or premises, a person in control of land or premises or a person who has the right to use the land or premises [Section 28 (1) and (2)].

5.3 NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT (ACT NO 34 OF 2004)

The key purpose of the National Environmental Management: Air Quality Act (Act No. 34 of 2004) reads.

“To reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto.”

Objectives for the Act are also identified, namely;

- (a) *To protect the environment by providing reasonable measures for –*
 - (i) *The protection and enhancement of air in the Republic;*
 - (ii) *The prevention of air pollution and ecological degradation; and*
 - (iii) *Securing ecologically sustainable development while promoting justifiable economic and social development; and*

- (b) *Generally to give effect to Section 24(b) of the Constitution in order to enhance the quality of ambient air for the sake of securing of securing an environment that is not harmful to the health and well-being of people.*

The operation of the landfill is likely to result in the generation of odour especially during the process of waste compaction. Section 35 of the Air Quality Act makes provision for the Minister or MEC to prescribe measures for the control of offensive odours emanating from specified activities. It is the responsibility of the occupier of any premises to take all reasonable steps to prevent the emission of any offensive odour caused by any activity on their premises.

5.4 NATIONAL WATER ACT (ACT NO. 36 OF 1998)

The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors;

- (a) *Meeting the basic human needs of present and future generations;*
- (b) *Promoting equitable access to water;*
- (c) *Redressing the results of past racial and gender discrimination;*
- (d) *Promoting the efficient, sustainable and beneficial use of water in the public interest;*
- (e) *Facilitating social and economic development;*
- (f) *Providing for growing demand for water use;*
- (g) *Protecting aquatic and associated ecosystems and their biological diversity;*

- (h) *Reducing and preventing pollution and degradation of water resources;*
- (i) *Meeting international obligations;*
- (j) *Promoting dam safety;*
- (k) *Managing floods and droughts; and for achieving this purpose, to establish suitable institutions and to ensure that they have appropriate community, racial and gender representation.*

In terms of Section 19 (1) of the National Water Act, an owner of land, a person in control of land or a person who occupies or uses the land on which -

- (a) *any activity or process is or was performed or undertaken; or*
- (b) *any other situation exists, which causes, has caused or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.*

Reasonable measures referred to above include:

- cease, modify or control any act or process causing the pollution;
- comply with any prescribed standard or management practice;
- contain or prevent the movement of pollutants;
- eliminate any source of the pollution;
- remedy the effects of pollution; and
- remedy the effects of any disturbance to the bed or banks of a watercourse.

If these measures are not employed, the catchment management agency concerned may take the measures it considers necessary to remedy the situation.

A proper stormwater management system is required to ensure that the landfill activities do not directly impact the clean water systems. Clean stormwater needs to be separated from the landfill cell preventing contamination and reducing the amount of leachate and/or contaminated stormwater.

As part of the landfill design, a stormwater management system designed in terms of the SANS 1200 LE (Storm water Drainage) and SANS 1200 DK (Gabions and Pitching) requirements is planned for the Newcastle Landfill site.

The management of leachate must be considered in terms of the provisions of the National Water Act. Section 21 of the Act requires that the applicant applies for a water use licence for activities that trigger the need for a water use licence application (WULA). It must be noted that the WULA is a separate process to the EIA.

5.5 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT (ACT NO. 59 OF 2008)

The purpose of the National Environmental Management: Waste Act (No. 59 of 2008) reads;
To reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.

The objectives of the National Environmental Management: Waste Act (No. 59 of 2008) are as follows;

- (a) *To promote health, well-being and the environment by providing reasonable measures for:*
 - (i) *Minimizing the consumption of natural resources;*
 - (ii) *Avoiding and minimizing the generation of waste;*
 - (iii) *Reducing, re-using, recycling and recovering waste;*
 - (iv) *Treating and safely disposing of waste as a last resort;*
 - (v) *Preventing pollution and ecological degradation;*
 - (vi) *Securing ecologically sustainable development while promoting justifiable economic and social development;*
 - (vii) *Promoting and ensuring the effective delivery of waste services;*
 - (viii) *Remediating land where contamination presents, or may present, a significant risk of harm to health or the environment; and*
 - (ix) *Achieving integrated waste management reporting and planning.*
- (b) *To ensure that people are aware of the impact of waste on their health, well-being and the environment;*
- (c) *To provide for compliance with the measures set out in paragraph (a); and*
- (d) *Generally, to give effect to Section 24(b) of the Constitution in order to secure an environment that is not harmful to health and well-being.*

The following listed activity, requiring a Waste License Application, applies to the proposed development:

Category A:

(3) *“the recycling of general waste at a facility that has an operational area in excess of 500 m², excluding recycling that takes place as an integral part of an internal manufacturing process within the same premises”*

Category B:

(6) *“The treatment of general waste in excess of 100 tons per day calculated as a monthly average, using any form of treatment”.*

(8) *“The disposal of general waste to land covering an area in excess of 200m² and with a total capacity exceeding 25 000 ”*

(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 C:

(5) "The extraction, recovery or flaring of landfill gas"

In terms of the NEMWA, the licensing procedure must be integrated with an environmental impact assessment process in accordance with the EIA Regulations promulgated in terms of Chapter 5 of the NEMA, hence the integrated application for both a waste management licence and environmental authorization.

Requirements of the National Norms and Standards for Disposal of Waste to Landfill (2013) set in terms of Section 7 (1) (c) of the National Environmental Management: Waste Act 2008 must be followed at all times, especially regarding standard containment barrier design, waste acceptance and waste disposal.

In terms of the waste management hierarchy, disposal to landfill should be considered as the last option as the hierarchy objectives promote waste generation prevention, minimise waste generated, re-use, recycle, recover energy and dispose as the last option (see Figure 4 below).

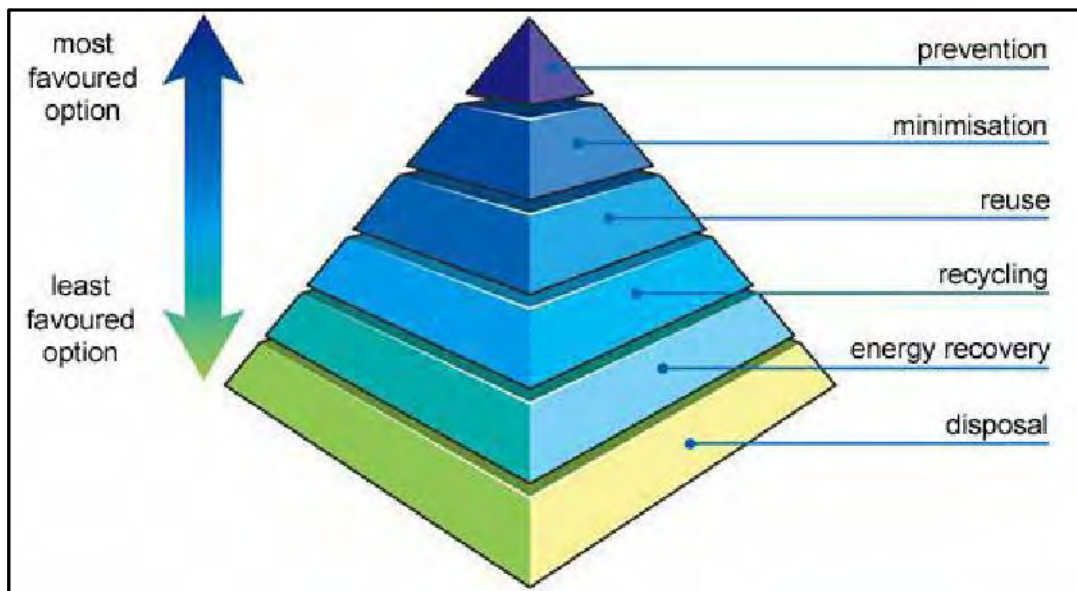


Figure 4 Waste management hierarchy objectives

5.6 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 minimize 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.

5.7 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 Landfill
- National Policy in Thermal Treatment of General and Hazardous Waste (where incinerators may be used)
- 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 (DWAFF) 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 Integrated Environmental Management (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 cost' is determined by a cost benefit analysis.

6. ASSESSMENT OF IMPACTS

6.1 ALTERNATIVES ASSESSMENT

The EIA Regulations require that reasonable and feasible alternatives to a proposed activity be considered. Alternatives may include location or site alternatives, temporal alternatives and must include the no-go alternative. The identification, description, evaluation and comparison of alternatives are important for ensuring the objectivity of the assessment process.

6.2 DESCRIPTION OF THE ENVIRONMENT

Baseline environmental information has been collected for the site. Data is presented on the social and biophysical status of the site and surrounds in order to meaningfully assess the potential changes (impacts) both positive and negative, which may result from project development.

6.3 IMPACT ASSESSMENT

Direct, indirect and cumulative impacts have been assessed for the proposed project. The nature, magnitude, extent and duration of the potentially significant impacts have been assessed. Minor impacts have been presented, but the report and mitigation focuses on potentially significant impacts.

7. PROJECT ALTERNATIVES

7.1 WASTE MINIMISATION

The National Waste Management Strategy (NWMS) is a legislative requirement of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), the "Waste Act". The purpose of the NWMS is to achieve the objects of the Waste Act. Organs of state and affected persons are obliged to give effect to the NWMS.

The objects of the Waste Act are structured around the steps in the waste management hierarchy, which is the overall approach that informs waste management in South Africa. The NWMS is structured around a framework of eight goals, which are listed below:

- (a) *Promote waste minimisation, reuse, recycling and recovery of waste;*
- (b) *Ensure the effective and efficient delivery of waste services;*
- (c) *Grow the contribution of the waste sector to the green economy;*
- (d) *Ensure that people are aware of the impact of waste on their health, well-being and the environment;*
- (e) *Achieve integrated waste management planning;*
- (f) *Ensure sound budgeting and financial management for waste services;*
- (g) *Provide measures to remediate contaminated land;*
- (h) *Establish effective compliance with and enforcement of the Waste Act.*

The implementation of the NWMS is an inclusive strategy with its achievement dependent on participation from a number of role players, mainly focusing on the government, the private sector as well as the community.

The Newcastle Local Municipality is committed to implementing waste minimisation and recycling initiatives within the areas under their jurisdiction. Recycling and waste minimisation does not eliminate all waste, but rather reduces the amount of waste that requires treatment and/or disposal. The reduction in the amount of waste generated has a positive impact in terms of extending the lifespan of the landfill site.

7.2 NO-GO OPTION

The no-go alternative was considered as per requirements of the EIA Regulations but was identified as not being favourable as it would lead to the continuation of poor waste management practices which have been identified to take place with the current waste management activities within the municipality. This alternative was therefore not considered as the best option.

The no go alternative will directly result in the following:

- No job creation,
- No proper waste management in the area of Newcastle,
- Lack of infrastructure to manage general waste produced in the area of Newcastle,
- Continue in operation of waste disposal sites that have not been engineered,
- Occurrence of illegal dumping,
- Undertaking of waste management that does not promote waste hierarchy objectives,

7.3 ALTERNATIVE LOCATIONS CONSIDERED FOR LANDFILL DEVELOPMENT

An initial candidate study investigating potential 'windows of opportunity' was conducted by Geomeasure Group (dated June 2010 – August 2011), in which fourteen (14) possible sites were identified within a 15 km radius of the existing landfill site. A limited invasive investigation was undertaken at the three (3) most favourable sites (dependent upon access and permission), and although two (2) of these sites appeared suitable, mining rights and the unwillingness of the land owners to sell meant that further investigations could not be concluded. Consequently, the Newcastle Municipality identified three (3) new areas / farms, where the land owners might be willing to sell, in which 'windows of opportunity' could be delineated through this desk study.

The methodology employed by Geomeasure Group (Pty) Ltd for the initial investigation was based on the identification of 'windows of opportunity' that were identified through a systematic process of elimination, utilising factors that form obvious 'inherent fatal flaws' in terms of Section 4 of the DWA Minimum Requirements for Waste Disposal by Landfill (2nd Edition – 1998). During this elimination process, 'windows' of opportunity emerge within the new areas / farms, which offer potentially technically suitable candidate sites for landfill development.

These candidate sites were defined as sites which possibly can be developed and operated cost effectively without having a significant negative impact on the environment and being acceptable to all I&AP's in the region.

From a technical perspective, it is also important that the potential pollution threat to ground and surface water resources will be relatively insignificant. The limited Geohydrological Report dated March 2013 prepared by Geomeasure Group (Pty) Ltd contained findings of Phase I and Phase II in the process of identifying potential candidate sites for the development of a new landfill site, as described below:

7.3.1 Phase I – Desk Study

This initial phase of the investigation is a relevant data collection and evaluation exercise aimed at the identification and delineation of 'windows of opportunity' within the new areas / farms, within which further, more detailed studies will be carried out in subsequent phases. Specific candidate landfill sites are identified through a process of elimination of certain areas which display one or more 'inherent fatal flaws' as set out in Section 4 of the Minimum Requirements.

The study area comprised of the areas included within the proclaimed Newcastle municipal boundaries, as well as adjacent agricultural lands, which are encompassed within a 15 km radius of the centre of the area that needs to be serviced.

'Windows of opportunity' have been delineated within the sites and are located to minimize the impact of storm water run-off whilst providing adequate airspace and cover material required for the operation of the site. A description of each of the sites follows.

Site A – Schaap Vlakte

This site is situated well to the north of Newcastle, on the farmlands of Schaap Vlakte 2988. The site appears to be covered by natural vegetation, and slopes towards the northeast and southeast off a ridge, whilst slope angles are moderate.

The site is underlain by sedimentary rocks of the Vryheid Formation of the Ecca Group, and Jurassic-age doleritic intrusions of Karoo Supergroup. The sedimentary units typically comprise dark grey muddy siltstone and shale with occasional thin sandstone layers. Consequently, in-situ weathered soils are expected to be silty to clayey in nature, although sandy horizons are possible.

This site is located approximately 185 m (at minimum) up-gradient of a non-perennial tributary of the Mbizana River.

The site is situated in the vicinity of two farmhouses, which are located away to the east and west, however given the principle wind directions, the airborne effects of a potential landfill on the surrounding community are expected to be limited. The R34 main road passes 3.50 km to the east of the site, whilst an access road is located just to the north of the site, thereby providing adequate access and reducing the costs of required road infrastructure. The site is however, visible to the surrounding farming areas, and possibly to the R34 main road.

This site is approximately 111 ha in extent and therefore large enough for the anticipated lifetime of the landfill. Road travel distance through the residential areas from the centre of Newcastle is approximately 19.5 km.

Site B – Tiger Kloof

This site is situated to the south of Newcastle, on the farmlands of Tiger Kloof 3383. The site appears to be covered by natural vegetation, and slopes towards the northeast and southeast off a ridge, whilst slope angles are gentle to moderate.

The site is underlain by Jurassic-age doleritic intrusions of the Karoo Supergroup. Consequently, in-situ weathered soils are expected to be silty to clayey in nature.

This site is located immediately up-gradient of a perennial tributary of the iNgagane River, as well numerous farm dams.

The site is situated in the vicinity of a farmhouse / commercial unit, which is located away to the northwest, and given the principle wind directions, airborne effects from a potential landfill on the surrounding community are expected. These may only be moderate however, as a ridge of higher-lying land separates the two. The N11 main road passes 2.00 km to the east of the site, whilst an access road is located just to the northwest of the site, thereby providing adequate access and reducing the costs of required road infrastructure. The site does not appear to be visible to either the surrounding farming areas, or the N11 main road.

This site is approximately 138 ha in extent and therefore large enough for the anticipated lifetime of the landfill. Road travel distance through the residential areas from the centre of Newcastle is approximately 10.9 km.

Site C – Knockbrex

This site is situated to the south of Site B – Tiger Kloof, on the farmlands of Knockbrex 9018. The site appears to be covered by natural vegetation, and slopes towards the northeast, northwest and southeast off a ridge, whilst slope angles are moderate. The site is underlain by Jurassic-age doleritic intrusions of Karoo Supergroup. Consequently, in-situ weathered soils are expected to be silty to clayey in nature.

This site is located approximately 250 m (at minimum) up-gradient of a perennial tributary of the iNgagane River, as well numerous farm dams, however surface water sources are required for monitoring purposes.

The site does not appear to be situated in the vicinity of any residential areas, and hence the airborne effects of a potential landfill on the surrounding community are expected to be limited. The N11 main road passes 3.20 km to the east of the site, however only an old dirt track passes through the site. Access is therefore likely not adequate, and as a new road will have to be constructed, this will increase the costs of required road infrastructure. The site does not appear to be visible to the surrounding farming areas, although it may be to the N11 main road.

It is approximately 80 ha in extent and therefore large enough for the anticipated lifetime of the landfill. Road travel distance through the residential areas from the centre of Newcastle is approximately 11.4 km.

7.3.2 Phase II – Remote Sensing

The remote sensing exercise is carried out within the ‘windows of opportunity’ to identify geological structures which may be associated with significant aquifers. These structures are listed in Section 4 of the Minimum Requirements and may constitute ‘fatal flaws’. Elimination of areas affected by these structures will reveal potential ‘windows of opportunity’ within the sites, and it is thus possible to present these options for landfill development to I & AP’s as part of the Public Participation Process.

Despite these investigations, the project stalled due to non-consent from land-owners, and as such, a new possible candidate landfill site had to be identified. Subsequent to this, the Newcastle Municipality was since offered a possible site for further investigations (termed Greenwich after the farm name), and after a basic desktop analysis had been completed, the project proceeded.

Greenwich Farm is approximately 844 ha in size, however the eastern portions have already been sold and hence were not available for investigation. Since a landfill footprint of 80 ha was required for development, a 94 ha area incorporating the 80 ha footprint was delineated on our maps. It is the area between the 94 ha polygon and the proposed 80 ha landfill footprint which was considered for the installation of the groundwater monitoring boreholes to ensure they were not included in the area designated for excavation for the landfill footprint, please refer to Figure 2.

As was indicated in the Geotechnical Report entitled “Newcastle Municipality New Landfill Investigation – Geotechnical Investigation of Greenwich Farm Candidate Site”, dated 22nd April, it was decided to investigate the northern portions of the farm, away from the eastern areas, given that an 800 m buffer around the landfill footprint is generally required and the fact that the eastern portion of the farm Greenwich has been excluded from this investigation (as instructed by the landowner) and will remain in its natural condition. It can also be noted here that the eastern portion of the site will form part of the prescribed buffer zone and therefore any vegetation identified during the on-site plant search and rescue which must be undertaken as part of the

Environmental Impact Assessment Phase, as recommended by Messrs. Williams Environmental in their Ecological Survey Report entitled, "Ecological Review of the Preferred Candidate Site for the Development of a Landfill – Greenwich Farm, Newcastle", dated February 2014, can be relocated to the buffer zone to ensure its protection.

7.3.3 Phase III – Site Verification and Final Site Ranking

The Greenwich 8784 candidate landfill site was assessed in terms of suitability for development in accordance with the recommended ranking criteria outlined in Table 1 below and Table 2 overleaf and the information made available by the desk study, limited invasive investigation and the detailed investigation of the Candidate Landfill Site.

As extracted from the Newcastle Final Geohydrological Report dated June 2014 prepared by Geomeasure Group (Pty) Ltd, the ranking matrix used is presented below:

Table 1 Landfill Scoring System

Negative		Neutral		Positive	
Fatal Flaw	Can be Mitigated	Insufficient Information / Moderate		Good	Ideal
-2	-1	0		+1	+2

Table 2 Final Site Ranking Matrix

Candidate Site	Greenwich
Economic Criteria	
Regional disposal site potential	0
Economics of scale	+1
Haulage distance	+1
Size of operation	+1
Access	0
Cover availability on-site	+1
Soil quality on-site	+1
Site visibility	-1
Acquisition costs	0
Environmental Criteria	
Distance to groundwater	+1
Importance of water resources	+1
Surface water catchment	+1
Groundwater catchment	+1
Preferential flow paths	-1
Proximity to water supply boreholes	+2
Depth of soil on-site	+1
Quality of soil on-site	+1
Potential for temperature inversion	0
Potential for odour impacts to residential areas	+1
Sensitivity of receiving environment	-1
Public Acceptance Criteria	
Displacement of local inhabitants	+1
Land availability	+1
Visibility	+1
Sensitivity of environment along access road	+1
Prevailing wind directions	+1

Candidate Site	Greenwich
Distance to nearest residential area	+2
Buffer zone	+1
Engineering Criteria	
Storm water management	+1
Leachate management	+1
Stability	0
Access road	-1
Available airspace	+1
SCORE	21

The ranking above presents the Greenwich Farm as suitable for the landfill development with most of the criteria ranked as being “good” when used the landfill scoring system as presented above.

The environmental impact assessment (EIA) process was therefore initiated for the Greenwich Farm and this Scoping Report provides a preliminary description and assessment of the site and surrounding environments. The report also presents the planned design specifications for the landfill which will be presented and discussed in detail in the Draft EIA Report which will be circulated for public and authority review. Specialist studies undertaken during the EIA phase of the development will be appended to the Draft EIA report so as to present specific and detailed information on the aspects that the landfill is likely to negatively or positively impact.

7.4 PRELIMINARY LANDFILL DESIGN

The landfill is designed using a phased approach. Each phase/cell will have an expected life of approximately 5 years depending on the future waste volumes received by the site. At this stage of the design process a 10% annual increase in waste volumes was estimated therefore sizing each cell accordingly. The site will be classified as a GLB+ site and has been designed using the relevant waste management legislation.

It is anticipated that the lining for each cell will consist of a basal and slope lining system. It is proposed that the slopes of each cell will be lined using a “Class B” type lining system according to the “Norms & Standards August 2013”. It is further proposed that the base of each cell will be lined using a “Class A” type lining system to incorporate a leak detection system according to the “Norms & Standards August 2013”. Excavation for the cells will not be greater than 2m deep to avoid encountering large rock which was found during the geotechnical investigation. All excess cut material will be stockpiled and be used for cover material. The maximum height of the waste body for each cell will be 35m and this will be done in 2 separate lifts as can be seen on Sheet 4 of 7 of the landfill design (Appendix D).

Each cell will have a leachate collection system which comprises of a network of perforated leachate collection pipes (size to be confirmed during detail design). These collection pipes will flow by gravity into a leachate collection sump and then into a solid leachate gravity main which will then carry the leachate into the lined leachate collection dam which is located at the low point of the site. The future plan for the site is to have an on-site leachate treatment plant, and this can only be designed and finalized once the quantity and quality of the leachate produced can be assessed. For the purposes of this design, leachate will be collected in the leachate dam where it will be evaporated or recirculated onto the cells as required. The leachate dam will be lined with a geosynthetic lining system based on the lagoon liner as specified by the minimum requirements.

Concrete drains will be constructed at the toe of each cell to collect contaminated stormwater runoff from the slopes of the landfill and this will also be discharged into the leachate dam. A

clean stormwater management system will also be in place to ensure that all clean stormwater is managed as required and diverted from the landfill areas.

A future landfill gas extraction system will also be incorporated into the design, this will involve installing gas wells in the waste and actively extracting landfill gas from these wells and using it as required (either flaring, electricity generation, or cogeneration). This option will be explored once the site is established and landfilling operations have commenced.

7.4.1 Proposed landfill infrastructure

It must be noted that these design specifications may still change as they are preliminary and open for discussion; it is proposed that the following infrastructure be established as part of the landfill development:

Table 3 Description of proposed landfill infrastructure

Section	Description	Legislation/specification	Notes
Access roads	External access road from the N11 to the site. This road will be designed for heavy vehicles. Internal access roads for access to the active cell and site facilities.	TRH 14- Guidelines for road construction materials TRH 15- Subsurface drainage for roads TRH 16- Traffic loading for pavement and rehabilitation design SANS 1200 DM- Earthworks (Road, subgrade) SANS 1200 ME- Subbase SANS 1200 MM- Ancillary Road Works	The road design will be determined during the detail design phase, it is envisaged that an asphalt and/or concrete surfaced road will be constructed since the expected design life of the landfill is 40 years. The current condition of the existing access road is not suitable for heavy vehicles and the land does not currently belong to the Municipality, this is still to be discussed and finalized. Landfill design sheet 7 of 7 briefly shows the proposed road layer works detail.
Access control	Security gates and guard facilities including guard houses	SANS approved supplier for the security gates SANS 10400XA National Building Regulations and Building Standards Act No 103 of 1977	Access control and security facilities will be required at the entrance to the site. This could either be boom gates and/or aluminium gates.
Surveillance	Security cameras and monitoring system	N/A	Specialized service
Weighbridge	2 weighbridges to enable accurate tariffs to be charged to landfill users and to allow the owner to record and monitor the incoming waste	SANS 1200 G- Structural Concrete SANS 1200 H- Structural steelwork	The installation of the weighbridges will be a specialized service but the foundation will be constructed using reinforced concrete.

	volumes.		
Administration buildings	Landfill operations control room and building Offices for site staff Boardroom Kitchen/canteen Ablution facilities	SANS 10400XA National Building Regulations and Building Standards Act No. 103 of 1977	The size and layout will be determined during the detailed design.
Workshop area	Landfill operation equipment service and laydown area. Wheel wash bay/s	SANS 1200 G- Structural Concrete SANS 1200 H- Structural Steelwork SANS 1200 HB- Cladding and sheeting	The workshop will be a structural steel structure on a concrete slab.
Perimeter fencing	Concrete palisade fencing around the perimeter of the site to prevent any authorized access to the site.	SANS 1200 G- Structural Concrete SANS 1200 H- Structural Steelwork	Supplier to provide SANS approved fencing and to provide required quality test results for any materials cast on site.
Stormwater management system	A system of stormwater drains to ensure that stormwater on the catchment area of the site is managed.	SANS 1200 LE- Storm water drainage SANS 1200 DK- Gabions and Pitching	Clean storm water needs to be separated from the landfill cell preventing contamination and reducing the amount of leachate and/or contaminated storm water. The storm water drain will be positioned and sized during the detail design. Typically the drains will be constructed and/or lined with structural concrete as can be seen in Sheet 7 of 7 in Appendix D)
Landfill Construction Cell and Lining	The landfill will be constructed in phases and will be lined according to the requirements for a Class B landfill in line with relevant legislation.	National Environmental Management: Waste Act 2008 Norms and Standards for disposal of waste to landfill (DWAF) SANS 1200 D-Earthworks SANS 1200 L- Medium pressure pipelines SANS 1200 LB- Bedding (Pipelines) SANS 1200 C- Site Clearance	The site will be a GLB+ (Class B) for non-hazardous waste. Proposed footprints of the landfill cells are discussed in section 7.4.3 below and in Sheet 3 of 7 (Appendix D).
Leachate Management System	System designed to collect, store and contain the leachate	National Environmental Management: Waste Act 2008: National Norms and	Hazardous leachate generated by the site must be contained and

	produced within the cell until it can be disposed using the approved disposal method.	Standards for Disposal of Waste to Landfill SANS 1200 D-Earthworks SANS 1200 L- Medium pressure pipelines SANS 1200 LB- Bedding (Pipelines)	not contaminate the environment. The quantity and quality of the leachate can only be confirmed once the site is operational. The preliminary landfill design incorporates the leachate management infrastructure to be constructed i.e. leachate collection dam, leachate delivery pipe etc. (refer to sheet 1 of 7 in Appendix D)
Leachate Treatment Plant	Depending on the characteristics of the leachate generated by the landfill, a treatment plant could be used to treat the leachate to an acceptable standard were it could be reused for various purposes and/or discharged downstream of the site.	SANS 1200 G- Structural Concrete SANS 1200 H- Structural steelwork SANS 1200 L- Medium pressure pipelines SANS 10400XA National Building Regulations and Building Standards Act No 103 of 1977	The establishment of the leachate management system will be supplemented by a leachate treatment which will ensure that the leachate is treated to an acceptable so it can be reused for landfill purposes or be released of site in an acceptable quality. Further detail on the treatment plant can only be confirmed once the site is operational, as the quality and quantity of the leachate will be known at that stage.
Landfill gas extraction & flaring system	Extract landfill gas from the landfill using a series of wells. This can be flared or used to create energy, depending on the quantity and quality.	SANS 1200 D- Earthworks SANS 1200 L- Medium pressure pipelines SANS 1200 LB- Bedding (Pipelines)	Recovery and usage of the landfill gas reduces the carbon footprint of the landfill. The recovery of landfill gas will not commence up until the landfill is mature enough to produce a viable quantity of gas. The preliminary landfill design incorporates the design specifications of the gas monitoring probes which will assist in identifying that the landfill is producing sufficient gas which can be extracted.

Litter control fencing	Wire mesh fencing used to contain air blown litter	SANS approved fence	The specification of the fence will be supplied by the supplier for approval.
Signage	OHS signage and direction and road signage	SANS approved signage	-
Environmental Monitoring	Boreholes for groundwater monitoring Surface water monitoring from adjacent streams, if applicable. Gas monitoring probes for landfill gas migration monitoring	Minimum Requirements for Waste Disposal to Landfill SANS Water Quality Monitoring for Drinking Water and Agricultural Water	Environmental monitoring of the landfill site will be carried out at regular intervals to determine the environmental impacts of the landfill, and relevant mitigation measures will be carried out as required.
Chipper	Turning garden refuse into mulch that can be reused in the agricultural industry	-	Recommended (A Feasibility Study may be required)
Recycling Centre	Material recycling facilities are used to separate recyclable material from the waste stream. These recyclables can then be sold to end users.	-	Recommended (A Feasibility Study may be required)
Incineration	Selected waste can be burnt in an incinerator, the residue remains fractionally smaller and this reduces landfill airspace usage.	-	Optional (A Feasibility Study may be required)
AD Plant	Anaerobic Digestion Plant is a chemical biological process that uses organic waste to generate energy either in the form of heat or electricity.	-	Optional (A Feasibility Study may be required)
Composting	Organic waste can be used to create compost which can be reused in the agricultural industry.	-	Recommended (A Feasibility Study may be required)

7.4.2 Proposed landfill buffer zones

As can be seen on the general layout (Sheet 1 of 7 in Appendix D) the required buffer of 800m on 2 sides of the site has been achieved. The remaining 2 sides have reduced buffer zones and screens will be put into place on these sides to mitigate the possible issues associated with the reduced buffer zone. The details for these screens will be finalized during detail design.

Landfill buffer zones are proposed to be sized as follows:

- Northern buffer= 320m
- Eastern buffer=800m
- Western buffer=200m
- Southern buffer=800m

7.4.3 Proposed landfill cell footprints

It is currently proposed that the initial landfill cell (Cell 1) covers an area of 38 500m². Seven future cells are proposed and will be sized as follows:

- Cell 2= 45 500m²
- Cell 3= 52 500m²
- Cell 4= 64 700m²
- Cell 5= 77 000m²
- Cell 6= 93 500m²
- Cell 7= 112 800m²

7.4.3.1 Preliminary Cell 1 Design Details

The landfill will be constructed in phases and will be lined according to the requirements for a minimum Class B landfill in accordance with the legislation. The site will be a GLB+ (Class B) for non-hazardous waste.

Figure 5 below shows the cross section of Cell 1, Figure 6 & 7 show basal and slope landfill liner details.

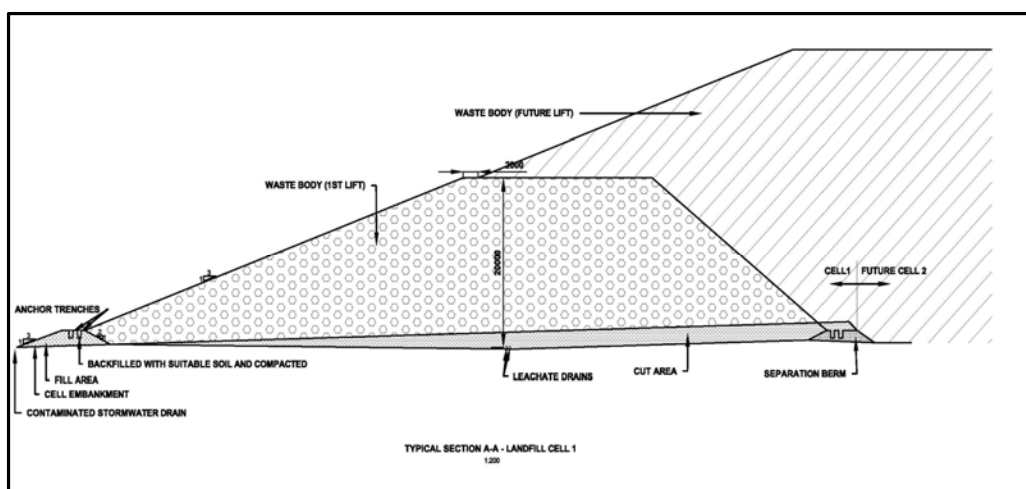


Figure 5 Cell 1 Cross Section

The landfill will have engineered liners for the base as well as for the slope, note that the landfill base will have its specific liner, different to the liner used for the landfill slope. Design details for the two landfill liners are as follows:

Basal Landfill Liner Detail (listed from base to surface):

- 150mm thick base preparation layer compacted to 93% of MOD AASHTO maximum density
- 1.5mm thick double sided textured HDPE liner (coarse textured down) GCL
- 100mm sand cushion layer
- 150mm thick 38mm crushed rock leak detection
- Needle punched nonwoven geotextile minimum nominal mass 200g/m²
- 100mm sand cushion layer
- 2.0mm thick double sided textured HDPE liner (coarse textured down)
- Needle punched nonwoven geotextile minimum nominal mass 1000g/m²
- 150mm thick 38mm crushed rock aggregate to leachate drainage layer
- Needle punched nonwoven geotextile minimum nominal mass 200g/m²
- 1m selected waste to ensure free drainage

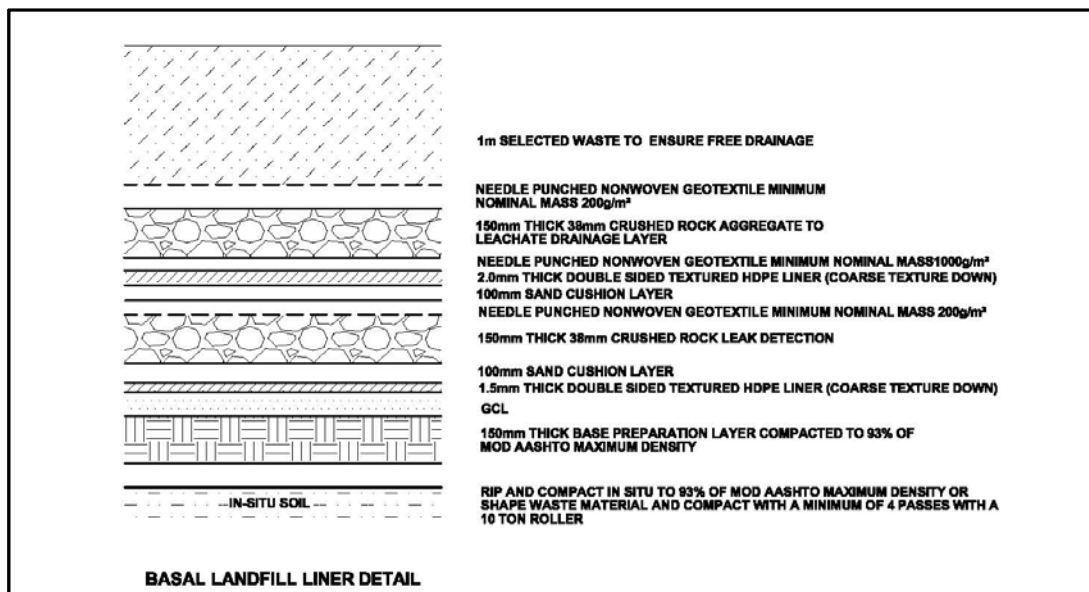


Figure 6 Basal landfill liner details

Slope landfill liner detail (listed from base to surface):

- 150mm thick base preparation layer compacted to 93% of MOD AASHTO maximum density
- 2.0mm thick double sided textured HDPE liner (coarse textured down) GCL
- Geogrid reinforcement
- Needle punched nonwoven geotextile minimum nominal mass 1000g/m²
- 150mm thick 53mm crushed rock aggregate to leachate drainage layer
- Needle punched nonwoven geotextile minimum nominal mass 200g/m²
- 1m selected waste to ensure free drainage

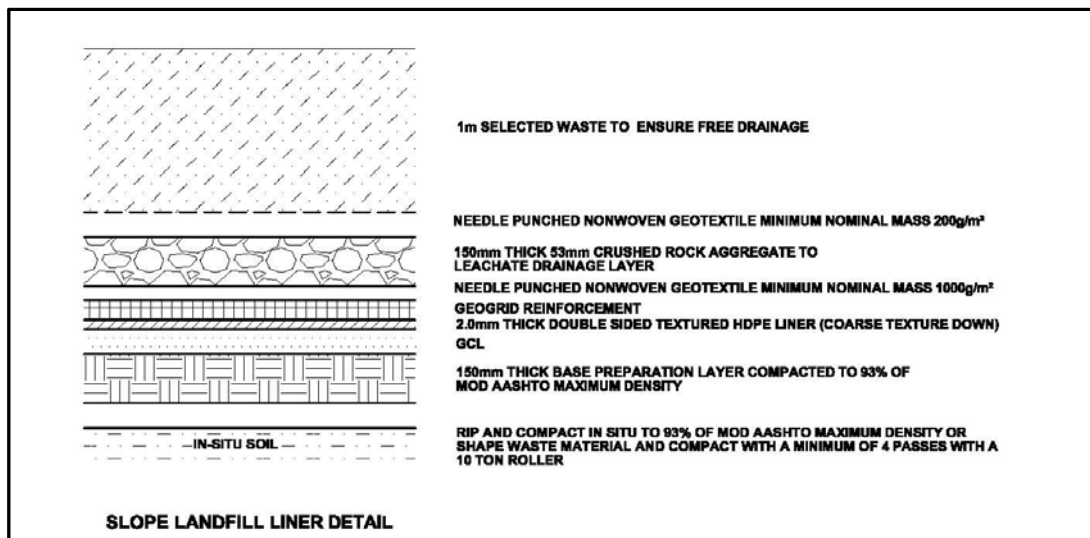


Figure 7 Slope Landfill Liner Detail

Please refer to Appendix D for the preliminary landfill designs.

8. ENVIRONMENTAL DESCRIPTION

8.1 CLIMATE

Climatic data for the Newcastle region was obtained from Agrimet at Cedara and the South African Weather Bureau. This data shows that the average precipitation for the wettest six months for the area is approximately 600 mm / annum – 830 mm / annum (based on 10 years of data). The evaporation of the wettest six months, as measured using the A-pan averages (based on 10 years of data) and incorporating an evaporation factor of 0.7, is approximately 490 mm / annum – 930 mm / annum. On average, this area experiences a rainfall surplus, such that the climatic water balance (B) is positive for more than one year in five, and therefore ‘leachate production’ is possible.

Average temperatures for the region vary from about 10°C to 26°C, with summer temperatures occasionally rising to over 30°C and winter temperatures dropping to 2°C. During winter months, mist and frost occur frequently, particularly in low-lying areas.

According to “Borough of Newcastle New Regional Landfill Site Candidate Site Selection Report” written by Knight Piésold Consulting in January 2003, the principal wind direction in the months of April to December is a north-westerly (toward the south-east), while in the months of January to March, the principle wind direction is a south-easterly (toward the north-west). Based on monthly averages, an approximate wind speed of 4.5 km / hour is expected.

Implications

- Periods of high rainfall may lead to high surface run-off, therefore the management of stormwater is important.
- Direct sunlight with the waste body may cause strong odour released at the landfill and promote the occurrence of pests.

- Windy conditions may contribute to high dust generation levels and scattering of waste.

Mitigation and management requirements

- Proper erosion control measures i.e. sediment basins, sand barrier bags etc. must be used where necessary
- The landfilled waste must not be left exposed for extended period of time; cover material must be applied as soon as waste is compacted.
- No construction activities should be undertaken during extremely windy conditions.

8.2 TOPOGRAPHY AND DRAINAGE

The City of Newcastle is partially located within the flood plain of the iNcandu River which enters the Amcor Dam just to the northwest of the existing landfill site. The terrain is generally moderately undulating with isolated ridges, such as Roy Point and Signal Hill, illustrating the deeply eroded nature of the study area. The terrain generally slopes towards the iNcandu and iNgagane Rivers as these form the major drainage features of the area. The elevation of Newcastle and the existing landfill site is ~ 1200 m above mean sea level (AMSL), while the ridges rise to an elevation of between 1300 m and 1400 m AMSL.

The iNcandu and Ngagane Rivers meander through the flood plain area south and south east of the town in a general south-easterly direction toward the Buffelsrivier located some 10 km due east of the existing landfill site. Numerous minor tributaries drain from both the north-east and south-west towards these three rivers. The drainage pattern of these tributaries is often deeply dendritic, with moderately deep erosion dongas being formed. The Chelmsford Dam is located along the Ngagane River upstream of the confluence with the iNcandu River about 20 km south-west of the existing landfill site.

The farm Greenwich on which the proposed candidate landfill site is located varies in altitude from 1300 m to 1470 m AMSL. Drainage occurs radially away from a central high located in the southern portions of the site, whilst the topography varies from gently to moderately undulating.

Implications

- Alteration in topography during site preparation.

Mitigation and management requirements

- Grubbing activities must be undertaken under supervision of the site manager. No part of the site must be interfered with if it does fall within the development footprint. Any excavations that exist must be filled to avoid ponding on site as well as possible injury to staff.

8.3 AIR QUALITY

The operational activities of the landfill will involve potential mobilisation of particulates when wastes are received, processed, deposited, compacted and covered. There will be odours emanating from the operation of the landfill and the disposal of some wastes may lead to the emission of bio-aerosols.

Eventual demolition and rehabilitation activities will involve final capping and vegetation of the deposited wastes, excavating and removing contaminated soil (if any), demolishing redundant infrastructure, scarifying and vegetating exposed compacted areas and would have dust generation impacts similar to those of the construction phase.

The air quality study which will be undertaken during the EIA phase will therefore involve the following:

- Determination of current (baseline) air quality in the vicinity of the Greenwich site;
- Identifying sensitive receptors in the surrounding areas;
- Compiling an emissions inventory for all point and area sources of atmospheric emissions associated with the proposed development;
- Constructing concentration isopleths for all identified emissions (including odours) by the application of appropriate dispersion models;
- Assessing the cumulative air quality impacts of the various emissions with reference to the baseline ambient air quality and South African as well as international standards and guidelines;
- Providing a screening level human health risk assessment to establish a recommended buffer zone;
- Developing an air quality management plan (aqmp) containing a monitoring plan and protocols and appropriate mitigation measures.

Implications

- Any foul odours generated by the facility could impact negatively on surrounding communities and may attract pests and other nuisance creatures.
- Dust impacts

Mitigation and management requirements

- The landfilled waste must not be left exposed for extended period of time; cover material must be applied as soon as waste is compacted.
- Dust generation should be limited and where it cannot be avoided, dust suppression methods must be practiced. Dust suppression should be undertaken in instances where dust poses as a threat to the workers onsite and neighbouring properties.

8.4 GEOLOGY AND SOILS

The Newcastle area is underlain by consolidated sediments of the Ecca Group of the Karoo Supergroup. The bedrock underlying the immediate vicinity of the town comprises shale and sandstone of the Vryheid Formation. To the west of the town, shale and mudrock of the Volksrust Formation and Adelaide Subgroup respectively begin to outcrop as the elevations begin to increase. These bedrock formations are relatively flat lying and present a stratigraphic succession with increasing elevation, see Figure 8 below.

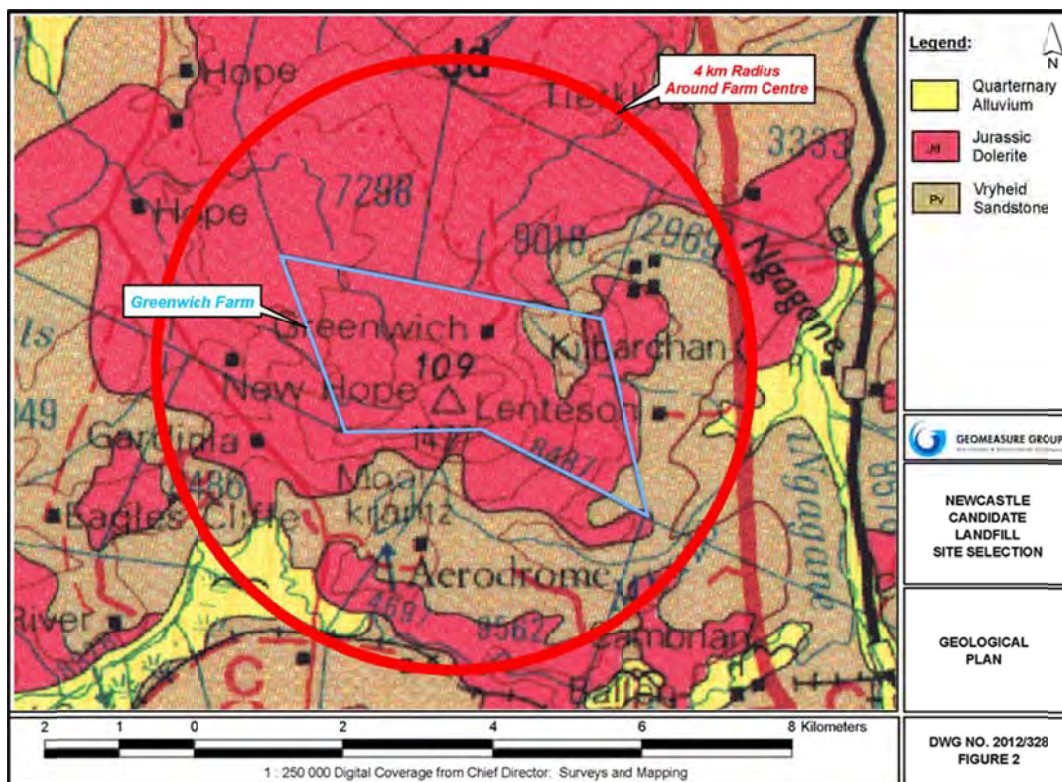


Figure 8 General Geological Plan

Karoo dolerite extensively intrudes the bedrock of the region in the form of both dolerite dykes and sills. The dolerite sills, as shown by the available geological maps, are fairly extensive, intruding large areas.

The soils in the study area are derived from weathering of the underlying geology, with the outcrops of Quaternary Sands along river beds the most recent addition to the soil profile.

The residual soils are generally comprised of silty to occasionally sandy clays and clayey silts; however profiles are usually not extensive, with typical depths in the region of 0.45 m to 0.75 m within the 15 km radius around the centre of the area that needs to be serviced. However, thick alluvial profiles with depths of > 5.00 m are seen to occur in the areas along the Buffelsrivier.

These structured soils erode readily to form the deep dongas which are seen to occur in the region. Additionally, the possibly expansive nature of these soils may cause a number of geotechnical problems associated with shrinkage and swell due to moisture and content fluctuations.

Areas underlain by dolerite produce deep red soils which often include spheroidal boulders, which are remnant products of the weathering the dolerite sills. These boulders are usually found on hilltop areas and scree slopes. Weathering profiles in the sediments are generally not deep, except in zones where seepage occurs, whilst dolerite sills are often weathered to depths of over 5.00 m.

8.4.1 Geotechnical Investigation

8.4.1.1 Scope of Work

This study is limited to the geotechnical investigation of the Greenwich Farm site, where the following was undertaken:

- Site walkover and evaluation of study area.
- Excavation of a total of sixteen (16 No.) trial pits to allow for measurement of depth to bedrock (if reached), soil profiling and identification of shallow / perched groundwater conditions.
- Collection and of submission of a total of six (6 No.) soil samples to a geotechnical laboratory for full indicator tests: two (2 No.) soil samples for natural MOD AASHTO analysis, two (2 No.) soil samples for constant head permeability test and two (2 No.) (2 x 3) soil samples for consolidated slow-drained shear tests.
- Backfilling of trial pits and re-instatement of ground surface.
- Evaluation of field data and laboratory data collected during the geotechnical investigation.
- Preparation of a geotechnical report, with input from a principle geotechnical engineer, summarising the current geotechnical conditions of the site, whilst recommendations for the safe construction of the proposed landfill site have also been given.

8.4.1.2 Methodology

A detailed geotechnical investigation was carried out on 19th February 2014 within the northern portions of the farm within the 94 ha polygon, where a number of soil profiles were exposed in excavated trial pits, and a number of soil samples were collected for analysis.

Soil Profiling

A tractor-loaded backhoe (TLB) was used to excavate sixteen (16) trial pits to a maximum depth of 2.53 m below ground level (bgl) across the investigated area. The soil profiles exposed in these pits were logged in accordance with the Jennings, Brink and Williams protocol for Geotechnical Profiling. Additional trial pits excavated as part of the detailed geotechnical investigation were delineated separately to those excavated during the initial investigation.

The various trial pit logs, and accompanying photographs, are included in Appendix A of the Geotechnical Investigation Report (see Appendix E). The overall profile can be characterized as a thin horizon of dry to slightly moist, brown, loose to medium dense, intact silty sand (~ 250 mm) over a layer of slightly moist to moist, tan-red brown, soft to firm, intact sandy to silty clay with occasional dolerite boulders (~ 750 mm). This horizon is typically underlain by a moist, tan-red brown, firm, intact silty clay layer with sporadic ferricrete and highly weathered dolerite near the base. The soil profiles typically represent the Bainsvlei Form, which often results from the weathering of dolerite in lowveld areas.

From the soil profile information, as well as additional socio-economic information made available to this office, and finally the recently-drilled borehole locations, an 80 ha 'Ultimate Inferred Landfill Footprint' was delineated mainly within the 94 ha investigated area. However, part of this

footprint sits outside of the investigated area to the immediate west, and will require further investigations when the final cells of the landfill are constructed many years from now (as it is recommended that the eastern areas of the site be developed first).

Each cell should, in any event, have its own soils investigation undertaken to provide more detailed and specific information for the construction.

The soil profiles were used to construct the below Soil Types Plan delineates the dominant soils across the investigated area within the inferred landfill footprint. As can be seen, there are two (2) principle soil types in existence, with the dolerite boulder soils (as they have been named due to maximum grain size, even though cobbles are more common) prevailing.

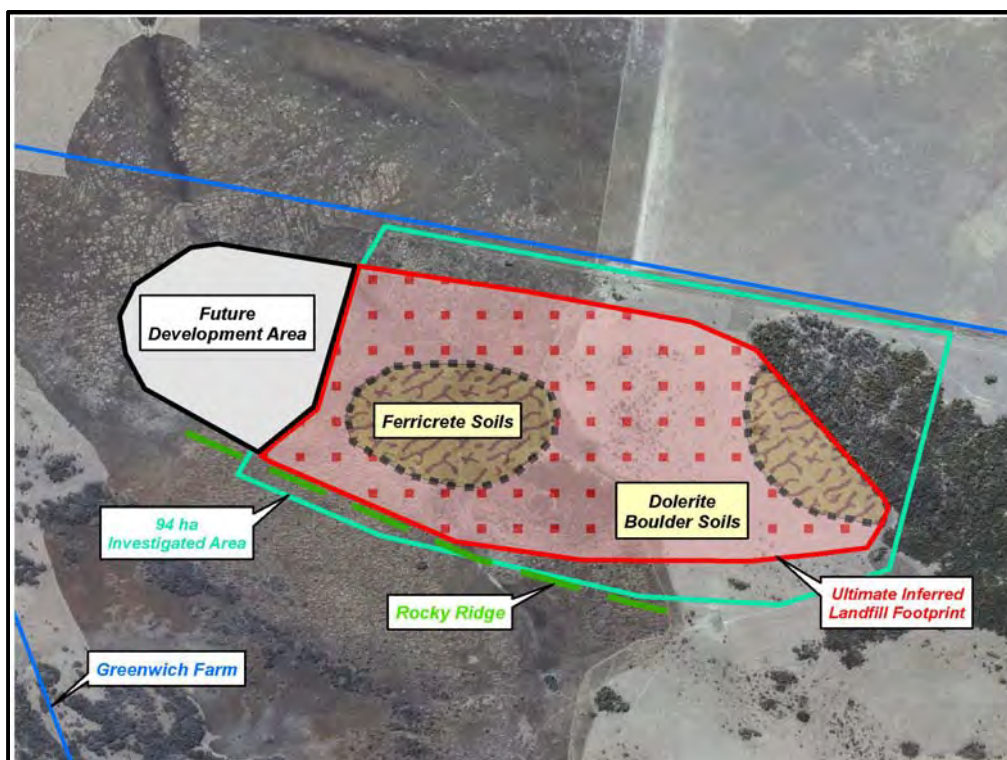


Figure 9 Greenwich Site Soil Profiles

Implications

- Improper storage of soil stockpiles may cause erosion.
- Soil contamination due to uninformed hazardous substance handling.
- Excavations may become a safety hazard for staff on site if not demarcated properly.

Mitigation and management requirements

- Topsoil must be removed from all areas where physical disturbance will occur and must be placed and protected from weed generation.
- The top 60-600 mm of topsoil should be stripped off on all areas in which construction is planned to take place and stored carefully for use in rehabilitation

- Excavations must be backfilled as soon as possible to avoid further negative impacts on the quality and stability of the soil.
- Soil stockpiles must not exceed 2m and must be covered at all times to avoid erosion as dust generation.
- Soil stockpiles must be stored, shaped and sited in such a way that they do not interfere with the flow of water to cause damming or erosion.
- Adequate drainage, such as sub-soil drains and stormwater channels will need to be installed around the site to maintain a stable moisture regime below the surface beds.

8.5 SURFACE WATER

The town of Newcastle is partially located within the flood plain of the iNcandu River which enters the Amcor Dam just to the northwest of the existing landfill site. The terrain is generally moderately undulating with isolated ridges, such as Roy Point and Signal Hill, illustrating the deeply eroded nature of the study area. The terrain generally slopes towards the iNcandu and iNgagane Rivers as these form the major drainage features of the area. The elevation of Newcastle and the existing landfill site is ~ 1200 m above mean sea level (AMSL), while the ridges rise to an elevation of between 1300 m and 1400 m AMSL.

The iNcandu and Ngagane Rivers meander through the flood plain area south and south east of the town in a general south-easterly direction toward the Buffelsrivier located some 10 km due east of the existing landfill site. Numerous minor tributaries drain from both the north-east and south-west towards these three rivers. The drainage pattern of these tributaries is often deeply dendritic, with moderately deep erosion dongas being formed. The Chelmsford Dam is located along the Ngagane River upstream of the confluence with the iNcandu River about 20 km south-west of the existing landfill site.

The farm Greenwich on which the proposed candidate landfill site is located varies in altitude from 1300 m to 1470 m AMSL. Drainage occurs radially away from a central high located in the southern portions of the site, whilst the topography varies from gently to moderately undulating as can be seen in the locality map in Appendix A.

According to the ecological assessment by Williams Environmental, the closest, desk top delineated (SANBI BGIS), wetland system to the site is located to the immediate north east. In terms of the National Wetland Classification System this wetland is classified as a NCWS L4: Seep wetland and as wetland type, Sub-escarpment Grassland Group 4. A NWCS L4: Channeled valley bottom wetland is located 1 800 m from the southern boundary of the site and is also considered wetland type, Sub-escarpment Grassland Group 4 (as can be seen in Figure 10 below).

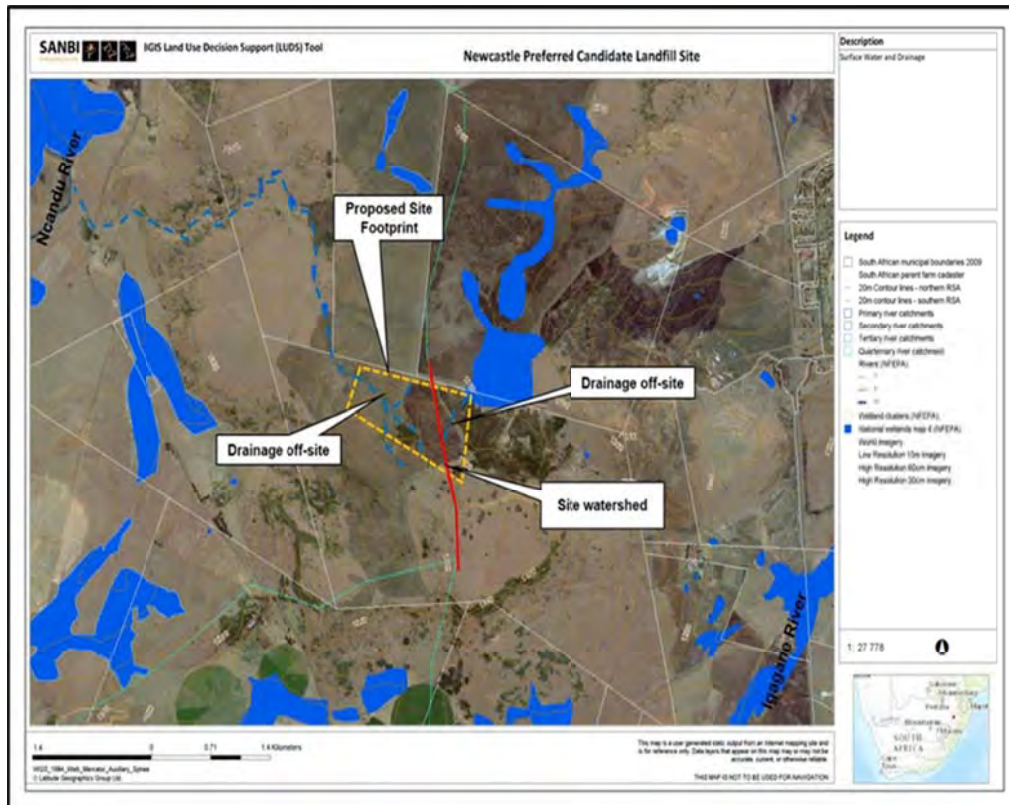


Figure 10 Surface water receptors as identified in the ecological assessment

It must be noted that during the EIA Phase of the process, a wetland delineation and hydrology and baseline water quality studies will be undertaken in order to identify if the site consists of wetlands, the study will also establish the functionality status of these wetlands. During the assessments, surface water resources that may be impacted upon by the proposed landfill site will also be identified.

All findings relating to the assessments will be attached in the Draft EIA Report which will be circulated for authority and public review for a period of 40 days. The requirement for a water use licence application will be informed after these assessments have been undertaken as they will provide detail on the baseline hydrology and wetland conditions thus informing the process on the potential impacts the development of the landfill will have on the aquatic environment.

Implications

- Hazardous substance spillages could contaminate the adjacent surface water resources
- Poor stormwater management may lead to dirty water entering the adjacent Ncandu and Ngagane rivers.

Mitigation and management requirements

- Surface water monitoring must be undertaken at the surrounding water resources, monitoring should be carried out as per the intervals stated in the waste licence and must be undertaken by an independent specialist and report be submitted to the relevant authorities.

- Mixing/decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface. Waste from these should then be disposed of to a registered disposal site.
- Streams, rivers, pans, wetlands and their catchments must be protected from erosion and from direct or indirect spillage of pollutants such as refuse, garbage, cement, chemicals, oils or tar products.

8.6 GROUNDWATER

According to the DWA publication produced for Unit 11 of the KwaZulu-Natal Groundwater Mapping Project, the Quaternary Sands exhibit a moderate ground water development potential as they are classified as an inter-granular aquifer. This can be ascribed to the unconsolidated nature of the unit, where pore spaces between the sand grains allow for the retention of water.

The shale and sandstone of the Vryheid Formation are generally classified as a good potential fractured rock aquifer, especially in a north-south trending zone which passes through the existing landfill site and the township of Madadeni; borehole yields in this vicinity for the Vryheid Formation are typically greater than 3.0 l/sec. The Adelaide Subgroup mudrock and Volksrust Formation shale away to the west, and the Vryheid Formation sandstone and shale away to the east, typically represent areas of moderate borehole yields of > 0.5 l/sec – 3.0 l/sec. Finally, the dolerite intrusions which typically underlie eastern Newcastle are considered as areas of poor and marginal borehole yields (typically < 0.5 l/sec).

Groundwater storage within these units is limited to the fractures and bedding planes within the rock mass and therefore storativity is typically low at approximately 0.17%. However, owing to the fact that the saturated thickness of the underlying aquifer is thought to be 20.00 m, and with the rock mass porosity set to be approximately 10%, actual volumes of water stored in the geological units are typically quite high. Groundwater rainfall recharge is of the order of 4% - 5% of MAP.

Where boreholes have been drilled to intersect fracture zones associated with dolerite intrusion emplacement, particularly on the lip of sills and in the contact zones of dykes, the groundwater development potential increases dramatically due to the enhancement of the porosity and the permeability within these discrete zones. Boreholes drilled to intersect these zones below the regional water table can produce yields in excess of 3 l/sec.

The Vryheid Formation bedrock, due to the coarser nature of the sediments in the sandstone horizons, has a slightly higher groundwater development potential than the Volksrust Formation and Adelaide Subgroups. Once again, fracturing and dolerite intrusions help to improve the groundwater potential of this unit.

As a groundwater potential unit, the Karoo dolerite formations are poor when boreholes are drilled into the dolerite bodies and not into the contact zones. Yields improve where fractures within the bodies can be intersected, however, the indurated contact zones between the dolerite bodies and the country rock formations provide a better potential development target.

Water quality in the region is generally good to moderate, with the Electrical Conductivity (EC) of the groundwater generally falling below 70.00 mS/m. However, within the 15 km radius around the centre of the area that needs to be serviced, bicarbonate-type waters, sulphate-type waters and chloride-type waters are all seen to be in evidence.

8.6.1 Geohydrological Investigation

8.6.1.1. Existing Borehole Data

A desk top study of the region was conducted using the KZN Groundwater Resource Information Project (GRIP) database, and our internal (Geom) database, which represent the most up to date and complete data sets for the study area. The results of this desktop hydrocensus exercise indicated that only one (1) borehole or spring record occurs within a 4 km radius of the Greenwich Farm (see Figure 11 showing Geological Structures & Available Hydrocensus Data).

The results of the field hydrocensus indicated that no groundwater boreholes are located geohydrologically down-gradient of the site. The field hydrocensus also indicated 3 surface water points, comprising 2 stream points and 1 dam point. The locations of these possible sampling points have been presented on the Hydrocensus and Receptors (see Figure 12).

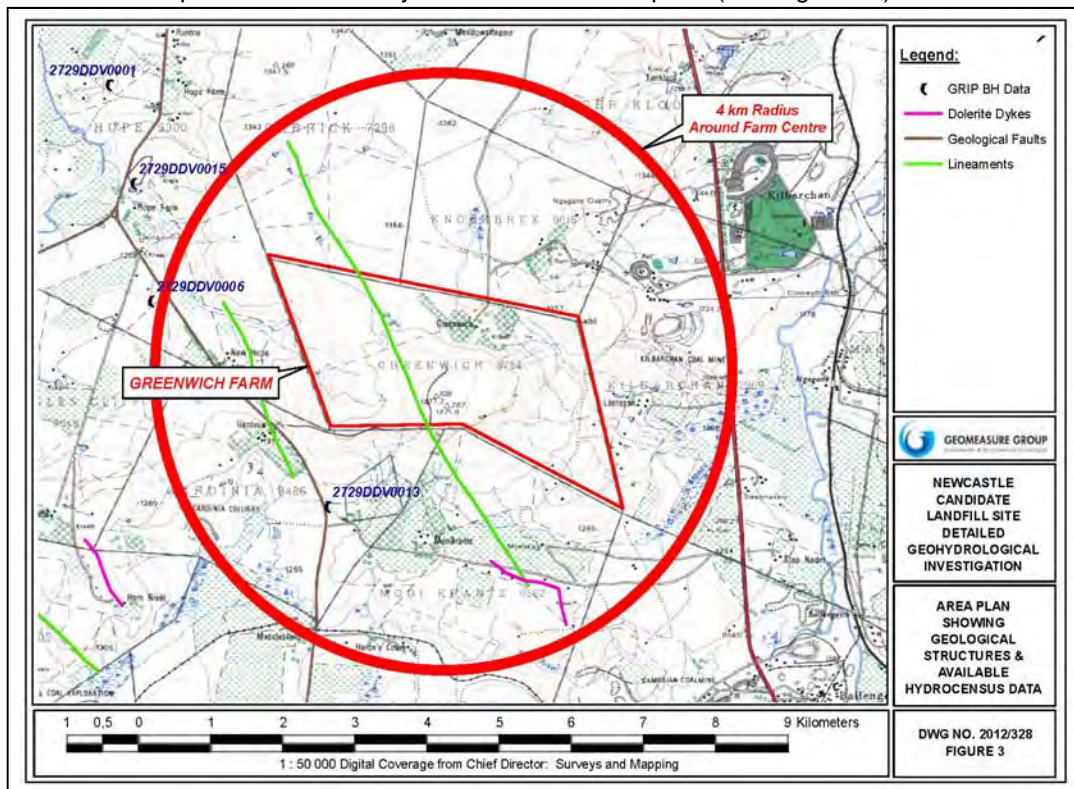


Figure 11 Geological structures and available hydrocensus data

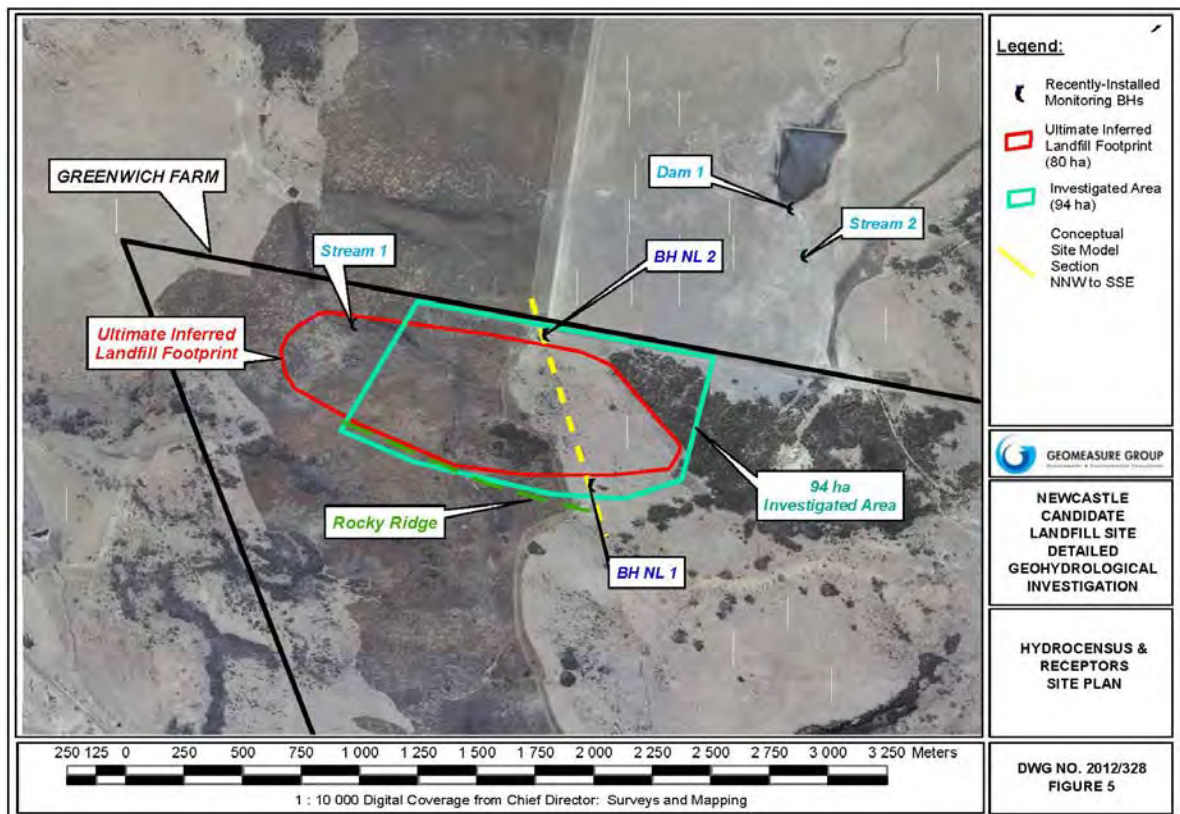


Figure 12 Hydrocensus and receptors

8.6.1.2 Water quality sampling

With regards to the water quality sampling undertaken as part of the detailed invasive investigations, the new borehole BH NL2 was found to be dry and therefore a baseline water quality sample could not be attained for laboratory analysis. In our full geohydrological assessment report (which is included in Appendix E), we therefore recommended that an additional sampling event be undertaken during (or just following) the wetter “summer” months, when the borehole was least expected to be dry.

This sampling event was undertaken on the 16th April 2015, however, the laboratory results are still pending at this stage and therefore this section of the report will be updated following receipt of the laboratory results and the submission of the additional geohydrological sampling event report.

The full geohydrological assessment report is included in Appendix E.

Implications

- Contamination from construction material and release of leachate during operation.
- Shallow groundwater – increased potential for pollution.

Mitigation and management requirements

- Every effort should be made to ensure that any chemicals or hazardous substances do not contaminate the soil or groundwater on site.
-
- The leachate management system must be monitored regularly to ensure that all infrastructure is in good working order so that impacts to the environment are reduced.
- A groundwater monitoring programme should be implemented during the construction and operational phases of the development, with monitoring and sampling conducted on a six-monthly basis (dry season and wet season).

8.7 FLORA AND FAUNA

As mentioned in the ecological survey report, the site is primarily a grassland environment, with sporadic wetland and riverine systems and hence the presence of a number of faunal species is to be expected. Some species considered to be of importance to the area and may be present on or around the site are:

- Oribi, (*Ourebia ourebi*) - a noted endemic and of conservation importance in the region. *O. ourebi* shows preference to open grassland, avoiding woodland and bush (Estes 1992). Taller grasslands are generally avoided, however ecotonal situations whereby shorter plain grasslands merge to taller grasslands are the preferred habitat structure (Estes 1992).
- Clawless otter (*Aonyx capensis*)
- Viverrids (mongoose and genet) - in particular *Herpestes sanguineus* (Slender mongoose) and *Ichneumon albicauda* (White tailed mongoose).
- *Proteles cristuatus* (Aardwolf) - particularly where the harvester termite, *Trinervitermes* is present. (Limited termitaria were noted on the site, possibly on account of previous farming regimen, however such termitaria were of the Family Termitidae, which include *Trinervitermes*).

Reptile and anuran presence may be considered to be "low to moderate" although the weathered dolerite outcrops may be conducive to the presence of Panaspids (skinks). The grassland environment may be considered conducive to the presence of *Bradypodion thamnobates*, a dwarf chameleon noted as "near threatened" in terms of NEMBA. Anuran populations were not assessed, however habitat and general understanding of the region indicates that species common to the area would include *Arthroleptis wahlbergii* (Common squeaker) and *Ptychadenia oxyrhynchus* (Sharp nosed grass frog), species both tolerant of extreme temperature fluctuations, as well as extended dry periods.

Avian presence was not considered in this investigation, however as a grassland environment, the area may be considered suitable habitat for a number of avian species. Consideration of data from the Avian Demography Unit, in respect of bird counts undertaken at Chelmsford Dam some 12kms south of the site, indicates that while much of the counts include species preferring open, aquatic environments, other species recorded include Crowned Crane and Grass Owl. Such species may utilise the immediate region for foraging purposes.

Large portions of the site are subject to invasion by *Acacia mearnsii*, an exotic and invasive wattle species, which has altered ecological factors within the site.

In terms of the Red Data Species list, only one species identified by the transect sampling is listed, namely *Hypoxis haemarcallidea*, which is listed as Declining (SANBI). However, only a few specimens were identified within the proposed landfill footprint and these can be relocated.

Invertebrates noted on the site relate primarily to members of the Family Nymphalidae (brush footed butterflies) as well as Orthopterans (crickets and grasshoppers). No sampling of such species ensued.

Although the proposed footprint of the landfill site lies within vegetation types that have been classified by the SANBI BGIS database as “vulnerable” and threatened, the on-site sampling data has revealed that vegetation on the site has been subject to anthropological transformation which has caused a reduction in species biodiversity e.g. overgrazing and regular burning.

Relating to the development of the landfill, the ecological report recommended that a substantial and connected conservancy area is established in the buffer zone, vegetation within in that zone will need to be managed in order to ensure that the Northern KZN Moist Grassland and Chelmsford North vegetation units are enhanced and protected in the buffer zone. A plant search and rescue must also be undertaken prior to the establishment of the site; the rescued plants must be relocated to the above mentioned buffer zone.

The establishment of a conservancy in the buffer zone will ensure that the plants and species which are unique to the area have a suitable habitat to thrive on; in addition, the conservancy will also ensure that environmental management of the landfill's buffer zone is kept at its maximum and in compliance with the waste management licence requirements.

Based on the findings of the ecological assessment report, it was noted that there are no definitive ecological factors that would preclude the development of a landfill site within the identified footprint area.

Please refer to Appendix E for the Ecological Assessment undertaken at the site.

Implications

- The vegetation within the development footprint will need to be cleared during construction activities
- Potential loss of habitat for species.
- Injury and relocation to fauna

Mitigation and management requirements

- Prior to construction, the layout plan must properly show the construction area so it is clearly demarcated.
- All development footprint areas should remain as small as possible and should not encroach onto surrounding natural areas.
- Proliferation of alien and invasive species is expected within any disturbed areas. These species should be eradicated and controlled to prevent their spread beyond the project footprint. Alien plant seed dispersal within the top layers of the soil within footprint areas, that will have an impact on future rehabilitation, has to be controlled.

- All soils compacted as a result of construction activities falling outside of project footprint areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all construction and rehabilitation phases to prevent loss of floral habitat.
- Informal fires on the property should be prohibited during all development phases.

8.8 NOISE

Noise is likely to be generated as a result of construction and operational activities occurring on site. During the construction phase, noise will be predominantly associated with heavy vehicles traveling to and from site to deliver construction materials and the machinery on site digging holes and landfill lining activities.

With the operational phase of the development, it can be expected that noise will result from waste delivery vehicles as well as landfill compactors that will be responsible for compacting the waste received by the landfill on a daily basis.

A noise assessment will be undertaken as part of the EIA process and will identify sensitive receptors that may potentially be impacted by the noise from the establishment and operation of the landfill. The assessment will also offer mitigation and management measures that the applicant will need to adopt in order to minimize negative noise impacts identified.

Implications

- Noise from material delivery trucks during construction
-
- Noise from landfilling activities and from waste delivery vehicles

Mitigation and management requirements

- Noisy activities must be restricted to the times given in the Project Specification of General Conditions of Contract i.e. weekdays 7h00 to 16h30, Saturdays 7h00 to 15h00. No works should be undertaken on Sundays
- Workers must be instructed to keep shouting, whistling to a minimum.
- Machinery and equipment used onsite must be in good working order in order to avoid negative noise impacts.

8.9 SOCIO-ECONOMICS

According to the 2014-2015 Draft IDP for the Newcastle Municipality, the education profile of the population shows significant improvement since 2001. The number of people who do not have any formal education declined from 13% in 2001 down to 7.8% in 2011. This was coupled by a substantial increase in the number of people with secondary education (Metric) from 25.8% to 32.8% during the same period. However, a low representation of people with higher education is worrisome as this category has recorded a remarkable decrease from 8.2% in 2001 to 4.4% in 2011. This phenomenon could be attributed to the general lack of tertiary institutions and

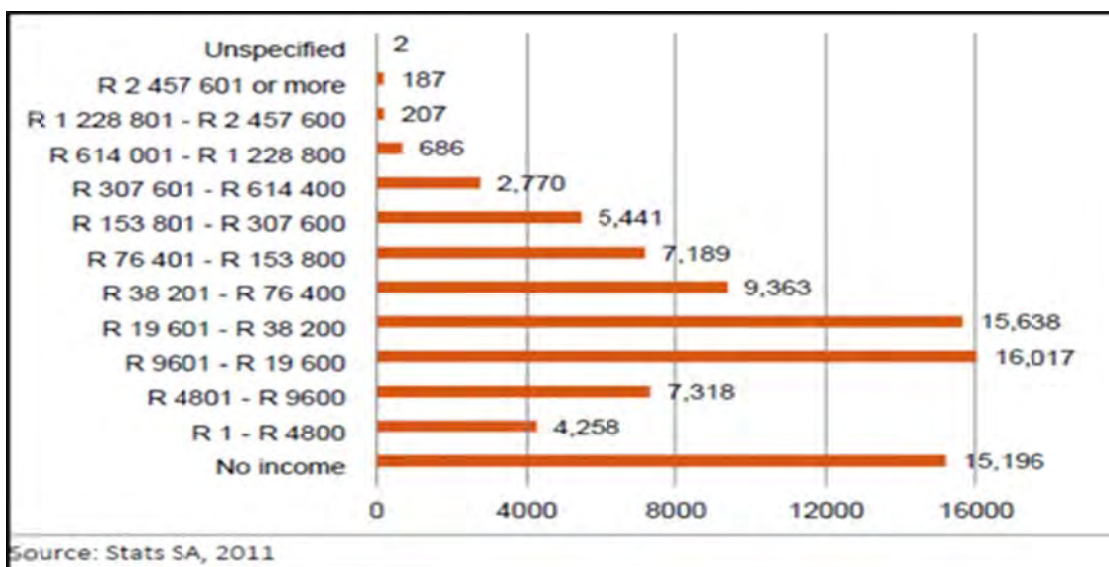
employment opportunities in the area. It limits the ability of the area to attract and keep highly qualified people.

Table 4 below shows the education profile for the relevant municipalities in the district, with Newcastle highlighted in green.

Table 4 Education Profile

MUNICIPALITIES	NO SCHOOLING		HIGHER EDUCATION		MATRIC		PRIMARY EDUCATIONAL ENROLMENT AGED 6-13	
	2001	2011	2001	2011	2001	2011	2001	2011
Amajuba	16.1	7.8	7.0	3.7	23.1	30.5	91.0	94.6
Newcastle	13.3	7.0	8.2	4.4	25.8	32.8	90.9	94.7
Emadlangeni	25.2	14.0	4.4	2.6	11.6	18.8	87.3	93.0
Dannhauser	22.8	8.9	3.4	1.3	17.1	25.3	92.2	94.9

Newcastle Municipality has a generally low income population with a large number of people (R15 196) living in abject income poverty as they do not have a reliable source of income. Those who earn some income earn less than R 38 200 per annum or R 3 183.33 per month. Dependence on grants funding such as welfare grants and pension is also relatively high. As indicated Figure 13 below, the level of representation drops sharply as income brackets increases. As a result, affordability level is generally low while dependency on social grants is high. 22000 people applied to be registered on the indigent list for the municipality in 2010.



Implications

- Creation of employment opportunities
- Improved waste management thus reducing illegal dumping of waste
- Infrastructure development

Mitigation and management requirements

- Local people should be given preference with regards to temporary jobs created during the construction phase of the proposed development.
- Security may be an issue at the site, therefore it is recommended that the entire site is fenced and any access to the site is controlled through a main access point.

8.10 VISUAL ASPECTS

The proposed development site located on a vacant and undeveloped piece of land and there are no immediate residential units. The site is located on high elevation but it should be noted that when the landfill site is being established, the engineering design will allow the actual disposal and compaction of waste to take place at a lower lying area of the Greenwich Farm.

However it should be noted that, during windy conditions, there is the potential for windblown waste to scatter to the surrounding properties, which would be a negative environmental and social impact.

Should the recommended management measures be put in place, it is anticipated that the visual impact of the proposed development will be minimal.

Implications

- Removal of vegetation will contribute to change in visual appearance of the site.
- Windblown waste may cause a negative visual impact and pollution to the environment
- Establishment of site camps and storage of construction material will change the visual appearance of the site temporarily.

Mitigation and management requirements

- Removal of vegetation must be limited to the areas where development will take place.
- Site clearing must be undertaken according to measures specified in the EMP.
- Trees should be planted around the site immediately after construction activities for long term visual management.
- Site offices and construction camps should be kept clean and tidy (i.e. good housekeeping should be employed).

- Regular visual inspection of the waste at the point of deposit should be undertaken to ensure that waste is properly sorted/ separated at the site.

9. IMPACT ASSESSMENT METHODOLOGY

The following section comprises a summary table of the implications and mitigation of each environmental aspect. The methodology used to rate the environmental impacts was qualitative. Each category was divided into a number of different levels. These levels were then assigned various criteria. This is detailed Table 5 below.

Table 5 Summary of Quantifiers and Qualifiers Used for Assessment Purposes

Sensitivity of Aspect Magnitude or intensity of impact	Low Medium High	The aspect has very little value in terms of its ecological importance e.g. a highly disturbed area is rated as low. The aspect has certain qualities which make it ecologically valuable. The aspect is near pristine and has numerous qualities which make it extremely ecologically valuable.
Duration (time scale)	Short-term Medium-term Long-term Permanent	Impact restricted to construction (0-1 years). Impact will exist during construction & operation (1-10 years). Impacts will exist in the long term (>30 years). Impacts will have permanent potential.
Geographic Spatial Scale	Site Local Regional National	The impact will be limited to within the site boundaries. The impact will affect surrounding areas The impact will affect areas far beyond the site boundary but limited to the Province of KwaZulu-Natal. The impact will affect areas far beyond the site boundary within South Africa.
Significance rating pre / post-mitigation (positive / negative)	Low Medium High	The impact will have a minimal effect on the environment. The impact will result in a measurable deterioration in the environment. The impact will cause a significant deterioration in the environment
Probability		Definite (>90%) Probable (>70%) Possible (40%)

		Unlikely (<40%)
Mitigation	Full	No mitigation necessary. Full mitigation/reversal of the impact is possible.
	Partial	Only partial mitigation/reversal of the impact is possible.
	None	No mitigation or reversal of the impact is possible.

Table 6 Identified Potential Impacts Assessment

Impact	Extent	Duration	Probability	Significance Without Mitigation	Significance With Mitigation	Comments and Mitigation Measures
PRE-CONSTRUCTION PHASE						
Property value						
Assessment of property value impacts	Local	Short term	Definite	High (+)	N/A	A property valuation assessment (forming part of the social impact assessment) should be undertaken in order to assess whether the development of the landfill will have a negative impact on the value of properties in the area of Newcastle.
Management of contractor camp areas						
Location	Site	Short term	Definite	Medium (-)	Low (-)	The site manager and the ECO must decide on the appropriate location of the construction camp/site office prior to moving on to the site. Construction camps should not be located close to any watercourse. The area with the construction camp must occupy a small area as possible.
Demarcation of contractor areas	Site	Short term	Definite	Medium (-)	Low (-)	The areas that will be used by the contractor staff for the duration of the development (including access roads to be used, construction lay-down areas, materials storage and delivery requirements, contractors' offices etc.) must be clearly demarcated prior to the undertaking of construction activities.
Management of waste	Site	Short term	Definite	Low (-)	Low (-)	Appropriate waste disposal receptacles must be placed within the construction camps/site offices.

						Recycling and the provision of separate waste bins for different types of waste (paper, glass and metal) should be encouraged.
Ablution facilities	Site	Short term	Definite	Medium (-)	Low (-)	Temporary chemical toilets must be provided at the construction site and must be made available to all staff. No ablution facilities may be placed close to a water resource.
Fauna and flora						
Removal of vegetation during clearing activities	Site	Short term	Definite	Medium (-)	Low (-)	Prior to construction, the layout plan must properly show the construction area so it can be clearly demarcated. The applicant/contractor must ensure that removal of vegetation is only limited to areas where construction is planned to take place. Clearing of vegetation should be undertaken in phases throughout the life of the site and should only occur when an area is to be developed. All development footprint areas should remain as small as possible and should not encroach onto surrounding natural areas.
Injury / relocation of fauna and flora	Site	Short term	Possible	Medium (-)	Low (-)	Before the removal or relocation of any species at the site, all relevant permits must be obtained. A plant search and rescue must be undertaken prior to establishment of the site and relocate the rescued plants into the buffer zone as identified in the

						<p>ecological survey undertaken by Williams Environmental.</p> <p>Ensure the vegetation management plan is designed and implemented for the buffer zone to enhance and protect the two vegetation units identified as vulnerable i.e. Chelmsford North Grassland and Northern KZN Moist Grassland. The buffer zone can be treated/established as a nursery for plants required for rehabilitation of completed areas of the landfill.</p> <p>Further habitat degradation as well as habitat fragmentation must be minimized through the avoidance of areas not planned for the development.</p>
Alien invasive species						
Management of alien species	Site	Short term	Definite	High (+)	N/A	<p>Alien and invasive vegetation control should take place throughout all construction and rehabilitation phases to prevent loss of floral habitat.</p> <p>Proliferation of alien and invasive species is expected within any disturbed areas. These species should be eradicated and controlled to prevent their spread beyond the project footprint. Alien plant seed dispersal within the top layers of the soil within footprint areas, that will have an impact on future rehabilitation, has to be controlled</p>
Handling of Hazardous Substances						
Identification of hazardous substances	Site	Medium term	Definite	Medium (-)	Low (-)	Potentially hazardous materials (if any) must be identified before being brought to the site.

						Safety Data Sheets must be available on site for all hazardous substances.
Storage areas	Site	Medium term	Definite	Low (-)	Low (-)	<p>Hazardous substance storage and refueling areas must be bunded and lined (impermeable).</p> <p>These storage areas must be clearly sign posted as such and access must be strictly controlled.</p>
Emergency preparedness	Site	Medium term	Definite	Medium (-)	Low (-)	<p>Emergency procedures for the handling of such substances during incidents must be available on site.</p> <p>Staff working with such substances must be trained and be competent to deal to emergency situations and have correct personal protective equipment (PPE).</p> <p>A spill kit must be available on site prior to construction taking place.</p> <p>A first aid kit must be made available on site.</p>
Management of staff						
Staff conduct	Site	Medium term	Definite	Low (-)	Low (-)	<p>Construction workers must be made aware of their specific responsibilities in terms of environmental impacts i.e. controlling noise levels, reducing dust, preventing pollution etc.</p> <p>Construction workers must be made aware that no alcohol or drugs will be allowed on site and no workers under the influence of alcohol will be permitted on site.</p> <p>Construction workers must be made aware that firearms or traditional weapons</p>

						will not be allowed on site.
Heritage Resources						
Protection of heritage resources	Site	Long term	Definite	High (+)	N/A	A heritage assessment must be undertaken prior to the undertaking of construction activities in order to ensure that existing heritage resources are properly protected.
CONSTRUCTION PHASE						
Climate						
High rainfall levels may cause soil erosion	Site	Short term	Probable	High (-)	Low (-)	Proper erosion control measures i.e. sediment basins, sand barrier bags etc. must be adopted where necessary.
Windy conditions may contribute to high dust generation levels	Local	Short term	Possible	Medium (-)	Medium (-)	No construction activities must be undertaken during extremely windy conditions.
Topography						
Minor change in topography during site preparation	Site	Short term	Definite	Medium (-)	Low (-)	Grubbing activities must be undertaken under supervision of the site manager. No part of the site must be interfered with if it does fall within the development footprint. Any excavations that exist must be filled to avoid ponding on site as well as possible injury to staff.
Soil management						
Topsoil removal	Site	Short term	Definite	Medium (-)	Low (-)	Topsoil must be removed from all areas where physical disturbance of the surface will occur and must be stored and be protected correctly. The top 60-600 mm of topsoil should be stripped off on all areas in which construction is planned to take place and stored carefully for use in rehabilitation.
Soil protection and storage	Site	Long term	Definite	Medium (-)	Low (-)	Topsoil shall not be disturbed more than is absolutely necessary on the construction site, and were possible

						<p>should be appropriately stock-piled, such as in the form of a berm to minimize visual impacts, and/or minimize stormwater impacts.</p> <p>Soil stockpiles must be stored, shaped and sited in such a way that they do not interfere with the flow of water to cause damming or erosion.</p> <p>Soil stockpiles must not exceed 2m and must be covered at all times to avoid erosion as dust generation.</p> <p>The stockpiled soil can then be reused following closure of the site for rehabilitation purposes.</p> <p>All soils compacted as a result of construction activities falling outside of project footprint areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas.</p>
Soil erosion	Site	Short term	Possible	Medium (-)	Low (-)	<p>Erosion control measures must be implemented in areas sensitive to erosion. These measures could include the use of sand bags, hessian sheets, retention or replacement of vegetation.</p> <p>Stockpiles must be appropriately covered and be stabilised at the bottom with concrete blocks to prevent erosion.</p>
Soil contamination	Site	Short term	Possible	High (-)	Medium (-)	<p>Substances with the potential to cause contamination must be carefully managed on site.</p>

						<p>Hazardous substance storage and refueling areas must be bunded and lined (impermeable).</p> <p>To avoid soil contamination, any mixing of materials must be undertaken in an impermeable bunded surface.</p>
Landfill construction						
Landfill construction as per approved design	Site	Medium term	Definite	Medium (-)	Low (-)	<p>The construction of the landfill must be undertaken as specified in the design drawings submitted with the environmental assessment report.</p> <p>A notice board must be erected at the site entrance notifying the public that construction of a landfill is taking place and that no unauthorized entry is permitted.</p>
Protection of wet areas						
Control of runoff	Site	Short term	Unlikely	Low (-)	Low (-)	<p>No contaminated runoff must be allowed to reach any wet areas within and around the construction site.</p> <p>Berms around cell to be constructed to keep stormwater off working areas.</p>
Material storage	Site	Short term	Unlikely	Low (-)	Low (-)	<p>No storage of construction materials or chemicals must be allowed within the proximity of any wet areas.</p>
Air Quality						
Dust	Local	Short term	Probable	Medium (-)	Low (-)	<p>Dust generation should be limited and where it cannot be avoided, dust suppression methods must be practiced.</p> <p>Dust suppression should be undertaken in instances where dust poses as a threat to the workers onsite and neighboring properties.</p>

Carbon emissions from delivery vehicles and machinery used	Local	Short term	Possible	Low (-)	Low (-)	Vehicles and machinery on site must be in good working order and be inspected regularly.
Soil management	Site	Short term	Definite	Medium (-)	Low (-)	Topsoil stockpiles must not exceed 2m in height and should be covered to avoid weed growth and dust generation. Any topsoil stockpiles to be used after construction activities should be covered to avoid being windblown.
Fauna and Flora						
Removal of vegetation during site clearing	Site	Short term	Definite	High(-)	Medium (-)	Removal of vegetation must be restricted to the areas that are within the development footprint. Mass vegetation removal must be avoided; clearing should be undertaken as construction work progresses. The clearing of invasive alien species (if any) must be undertaken as part of site clearing.
Disturbance to fauna habitat	Site	Short term	Probable	High (-)	Medium (-)	No fauna must be intentionally killed or injured on site. Contractors on site must be made aware of the need to avoid negative undertakings that could lead to fauna harm.
Management of alien vegetation	Site	Long term	Definite	High (-)	Medium (-)	Management of alien invasives identified at the site must be undertaken as per the recommendations in the EMP. Re-growth of alien plants must be controlled throughout the site during and

						after construction.
Visual						
Removal of vegetation will contribute to change in visual appearance of the area	Site	Permanent	Definite	Medium (-)	Low (-)	Removal of vegetation must be limited to the areas where development will take place. Site clearing must be undertaken according to measures specified in the EMPr.
Planting of vegetation immediately after construction	Site	Long term	Definite	High (+)	N/A	Trees should be planted around the site immediately after construction activities for long term visual management.
Establishment of a construction camp (if applicable)	Site	Short term	Probable	Medium (-)	Low (-)	Site offices and construction camps should be kept clean and tidy (i.e. good housekeeping should be employed). All litter must be collected from the working and camp areas daily.
Hazardous material handling						
Material spillages/ vehicle leaks	Local	Short term	Unlikely	High(-)	Medium (-)	Hazardous substances or materials must be transported in sealed containers or bags. Hazardous substances must be stored in banded lockable cage clearly labelled that it contains hazardous substances. Safety Data Sheets (SDS) for all hazardous substances must be available on site at all times. Staff working with such substances must be trained to deal to emergency situations and be provided with full personal protective equipment (PPE).

Hazardous waste handling	Site	Medium term	Probable	Medium (-)	Low (-)	Hazardous waste must be stored in a designated skip separate from general waste and must be disposed of at a registered hazardous waste landfill site. Records for safe disposal must be kept safely for record purposes.
Health impacts due to uninformed substance handling	Site	Medium term	Unlikely	Low (-)	Low (-)	Staff working with hazardous substances must be trained and be trained to deal with emergency situations. Emergency procedures for the handling of such substances during incidents must be available on site.
Fuel storage and re-fuelling of vehicles	Site	Short term	Probable	Low (-)	Low (-)	Hazardous substance storage and refuelling areas must be bunded and lined (impermeable) These hazardous substance storage areas must be clearly signposted as such and access strictly controlled.
Vehicle maintenance	Site	Short term	Probable	Low (-)	Low (-)	Washing, refuelling and maintenance of vehicles and the transferral of hazardous substances must be done within a demarcated, hard-surfaced area with a drip tray.
Surface pollution	Site	Short term	Possible	Medium (-)	Low (-)	Hazardous substances must be stored in a concrete bunded area and these storage areas must be clearly signposted as such and access strictly controlled.
Risk of injury to staff on site	Site	Short term	Possible	Medium (-)	Low (-)	Emergency procedures for the handling of such substances during incidents must be available on site.
 Vehicular and pedestrian access to the site						
Minimal congestion of vehicles during construction	Local	Short term	Possible	Low (-)	Low (-)	Construction vehicles must be restricted to demarcated areas within the site

						Material storage areas must not be established close to a water resource or sensitive environments.
Spillages during delivery	Site	Short term	Unlikely	Medium (-)	Low (-)	Vehicles delivering materials to the site must be properly inspected prior to being allowed to enter the site. Any spillage that occurs must be cleaned immediately. All spillages on or adjacent to the site access roads must be cleaned up immediately.
Pedestrian access	Site	Long term	Unlikely	Low (-)	Low (-)	Wire mesh fencing should be constructed around the site in order to prevent unauthorised access to site.
Stormwater management						
Possible contamination of stormwater	Site	Medium term	Unlikely	Low (-)	Low (-)	Stormwater runoff must be prevented from coming into contact with the waste or contaminants that may be on the site.
Soil erosion	Local	Short term	Possible	Medium (-)	Low (-)	Stormwater management measures must be in place and be monitored regularly in order to avoid significant soil erosion from taking place.
Health and safety						
Designation of smoking areas	Site	Short term	Definite	High (+)	N/A	Designated smoking areas must clearly be signposted as such and workers onsite be notified of these areas prior to construction activities taking place.
Break facilities	Site	Short term	Definite	High (+)	N/A	Workers must use canteen areas established on site for eating during tea and lunch breaks.
Use of ablution facilities	Local	Short term	Unlikely	High (-)	Medium (-)	Should chemical toilets be used, an appropriate contractor must be employed to service these facilities and disposal certificates be kept on site for record purposes.

						Ablution facilities must be within the construction site and must not be located close to a water resource.
Shower and changing facilities	Site	Short term	Definite	High (+)	N/A	The contractor must provide the employees at least with one shower facility per 15 workers and changing facilities for each sex as specified in the Facilities Regulations, 2004 as promulgated by Government Notice No. R924 of 03 August 2004
Providing of Personal Protective Equipment (PPE)	Site	Short term	Definite	High (+)	High (+)	Staff working onsite must be provided with Personal Protective Equipment (PPE) in order to reduce chances of injury and negative health impacts whilst undertaking site activities.
Uncontrolled generation and disposal of waste	Site	Short term	Possible	Medium (-)	Low (-)	Waste must be disposed of in designated bins i.e. paper, glass and plastic
Injury risk to contractors while undertaking work	Site	Short term	Unlikely	Medium (-)	Low(-)	A first aid kit must always be onsite, suitable training for its use must be provided during environmental training prior to the execution of construction activities.
Inspection of machinery/equipment used	Site	Short term	Definite	High (+)	N/A	Prior to the undertaking of activities onsite, the contractor must conduct an inspection on a daily basis on all machinery as well as equipment in order to ensure that it does not pose as a hazard to the workers onsite.
Surface Water						
Contamination from hazardous material leaks	Site	Short term	Unlikely	Low (-)	Low (-)	Hazardous substance storage and refuelling areas must be bunded and lined (impermeable).
Contamination from material mixing	Site	Short term	Unlikely	Low (-)	Low (-)	Mixing/decanting of all chemicals and hazardous substances must take place

						<p>either on a tray or on an impermeable surface. Waste from these should then be disposed of to a registered disposal site.</p> <p>If ready-mix concrete will be used, the contractor shall ensure that the delivery vehicles do not wash their chutes directly onto the ground or into a water resource.</p>
River health assessment	Site	Short term	Definite	High (+)	N/A	A river health assessment must be undertaken to determine the functionality and aquatic characteristics of the rivers before the landfill is constructed.
Drainage control	Site	Short term	Definite	High (+)	N/A	The quality, quantity and flow of direction of any surface water runoff must be established prior to disturbing any area for construction purposes.
Protection of surface water resources	Local	Medium term	Definite	High (+)	N/A	<p>Streams, rivers, pans, wetlands and their catchments must be protected from erosion and from direct or indirect spillage of pollutants such as refuse, garbage, cement, chemicals, oils or tar products.</p> <p>Surface water monitoring must be undertaken at the surrounding water resources, monitoring should be carried out as per the intervals stated in the waste licence and must be undertaken by an independent specialist and report be submitted to the relevant authorities.</p>
Groundwater						
Contamination from construction material	Site	Short term	Unlikely	High (-)	Low (-)	Mixing/decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface.

Hazardous material leaks	Site	Short term	Unlikely	Low (-)	Low (-)	Every effort should be made to ensure that any chemicals or hazardous substances do not contaminate the soil or groundwater on site.
Monitoring	Site	Short term	Definite	High (+)	N/A	A groundwater monitoring programme should be implemented during the construction and operational phases of the development, with monitoring and sampling conducted on a six-monthly basis (dry season and wet season).
Noise						
Noise from machinery and vehicles	Local	Short term	Probable	Medium (-)	Low (-)	Machinery and vehicles must be kept in good working order for the duration of the project to minimise noise nuisance to neighbours.
Construction noise	Local	Short term	Possible	Medium (-)	Low (-)	Noisy activities must be restricted to the times given in the Project Specification of General Conditions of Contract i.e. weekdays 7h00 to 16h30, Saturdays 7h00 to 15h00. No work on Sundays. Workers must be instructed to keep shouting, whistling, music etc to a minimum.
Waste management						
Recycling of waste	Site	Short term	Definite	High (+)	N/A	Before separating waste for recycling purposes, a recycling organisation will need to be identified. Separation of waste i.e glass, paper and metal is encouraged in order to achieve recycling objectives. Construction workers must be trained in material sorting policy and waste receptacles be monitored to check that

						there is no mixing of different waste types.
Waste disposal	Site	Short term	Definite	Medium (-)	Low (-)	<p>Refuse must be placed in the designated skips/bins which must be regularly emptied.</p> <p>These should remain within demarcated areas and should be designed to prevent refuse from being blown out by wind.</p> <p>All waste must be removed from the site and transported to a licensed landfill site.</p> <p>General waste receptacles must not be allowed to overflow and must be emptied timeously (preferably weekly).</p> <p>Waybills proving disposal at each site shall be provided for the Project Applicant's or the ECO's inspection.</p>
Construction waste	Site	Short term	Definite	Low (-)	Low (-)	All construction waste generated during the construction process including rubble, concrete, waste metals etc. must be placed in a waste collection area in the construction camp and must be collected by an appropriate waste contractor.
Hazardous waste	Site	Short term	Definite	Medium (-)	Low (-)	<p>Hazardous waste must be classified and placed in a leak proof waste receptacle clearly labelled "hazardous waste" and then be disposed of at a registered hazardous waste landfill site.</p> <p>Certificate of disposal must be kept on site for record purposes.</p>
Safety and security impacts						
Illegal access to site	Site	Short term	Unlikely	Low (-)	Low (-)	The construction site should be fenced and secured in order to reduce the opportunity for trespassing.

Injury during construction	Site	Short term	Probable	High (-)	Low (-)	Contractor is to comply with Occupational Health & Safety Act, No 85 of 1993 to ensure the health and safety of the contract workers.
Socio-economic						
Creation of employment opportunities	Local	Short term	Definite	High (+)	N/A	None
HANDOVER PHASE						
Site rehabilitation and wet areas management						
Construction material clearing	Site	Short term	Definite	Medium (-)	Low (-)	All surfaces of the construction footprint areas are to be checked for waste products i.e. oil or fuel spills and to be cleared from the site and disposed of at an appropriately licensed Landfill under the supervision/ advice of the ECO and Project Applicant.
Re-vegetation	Site	Long term	Definite	High (+)	N/A	Any areas of vegetation which have been disturbed by construction activities around the landfill and infrastructure areas will need to be rehabilitated. These will have to be identified by the ecologist in conjunction with the Project Applicant.
OPERATIONAL PHASE						
Landfill operations						
Compliance with legislation	National	Long term	Definite	High (+)	N/A	A landfill operational plan must be developed in order to ensure that operations at the landfill are undertaken accordingly. The Waste Management Licence will dictate many of the operational and monitoring requirements for the landfill.

						<p>This must be complied with at all times.</p> <p>Compliance with the relevant policies, legislation and regulations must be achieved at all times.</p>
Storm water management						
Compliance to the stormwater management plan	Site	Long term	Definite	High (+)	N/A	Separation of dirty water from clean water must be achieved at all times through the management of stormwater in accordance to the approved stormwater management plan.
Dirty and clean water separation	Site	Long term	Definite	High (+)	N/A	Stormwater control measures should ensure that impacted waste water does not come into contact with bare soil and that will prevent any impact on the groundwater underlying the site.
Inspection of infrastructure	Site	Long term	Definite	Medium (+)	Medium (+)	Storm water management infrastructure must be monitored regularly of blockages and malfunctions in order to ensure that no contamination takes place.
Surface water						
Contamination from waste	Site	Short term	Unlikely	Low (-)	Low (-)	<p>The migration of leachate or spillage into the ground must be avoided at all times.</p> <p>The landfill lining material must be fitted in accordance to the set standards in order to ensure that faults are not experienced.</p> <p>Maintenance of the stormwater management measures during all phases of the development is vital. Routine checks, maintenance and revision of erosion control measures must be carried out following any storm event.</p> <p>Surface water monitoring must be undertaken at the surrounding water</p>

						<p>resources and should be carried out as per the intervals stated in the waste licence and must be undertaken by an independent specialist and report be submitted to the relevant authorities.</p> <p>Site staff must be trained on spill management requirements and ensure that no spill is left unattended for an extended period of time as that can lead to contamination.</p>
Groundwater						
Potential migration of determinants into the shallow groundwater underlying the site.	Local	Medium	Unlikely	Low (-)	Low (-)	<p>The migration of leachate or spillage into the ground must be avoided at all times as this may contaminate the groundwater.</p> <p>Lining material must be properly installed in order to prevent any leachate from being absorbed into the ground or migrating off site.</p> <p>Every effort should be made to ensure that any chemicals or hazardous substances do not contaminate the soil or groundwater on site.</p>
Monitoring	Site	Long Term	Definite	High (+)	N/A	<p>A groundwater monitoring programme should be implemented during the construction and operational phases of the development, with monitoring and sampling conducted on a six-monthly basis (dry season and wet season) and submitted to a SANAS-accredited laboratory for analyses for selected determinants, which will need to be agreed on with the relevant authorities including the Department of Water and Sanitation.</p>

						The groundwater monitoring should include the recording of static water levels and groundwater parameters in the monitoring well network in order to identify variations in the groundwater parameters.
Cumulative impact						
Improved waste management	Local	Long term	Definite	High (+)	N/A	<p>Inspection of the landfill infrastructure i.e. pipes, tanks, skips etc. must be undertaken regularly in order to detect malfunctions at an early stage.</p> <p>The waste will need to be handled and transported as per the conditions and stipulations of the legislation governing the handling and transportation of general waste.</p>
Fauna and flora						
Protection of fauna and flora species	Site	Long term	Definite	High (+)	N/A	<p>It must be ensured that no further harm occurs to the fauna and flora on site.</p> <p>Where suitable, previous fauna habitats may be restored on areas not disturbed by the development.</p>
Management of alien species	Site	Long term	Definite	High (+)	N/A	The applicant must ensure that no alien vegetation occurs on the site Ongoing control of alien vegetation and rehabilitation must be undertaken.
Health and safety						
Development of an emergency response plan	Site	Short term	Possible	High (+)	N/A	An emergency plan (including fire management, spill responses etc) must be developed and implemented; the relevant authority must approve this plan.
Emergency preparedness and fire management	Site	Short term	Possible	High (+)	N/A	Site safety checks should be carried out in accordance with the relevant occupational health and safety requirements.

						<p>Fire extinguishers must be serviced regularly before their expiry dates.</p> <p>Accidental fires on the landfill must be extinguished immediately. Appropriate operational procedures involving the spreading and smothering of burning waste, rather than the application of water must be implemented.</p> <p>Site staff must be regularly trained on emergency preparedness and fire management requirements.</p> <p>Emergency telephone numbers must be posted in a location clearly visible to all staff on site.</p>
Leachate management						
Use of appropriate lining material	Site	Long term	Definite	High (+)	N/A	Each cell must be lined using Class A type lining system to incorporate a leak detection system according to the "Norms & Standards August 2013, to ensure that leaks are identified early and managed accordingly.
Surface and groundwater contamination	Local	Short tem	Unlikely	Low (-)	Low (-)	<p>Management of leachate must be undertaken in accordance to the relevant legislation i.e. National Environmental Management: Waste Act (Act 59 of 2008), NEM: Water Act (Act 36 of 1998) and other applicable legislation.</p> <p>Leachate should not be allowed to flow freely offsite without being properly treated and proven to be of acceptable quality as per waste licence requirements.</p>

Landfill gas/odour management						
Use of landfill cover material	Site	Long term	Definite	High (+)	N/A	The working face must be covered daily with suitable cover material to reduce odour emissions from the area. The prompt covering of smelly waste to reduce odour impacts is a minimum requirement. In extreme situations, sprays should be used.
Development of a gas management system	Site	Long term	Probable	Medium (+)	Medium (+)	Active gas venting and flaring must be adopted in order to minimise negative odour impacts. Where a gas management system exists, it must be correctly operated, maintained and monitored in order to ensure that any landfill gas produced from the landfill is managed appropriately. Recovery of landfill gas cannot be done immediately as the landfill will be too 'young' (years in operation), however the operations at the site and its management will comply with norms and standards.
Covering of waste being transported						
Waste spillages	Local	Long term	Probable	Medium (-)	Low (-)	Trucks transporting the waste must be appropriately covered at all times in order to avoid waste being windblown resulting in pollution. No waste must be deliberately thrown on the landfill access roads.
Illegal dumping	Local	Long term	Probable	High (+)	N/A	Notice boards should be placed at the entrance and boundary of the landfill site stating that illegal dumping is not allowed.
Waste inventory and inspection						
Recording of waste disposed	Site	Long term	Definite	High (+)	N/A	The landfill operator must ensure that a waste register is kept throughout the life of the facility of the quantities and

						<p>characteristics of the waste disposed.</p> <p>The applicant must register with the South African Waste Information System (SAWIS) which keeps records of waste tonnages handled by waste management facilities in South Africa.</p> <p>Information on the waste register must include the origin of the waste, type of waste, date of disposal and identify the producer/deliverer.</p>
Site inspections	Site	Long term	Definite	High (+)	N/A	Regular visual inspection of the waste at the point of deposit should be undertaken to ensure that waste is properly sorted/separated at the site.
Site access						
Controlled site access	Site	Long term	Definite	High (+)	High (+)	<p>Site access must only be permitted to authorized personnel in order to avoid problems of trespassing.</p> <p>The landfill must have a weighbridge and type as well as amount of waste received be recorded for information and audit purposes.</p> <p>Only waste permitted for disposal at a Class B site will be accepted and will be checked by site staff at the entrance gate.</p> <p>Appropriate signage must be placed at relevant points along the roads in the proximity of the site so as to caution motorists of the activity taking place.</p>
Traffic management						
Traffic	Local	Short term	Unlikely	Low (-)	Low (-)	Vehicles transporting the waste to the facility must avoid heavy traffic hours so

							<p>as to ease the flow of traffic.</p> <p>Vehicles transporting the waste to and from the compactor must be kept in good working order.</p> <p>Vehicles and drivers must comply with the relevant transportation legislation.</p>
Odour							
Uncontrolled odour may cause nuisance	Site	Short term	Unlikely	Low (-)	Low (-)		<p>It is vital that waste is covered on a daily basis in order to avoid odour and waste being blown by the wind.</p> <p>An odour masking agent may be used in order to suppress negative odour impacts resulting from the landfill's operations if these pose a nuisance to neighbours.</p> <p>Special cells may be constructed for the disposal of putrescible general wastes. Such wastes should be deposited and covered immediately with a layer of soil at least 0.5m thick.</p>
Social impacts							
Minimal employment opportunities	Local	Long term	Definite	High (+)	N/A		<p>Local people must be given preference when it comes to any employment opportunities during operation of the facility.</p>
Management of complaints and incidents	Local	Long term	Definite	High (+)	N/A		<p>An incidents and complaints register must be kept at the landfill's office and all complaints received must be noted down, with the date, name of complainant, nature of complains and response provided.</p> <p>Waste delivery vehicles must adhere to</p>

						the set speed limits in order to avoid spillage of waste and occurrence of accidents.
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10. SUMMARY OF ENVIRONMENTAL IMPACTS AND ISSUES

Potential project impacts have been identified in Section 9. The key issues are summarized below:

10.1 POTENTIAL POSITIVE IMPACTS

- Infrastructure development through the construction of the landfill using modern technology;
- Job creation with focus on the local community;
- Improved waste management in the area of Newcastle;
- Promotion of waste recycling;
- Possibility of landfill gas extraction which will positively contribute in energy generation for site activities;
- Promotion of waste composting;
- Undertaking of landfilling activities in accordance with the requirements of the relevant environmental and waste management policies, regulations and legislation.

10.2 POTENTIAL NEGATIVE IMPACTS

Construction Phase:

- Clearing of vegetation for construction purposes;
- Soil erosion during construction activities;
- Noise from material delivery vehicles travelling to the landfill site;
- Possible loss of habitat and injury of fauna;
- Occupational injuries;
- Noise from construction activities;
- Possible traffic congestion;
- Removal of vegetation will contribute to change in visual appearance of the site;
- Establishment of site camps and storage of construction material will change the visual appearance of the site temporarily;
- Alteration in topography during site preparation;
- Contamination from release of construction materials;
- Hazardous substance spillages could contaminate the adjacent surface water resources;
- Dust impacts;
- Improper storage of soil stockpiles may cause erosion;
- Soil contamination due to uninformed hazardous substance handling;

- Excavations may become a hazard for staff on site if not demarcated properly;
- Property values in the area may decrease with the development of the landfill (property valuation assessment to confirm)
- Possible disturbance of wetlands

Operational Phase

- Creation of employment opportunities;
- Improved waste management thus reducing illegal dumping of waste;
- Recycling of waste will promote waste hierarchy objectives
-
- Recovery of landfill gas
- Possible occurrence of scavenging activity;
- Windblown waste may cause a negative visual impact and pollution to the environment;
- Poor stormwater management may lead to dirty water entering the adjacent Ncandu and Ngagane rivers;
- Periods of high rainfall may lead to high surface run-off, therefore the management of stormwater is important;
- Direct sunlight with the waste body may cause strong odour released at the landfill and promote the occurrence of pests;
- Windy conditions may contribute to high dust generation levels and scattering of waste;
- Waste spillage from vehicles travelling to the site if not properly covered;
- Illegal dumping in access roads to the site;
- Shallow groundwater – increased potential for pollution;
- Possible traffic congestion during operation;
- Potential contamination of soil and surface water from the generation of leachate;
- Soil stockpiles (cover material) may contribute to dust generation if not properly covered;

11. PLAN OF STUDY FOR EIA

11.1 AUTHORITY CONSULTATION

Key authorities will be engaged during the EIA process and meetings will be held should they be required. Once the specialist studies (see Section 11.3) have been completed the findings will also be made available to the relevant authorities for comment.

11.2 PUBLIC PARTICIPATION

All registered I&APs will be kept informed of the progress of the project and will automatically receive further information on the project as it becomes available.

Once the Draft EIA Report is available a public meeting will be held, should it be deemed necessary, in order to discuss the findings of the studies and provide an opportunity for the I&APs to comment on the proposed development. All comments will be incorporated into the Final EIA Report.

11.3 PROPOSED SPECIALIST STUDIES

As part of the EIA Report a number of specialist studies will be undertaken in order to further investigate potential environmental impacts (negative and positive) likely to result from the establishment and operation of the proposed development. The studies listed below will offer a detailed and specialist findings on each specific aspect of the environment that needs to be assessed, in addition, mitigation and management measures will also be provided in order to minimize potential harm that might occur to the environment and its surroundings.

11.3.1 Visual Assessment

The visual impact assessment will comprise:

- Describing and assessing the changes in visual appearance of the project area from construction, through the operational phase and during the closure and rehabilitation phases;
- Identifying potentially sensitive receptors in the vicinity of the project area;
- Assessing the visual impact of each phase with reference to the current quality and value of the project area as a visual resource; and the recommendation of the required management and mitigation measures.

11.3.2 Noise Assessment

The Noise Assessment includes the following:

Site visit: Undertaking a site visit in order to familiarise the consultant with the environment of the proposed development. Possible noise issues and the nearest noise sensitive receptors are identified.

Noise measurements: Although major environmental noise measurements are not expected to be necessary, samples of the noise emission levels of existing noise sources, such as pumping stations, help during the assessment of possible noise issues.

Modelling and calculations: In order to illustrate the reasoning behind the assessment of noise related issues, sample calculations will be made.

Assessment of the results: The results of the observations and calculations will be assessed in terms of the applicable noise regulations and the guidelines provided in SANS 10103:2008 'The measurement and rating of environmental noise with respect to annoyance and to speech communication'.

Reporting: A report describing methodology used during the assessment as well as results and findings of the noise study will be compiled and be included as part of the Draft EIA Report.

11.3.3 Air Quality Assessment

The Air Quality Assessment includes a Baseline Characterisation and an Impact Assessment that will include the following:

- A desktop literature review and information gathering exercise to determine and/or describe the following in a technical report:
- Description of the material characteristics of the landfill material, where known.
- Identification of expected sources air emissions and likely air quality parameters of potential concern on site based on potential health effects to identified sensitive receptors.
- Identification of applicable air quality standards, legislation and guidelines which would constitute project adherence / compliance requirements;
- An assessment of regional baseline ambient air quality and climatic data / information. Depending on the availability of baseline monitoring data this assessment would involve quantitative (statistical) analysis of the available data and/or reliance on literature review information.
- The methodology and findings of the site screening exercise based on air quality criteria.

11.3.4 Hydrological assessment

A hydrological assessment will be commissioned to investigate the potential impacts that the development might have on the Ngangane River and the Ncadu River located adjacent to the site, impacts on the other existing water resources in the proximity of the proposed development site will be assessed as well.

11.3.5 River Health Assessment

South African Scoring System version 5 (SASS-5) is a biological index which determines the health of a river based on the aquatic invertebrates. It is used in conjunction with the water quality indices such as the pH, electrical conductivity, temperature and dissolved oxygen.

In order to determine the baseline quality of the Ncadu River and the Ngagane River, a SASS-5 will need to be undertaken.

11.3.6 Traffic Study

The traffic study will be undertaken in order to assess potential traffic impacts that the proposed development might have on the existing traffic patterns. The traffic study includes the following:

- A site visit, taking cognisance of the traffic in the area;
- Undertaking of a review of existing information and conceptual plans of the study area;
- Providing an opinion on the existing and predicted traffic impact during and after construction of the proposed landfill site and assess the general impact of the project on traffic.
- Providing mitigation measures to prevent and/or mitigate any environmental impacts that may occur due to the proposed project; and
- Compilation of a Traffic Impact Report.

11.3.7 Wetland Delineation

The objectives of the wetland delineation will be to:

- Review existing information available for the area;
- Delineation of riparian zone and wetlands according to the DWS accepted methodologies.
- During the site investigation the following indicators of potential wetlands will be identified:
 - o Terrain unit indicator;
 - o Soil form indicator;

- Soil wetness indicator; and
- Vegetation indicator.
- Assess the status of each of the wetlands identified and assess the potential impacts on the wetlands;
- Compilation of a wetland delineation report that is sufficient to address the requirements of the waste license application, the EIR and management practices including mitigation measures.

11.3.8 Social Impact Assessment

The objective of the Social Impact Assessment (SIA) is to assess possible positive and negative social impacts associated with a proposed development. The following are included in the Social Impact Assessment:

- Social Baseline study which assesses available literature regarding the demographical information of the particular area under investigation. This phase also involves a review of municipal documentation that focuses on the social aspects of an area; this documentation may be local or regional.
- Scoping report which involves meetings with the key stakeholders, capturing of issues and comments raised by the community, undertaking of a site visits to capture demographical information of the area.
- Compilation of a Social Impact Assessment report identifying social impacts and suggesting management and mitigation measures for identified impacts that cannot be avoided.

As part of the SIA, a brief property valuation assessment will be undertaken in order to detail the potential impacts that the proposed landfill may have on the value of the existing properties in the vicinity of the proposed development site.

During public participation, it was evident that interested and affected parties are concerned regarding the property value declines that might be experienced should the landfill site be established at the Greenwich farm.

11.3.9 Heritage Impact Assessment

A Heritage Impact Assessment will be conducted to comply with Section 38 of the National Heritage Resources Act (No 25 of 1999). Specific objectives of this study will be:

- Desktop study (consulting heritage data banks and appropriate literature);
- Site visit of the project area;
- Determine whether any of the types and ranges of heritage resources as outlined in Section 3 of the Act (No 25 of 1999) do occur in the project area;
- Determine what the nature, the extent and the significance of these remains are;
- Determine whether any heritage resources (including graves) will be affected by the development project; if any heritage resources are to be affected by the development project mitigation measures has to be undertaken and management proposals have to be set for heritage resources which may continue to exist unaffected in or near the project area.

- Compile a report which would:
 - Clearly identify possible archaeological, cultural and historical sites within the study site;
 - Identify the potential impacts of construction and operation of the proposed development on such resources, with and without mitigation;
 - Offer an opinion on a preferred site in terms of this specialist field;
 - Provide mitigation measures to ameliorate any negative impacts on areas of heritage significance; and
 - Include a map illustrating the relevant aspects of the report.

11.4 PUBLIC PARTICIPATION DURING THE EIA PHASE

The purpose of public participation during the Impact Assessment Phase is to present the findings of the EIA phase and to avail the Draft Environmental Impact Report (EIR) to the public for review and comment. I&APs will be afforded an opportunity to see that their issues have been considered by the EIA specialist studies and the assessment of potential impacts. Also, I&APs will comment on the findings of the Draft EIR, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones. Once the review is completed, the authority may decide to request additional information on matters that may not be clear from the report, authorise the application with certain conditions to be complied with by the applicant or reject the application. A waste management licence and environmental authorisation reflecting the decision of the authority as well as any conditions that may apply will be issued to the applicant.

I&APs will be advised in good time of the availability of these reports, how to obtain them, and the dates and venues of public and other meetings where the contents of the reports will be presented for comment.

The public participation process for the EIAs will involve the following proposed steps:

- Announcement of the availability and public review of the Draft EIR;
- Announcement of the availability of the Final EIR;
- Notification of the authorities' decision with regard to EAs

11.4.1 Announcing the availability of the Draft EIR and the EMP

Correspondence will be circulated to all I&APs, informing them in terms of progress made with the assessment and that the Draft EIR and EMP are available for comment. The report will be distributed to public places and also forwarded to I&APs electronically.

11.4.2 Public review of Draft EIR and EMP

The EIA Guidelines specify that all interested and affected parties must have the opportunity to verify that issues they have raised are captured and assessed before the EIA Report will be approved. The findings of all specialist studies undertaken will be integrated into the Draft EIR. The Draft EIR will have a comprehensive project description, motivation and also the findings of the assessment and recommended mitigation measures. It will further include the Issues and Responses Report, which will list every issue raised with an indication of where the issue was dealt with in the EIR. The findings of the assessment and recommended mitigation measures will also be incorporated into the EIR. The Draft EIR and EMP will be available for public review and comment for a period of 40 days, comments received will be responded to in the Final EIR which will also be circulated for comment once finalised.

11.4.3 Announcing the availability of the Final EIR and EMP

Correspondence will be circulated to all I&APs, informing them of progress made with the assessment and that the Final EIR and EMPr are available for comment. The reports will be distributed to the same public places as the previous reports for I&APs to review and comment on.

The Final EIR will be available for public review and comment for a period of 21 days, thereafter it will be submitted to EDTEA for consideration.

11.4.5 Announcing of EDTEA decision

Registered I&APs will be notified of the decision from the Department of Economic Development, Tourism and Environmental Affairs. An advert will also be placed in the newspaper if the licence conditions require it to be undertaken.

11.5 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

An EMPr will be drawn up for the construction and operational phases of the proposed development. The objective of the EMPr is to provide practical, economically viable and sustainable environmental management guidelines for those aspects of the development that have the potential to impact negatively on the receiving environment. The implementation of the recommendations within the EMPr will minimise the overall negative impacts of the construction and operation activities on the receiving environment.

The EMPr will form part of the Draft EIR.

11.6 PROPOSED EIA TIMEFRAMES

The proposed timeframe for the EIA phase of the development is presented in Table 7 below.

Table 7 Proposed Timeframe for Remaining EIA Tasks

ACTIVITY	START DATE	END DATE
Undertaking of Specialist Studies (approximately 4 months after acceptance of Scoping Report)	October 2015	Mid February 2016
Public meeting to discuss findings of specialist studies	March 2016	March 2016
Compilation of Draft EIA Report and EMPr	October 2015	March 2016
Submission of Draft EIA Report for client review	22 March 2016	29 March 2016
Circulation of Draft EIA and EMPr for I&AP comment (40 days and 60 days for DWS)	Early April 2016	End May 2016
Compilation of Final Report (incorporating authority comments)	02 June 2016	21 June 2016
Submission of Final EIA Report for client review	23 June 2016	30 June 2016
Circulation of Final Scoping for I&AP comment (21 days)	04 July 2016	25 July 2016
Submission of Final EIA Report to EDTEA for decision	28 July 2016	28 July 2016
EDTEA Acceptance of report (within 60 days of submission)	28 July 2016	22 September 2016
EDTEA issuing of licence and environmental authorization (within 45 days of accepting the report)	22 September 2016	07 November 2016

12. CONCLUSION AND RECOMMENDATIONS

It is concluded that, at this stage of the assessment, the proposed Newcastle General Waste Landfill Site will have a major contribution in improving waste management in the area of Newcastle and that it will result in temporary and permanent employment opportunities for the local communities.

The EMPr which will be included in the Draft EIA report will offer management and mitigation measures for any potential negative impacts arising as a result of the proposed development, specialist studies will confirm the exact positive and negative impacts likely to be associated with the development.

The EAP therefore considers the information available in this report as sufficient to make an informed decision for the proposed development to proceed to the EIA Phase, where significant additional information on the site will be collected in the form of the specialist studies.

Prepared by:



Nokukhanya Gasa

APPENDIX A
EDTEA ACKNOWLEDGEMENT OF RECEIPT



edtea

Department :

Economic Development, Tourism and
Environmental Affairs

PROVINCE OF KWAZULU-NATAL

Enquiries: Ms Z. Mbanjwa
Imibuzo :
Navrae :

Telephone: 035 7806765
Ucingo :
Telefoon :

Private Bag : X1048
Isikhwama Seposi : Richards Bay
Privaat Sak : 3900

Reference: DC25/WML/0002/2014
Inkomba : KZN/WASTE/0000213/2014
Verwysing:

Fax : 035 789 0662
iFeksi :
Faks :

Date :
Usuku : 17/11/2014
Datum :

Fax Transmission

Geomeasure Group (Pty) Ltd
P.O. Box 1194
Hillcrest
3650

Attention: Ms Nokukhanya Gasas

Fax no: 031 765 1935

Dear Sir / Madam

DC25/WML/0002/2014: KZN/WASTE/0000213/2014: ACKNOWLEDGEMENT OF APPLICATION FOR THE WASTE MANAGEMENT LICENCE FOR THE NEWCASTLE LANDFILL ESTABLISHMENT.

The application for variation of an existing waste management license for the abovementioned waste management activity, submitted in terms of the requirements of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), was received by this Department on **29/09/2014**.

1. This application has been assigned the reference number **DC25/WML/0002/2014: KZN/WASTE/0000213/2014**: .Kindly quote this reference number in any future correspondence in respect of this application.
2. Enquiries regarding this application may be directed to the Assistant Manager: Pollution & Waste Component: **Mr. S. Mgaga. Tel No: 034 315 3936 Fax No: 034 312 9983 Amajuba District Office.**

Yours sincerely

for: Head of Department:

KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs

cc: Mrs Simphiwe Dube: Newcastle Municipality: Fax: 034 328 3493.



edtea

Department :
Economic Development, Tourism and
Environmental Affairs
PROVINCE OF KWAZULU-NATAL

Enquiries : **Ms Z. Mbanjwa**
Imibuzo :
Navrae :

Telephone: **035 7806765**
Ucingo :
Telefoon :

Private Bag : **X1048**
Isikhwama Seposi : **Richards Bay**
Privaat Sak : **3900**

Reference: **DC25/0007/2014**
Inkomba : **KZN/EIA/0001707/2014**
Verwysing:

Fax : **035 7890662**
iFeksi :
Faks :

Date :
Usuku : **17/11/2014**
Datum :

Fax Transmission

Geomeasure Group (Pty) Ltd
P.O. Box 1194
Hillcrest
3650
Attention: Ms Nokukhanya Gasas


Fax no: 031 765 1935

Dear Sir / Madam

DC25/0007/2014: KZN/EIA/0007/2014 ACKNOWLEDGEMENT AND ACCEPTANCE OF APPLICATION FOR ENVIRONMENTAL AUTHORIZATION SUBJECT TO SCOPING AND ENVIRONMENTAL IMPACT REPORT FOR **NEWCASTLE LANDFILL ESTABLISHMENT.**

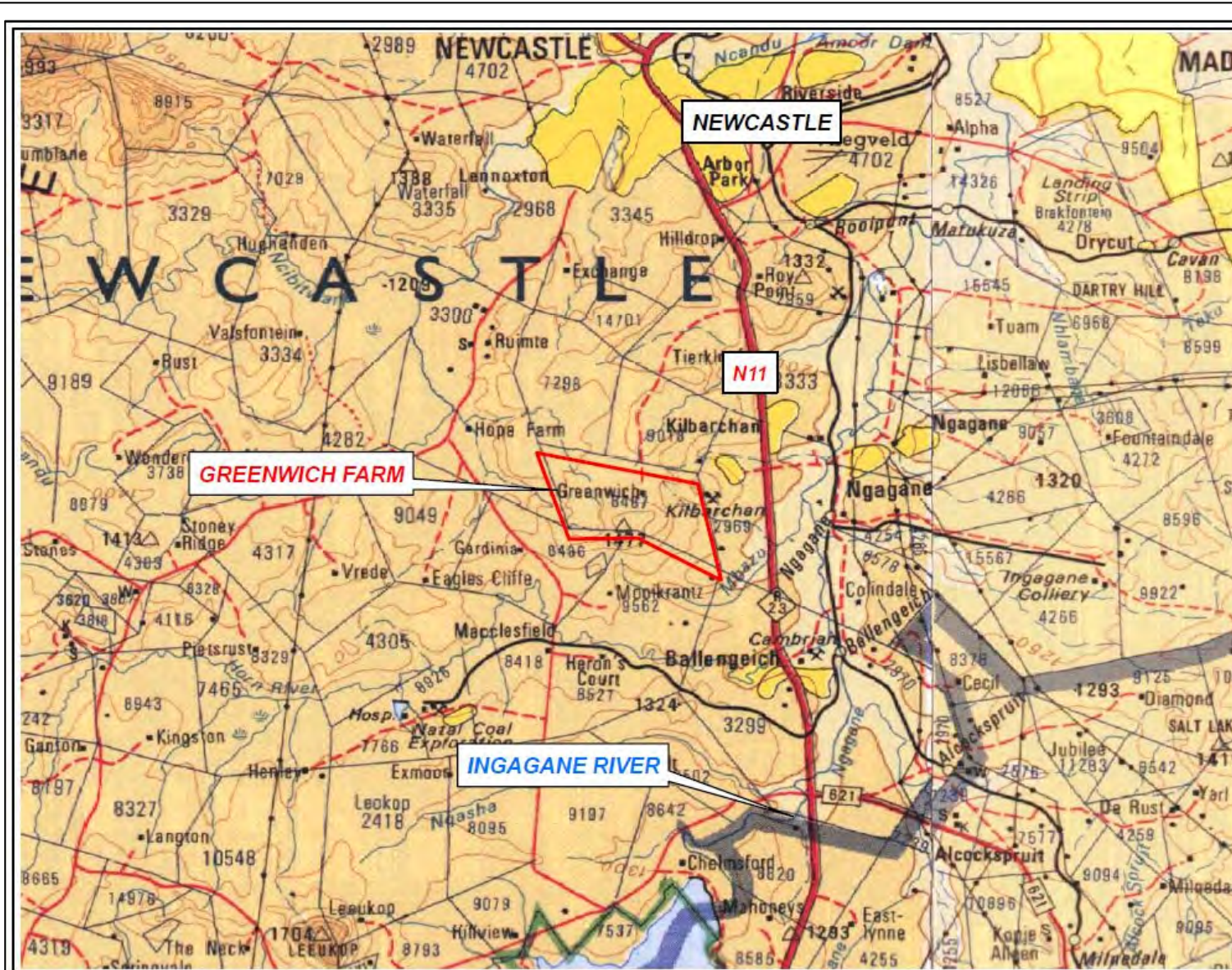
1. The abovementioned application for environmental authorization in terms of the requirements of regulations 12(1) and 26(a) of the Environmental Impact Assessment Regulations, 2010, was received by this Department on **29/09/2014**.
2. This application has been accepted by this Department and assigned the reference number **DC25/0007/2014: KZN/EIA/0001707/2014**. Kindly quote this reference number in any future correspondence in respect of this application.
3. Please note that the activity/ies applied for may not commence prior to an environmental authorization being granted by this Department.
4. Enquiries regarding this application may be directed to the Assistant Manager: Impact Assessment: **Mr. P. Moodley** Tel No: 034 315 3936 Fax 034 312 9986 No: Amajuba District Office.

Yours faithfully


For: Head of Department:

KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs
cc: Mrs Simphiwe Dube: Newcastle Municipality: Fax: 034 328 3493

APPENDIX B
MAPPING



1 : 250 000 Digital Coverage from Chief Director: Surveys and Mapping

LEGEND:



GEOMEASURE GROUP
Groundwater & Environmental Consultants

Unit 3 Burnside Office Park, 1 Builders Way, Hillcrest (3610)
 Tel: (031) 765 1900 Fax: (031) 765 1935

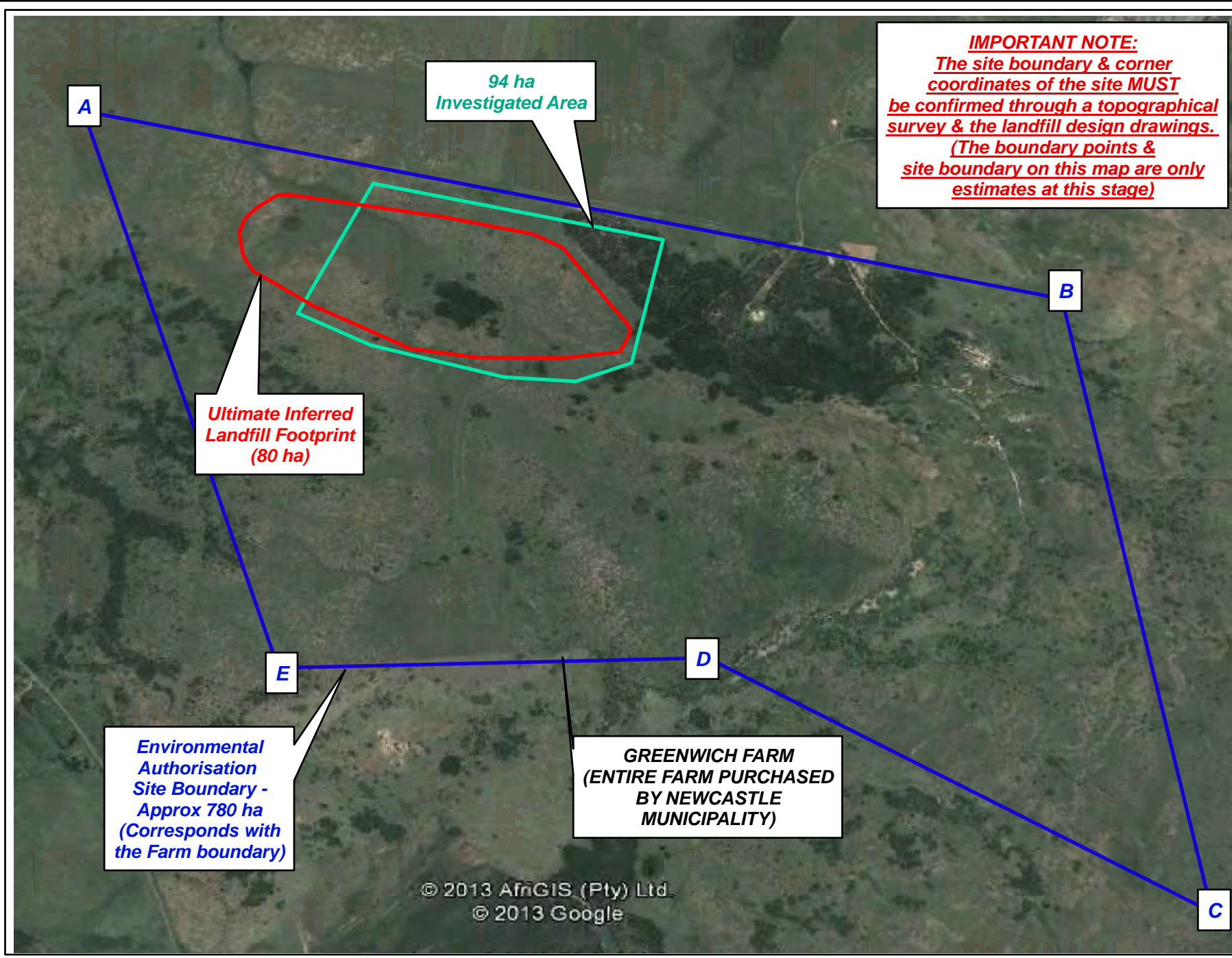
PROJECT:

NEWCASTLE GENERAL WASTE LANDFILL EIA

TITLE:

LOCALITY PLAN

APPENDIX 7



IMPORTANT NOTE:
The site boundary & corner coordinates of the site MUST be confirmed through a topographical survey & the landfill design drawings. (The boundary points & site boundary on this map are only estimates at this stage)

Legend:

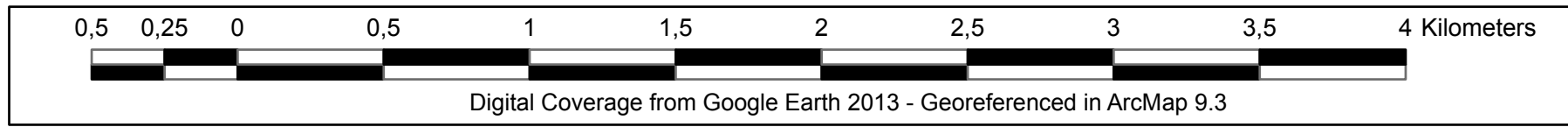
-  Ultimate Inferred Landfill Footprint (80 ha)
-  Investigated Area (94 ha)
-  Environmental Authorisation area



NEWCASTLE CANDIDATE LANDFILL SITE ENVIRONMENTAL AUTHORISATION

SITE PLAN SHOWING AREA FOR ENVIRONMENTAL AUTHORISATION

DWG NO. 2012/328 ENVIRONMENTAL AUTH



APPENDIX C
PUBLIC PARTICIPATION DOCUMENTATION

NEWSPAPER ADVERTS

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The Regional Director
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Durban Central

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Job assist. 508 Smith
St. ☎ 031-3069880

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secretary, reception-
ist, cashiers, IT staff,
book keepers, IT staff,
Datacapturer, com-
puter operators, call
center agents wanted
by major company.
email to rankpo@
gmail.com, or deliver
to 356 Smith St, Denor
House 10th flr, Durban
☎ 0316388147/48

ST ANDREWS STR.

Bath - furnished or
unfurnished in well
maintained building.
R2850 Incl water.
Pre-paid elec.
Suitable for couple of 2
people.
☎ Priscilla/Pearl
031-3017017

UMLAZI

2 Bedrooms with
aluminium windows,
fully tiled.
R374 000
☎ Thamba Msomi
031-3053270
0833-553136

**DoObest
PROPERTY GROUP**

Uma Udayisa umuzi
wako eMlazi
KwaMashu, Lamont
Chesterville, Ntuzuma
Inanda, Lovu, Dabeka
Ndengezi Phoenix
Pinetown etc

☎ 031-3013926

**RESTORATION GFCC
PLEASE TAKE NOTICE** that
STEPHEN OBETA, intends
making an application to the
commissioner at CIPC for
the restoration of TALK
TECH, registration number
CK2000/01537/23
PLEASE TAKE NOTICE
Further there are any
objections to this
application, all objections
must be lodged to the
commissioner at the CIPC
offices within 21 days of
the date of publication.
NAME OF APPLICANT:
STEPHEN OBETA

SAHARA Firearm Train-
ing SAPS 10000689
competency and secur-
ity Officers R900. 16th
Floor Commercial
City, Dbn. ☎ 031-3010449

SECURITY GUARDS
Required. Must be
PSHA registered. Must
live in and around
KwaMashu.
☎ 031 811 6505

**For all
RECRUITMENT
ADVERTISING**
☎ (031) 3082004
kzn.classifieds@inl.co.za

**ISAZISO SOKUFAKWA KWESICELO SELAYISENSI
YOKWAKHWA KWENDAWO YOKULAHLA UDOTTI**

Ukwakhiwa kwendawo yokulahlwa kwadoti
endaweni yase Newcasttle ngaphansi kwa-
masipala i-Newcasttle Local Municipality ethol-
akala KwaZulu Natal

EIA Reference: DC25/0007/2014
WML Reference: DC25/WML/0001/2014

UMLAZI

3 Beds, lounge & dining;
Fitted kitchen, Garage &
fenced. Beautiful house
in Good area.
☎ Siba Ababa
082 551 7728
031-529 2813
Salmon Grove Chemists
107 Smith Street
Phone face value 1004

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R348 000, Lomaspark
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611 Computer/IT

711 Public Notices

711 Public Notices

715 Tenders

715 Tenders

715 Tenders

DTP OPERATOR

Experienced Desk Top Publisher required for the Flexographic industry. Must be fluent in both Adobe Illustrator CS6 and Photoshop. Must have sufficient knowledge in Flexographic printing and able to work under pressure and with unreasonable deadlines. No chancers please. Please fax to email: 0866 503 668.

PUBLIC NOTICE ABNORMAL LOAD

Notice is hereby given that the company Vanguard Rigging (Pty) Ltd intends transporting 1 x 230t Generator load by means of a 20 axle multi-axle trailer combination from Richards Bay to Shaka's Kraal via the R102 from the 22 October 2014. The load will be under police escort and the estimated travel time in KZN will be 3 days.

613 Drivers

DRIVERS req. urgently. Must have own reliable vehicle, must be ex police / military & be able to converse in Afrikaans. Licensed firearm an advantage. Contact 0824979278.

711 Public Notices

711 Public Notices

NOTICE OF APPLICATION FOR A WASTE MANAGEMENT LICENCE AND ENVIRONMENTAL AUTHORISATION

Newcastle General Waste Landfill Establishment, Newcastle Local Municipality, KwaZulu Natal
EIA Reference: DC25/0007/2014
WML Reference: DC25/WML/0001/2014

Notice is hereby given that an application for a Waste Management Licence (WML) and Environmental Authorisation in terms of Section 24L of the National Environmental Management Act, 1998 (Act No. 107 of 1998) has been lodged with the KZN Department of Economic Development, Tourism and Environmental Affairs

Project details: Newcastle Local Municipality is applying for a Waste Management Licence as well as Environmental Authorisation for the establishment of the Newcastle General Waste Landfill Site to be located within the area of Newcastle, KwaZulu Natal. The landfill is proposed to be located on a portion of the Farm Greenwich 8784.

An application for a Waste Management Licence and Environmental Authorisation has been lodged with the KZN Department of Economic Development, Tourism and Environmental Affairs. The assigned reference numbers are DC25/0007/2014 for environmental authorisation and DC25/WML/0001/2014 for the waste management licence application.

If you would like more information on the proposed development or to be registered as an interested and affected party (I&AP), please contact Nokukhanya Gasa by fax or email (contact details below) before the 05th November 2014.
Geomeasure Group
PO Box 1194
Hillcrest
3650
Tel: 031 765 1900
Fax: 031 765 1935
Email: khanya@geomeasuregroup.co.za
DATE OF NOTICE : 21 OCTOBER 2014

614 Education & Training

GOEZACK WELDING AND OPERATOR TRAINING



Welding courses
Arc, CO2, flux core, gas, stick & argon welding, boiler making, Mig, Tig Coated
Over Machine 5-10 days
Forklift, grader, tower crane, TLB, excavator, bulldozer, CCTV, DSTV, Container Handler. We Offer Job Assistance. We offer Certificates + Renewal of Certificates. Obn / Jhb / Newcastle / Vryheid / Emp / Pmb
+ Driving School Code 8-14
031-8367356 / 0764130080

620 General

CARPET CLEANING SUPERVISOR REQ

No exp necessary. Full training provided. Own vehicle essential. Tel 031-5636066.

LADIES REQUIRED

Smart, attractive, well spoken ladies for Massage Parlor. No exp needed. 071 807 8310

LOOKING FOR A JOB??

DO NOT deposit any money into an advertiser's account when responding to advertisements in the hope of securing a job as advertisers are obliged to stipulate pre payment in their adverts

644 Technical

644 Technical

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DO NOT deposit any money into an advertiser's account when responding to advertisements in the hope of securing a job as advertisers are obliged to stipulate pre payment in their adverts



TENDER NOTICE
RFP NUMBER: 11-14-DURBAN-001-087

FOR THE: DESIGN, SUPPLY, INSTALLATION AND COMMISSIONING OF 1. 2 OFF 1550 CFM ROTARY SCREW COMPRESSORS, 2. 1040 CFM ROTARY SCREW COMPRESSOR AND 3. 2 OFF 10485M3 AIR RECEIVERS WITHIN TRANSNET ENGINEERING, DURBAN

CIDB GRADING OF 3ME AND HIGHER
Transnet Engineering, a division of Transnet (SOC) Ltd invites all interested parties to respond to the abovementioned RFP. The RFP documents may be inspected and obtained on and after 21 October 2014 from the Main Admin Building at 311 Solomon Mahiangu Drive Rossburgh Durban during the office hours of 08H00 to 15H00 on weekdays. RFP documents will only be available until 29 October 2014. No Tender Documents will be available on the day of the Site Meeting.

A specimen copy of the RFP will be made available for viewing ONLY at <http://www.transnetengineering.net/Supply/Pages/What's-out-for-tender.aspx>
For enquiries regarding collection of the RFP, please contact Zandi Khalishwayo 031 361 4206 and email Zandi.Khalishwayo@transnet.net OR Lindy van Zyl 031 361 5328 and email lindy.vanzyl@transnet.net
Please note: These documents will be free of charge and all copies will be controlled and registered. Responses, other than those submitted against a controlled issue, will be disqualified.

A compulsory RFP briefing session will be held on 30 October 2014 at 09H00, only designated personnel must attend the site briefing. An appointment letter must be signed at the briefing and returned with the RFP. Details of the briefing session are contained in the RFP documents.

Transnet support the government objective such as the New Growth Path, which seeks to promote the development of suppliers within the city of operation (Rural Integration and Regional Development).

This RFP shall close punctually at 10H00 am, South African Time on Tuesday 11 November 2014 in the tender box located at 160 Lynette Street, Kilner Park, Pretoria

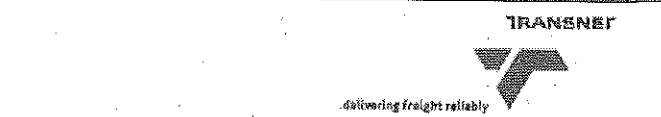
Transnet urges Clients, Suppliers and Service Providers to report any acts of fraud and/or instances of corruption to Transnet's TIP-OFFS ANONYMOUS on 0800 003 056 or Transnet@tip-offs.com.

freight rail engineering pipelines port terminals national ports authority
Facebook.com/Transnet.SOC.Ltd @follow_transnet www.transnet.net

715 Tenders

715 Tenders

715 Tenders



TENDER NOTICE
RFP NUMBER: 11-14-DURBAN-001-088

FOR THE: DESIGN, MANUFACTURING, SUPPLYING, DELIVERING, TESTING AND COMMISSIONING OF 80 X 40 TON LOCOMOTIVE STANDS (ELEPHANT FEET TYPE) FOR LOCOMOTIVE BUSINESS WITHIN TRANSNET ENGINEERING, DURBAN

CONVENTIONS:

The successful Project Manager/Implementing Agent will be required to undertake all designs, approvals and the implementation of the IDP programme and related infrastructure programme to the satisfaction of the Municipality.

Proposals must be submitted in a sealed envelope clearly marked: **"PROPOSALS OF SUITABLY QUALIFIED SERVICE PROVIDERS TO RAISE FUNDS FOR TOWN DEVELOPMENT I, PROPOSAL NO: 13/09/2014"**. Must be deposited into the tender box situated at the reception area of Danuabuse Municipal offices. Proposals should be received no later than **12H00 on Thursday, 13 November 2014**, where after bids will be opened in public. **Late, emailed or faxed bids will not be accepted**. Any enquiries with regards to the above may be directed to the Manager Technical Services, Mr. M Nene at 08 church Street or telephonically on 034- 621 2866 Ext: 12819 during working hours, between 07H30 and 16H00 with lunch interval from 13H00 to 13H30, Monday to Friday.

W.B. Nkosi
Municipal Manager ©-DS07367RDT
TENDER NUMBER: 13/09/2014

PAID IN FULL

We like this stamp. So do you. But.....

When paying accounts by direct deposit or internet banking, please use your Account Number as a reference. **Otherwise, we will not know who to stamp.**

NOTICE OF APPLICATION FOR A WASTE MANAGEMENT LICENCE AND ENVIRONMENTAL AUTHORISATION

Newcastle General Waste Landfill Establishment,
Newcastle Local Municipality, KwaZulu Natal

EIA Reference: DC25/0007/2014
WML Reference: DC25/WML/0001/2014

Notice is hereby given that an application for a Waste Management Licence (WML) and Environmental Authorisation in terms of Section 24L of the National Environmental Management Act, 1998 (Act No. 107 of 1998) has been lodged with the KZN Department of Economic Development, Tourism and Environmental Affairs

Project details: Newcastle Local Municipality is applying for a Waste Management Licence as well as Environmental Authorisation for the establishment of the Newcastle General Waste Landfill Site to be located within the area of Newcastle, KwaZulu Natal. The landfill is proposed to be located on a portion of the Farm Greenwich 8784.

An application for a Waste Management Licence and Environmental Authorisation has been lodged with the KZN Department of Economic Development, Tourism and Environmental Affairs. The assigned reference numbers are DC25/0007/2014 for environmental authorisation and DC25/WML/0001/2014 for the waste management licence application.

If you would like more information on the proposed development or to be registered as an interested and affected party (I&AP), please contact Ndikukhanya Gasa by fax or email (contact details below) before the 07th November 2014.

Geomeasure Group
PO Box 1194
Hillcrest
3650
Tel: 031 765 1900
Fax: 031 765 1935
Email: khanya@geomeasuregroup.co.za
Date of Notice: 24 October 2014

©-DS073752RDT



Newcastle Municipality



Notice No. CS 88/2014

SMALL BUSINESS WEEK

The Newcastle Municipality in partnership with SEDA and the Department of Economic Development and Tourism invites you to the annual **Newcastle Small Business Week 2014**

The Newcastle Small Business Week is a four day event and is planned as follows:

Nav one 28 October : Mining and Manufacturing

5073555RDT

Call Cherry!
to place your
Legal, Tenders, Public Notices,

Cancellat

CANCELLATION OF NUMBER GSM 13/0 FOR HOTEL ACCOM

CANCELLATION OF REQUEST FOR PROVISION OF HOTEL ACCOMMODATION FOR BUSINESS RELATED TRAVEL FOR A FURTHER ONE (1) YEAR

Transnet has taken a decision to cancel the contract and will be refunding the

BACKGROUND INFORMATION DOCUMENTS

PROPOSED CONSTRUCTION OF THE NEWCASTLE GENERAL WASTE LANDFILL SITE, NEWCASTLE LOCAL MUNICIPALITY

Background Information Document

October 2014

Purpose

The purpose of this document is to:

- Inform Interested and Affected Parties (I&APs) about the proposed project
- Provide brief background details and purpose of the proposed project
- To offer I &APs an opportunity to register and comment/raise any issues relating to the proposed development

Background

The Newcastle Municipality is under significant pressure to construct a new landfill site in the area due to the existing landfill site rapidly reaching the end of its design life. This is due to the closure of the Madadeni and Osizweni Landfill Sites by the Department of Water Affairs (DWA – previously known as DWAF) as a result of non-compliance with the Minimum Requirements for Solid Waste Disposal. This event resulted in an influx of solid waste to the existing landfill site, which in turn further reduced its anticipated design life.

Consequently, a regional site is urgently required for the disposal of domestic, commercial and non-hazardous waste. According to the Newcastle Municipality Integrated Development Plan (IDP), the municipality has initiated a process towards the identification and establishment of a new landfill site, whilst simultaneously addressing the closure and rehabilitation of the existing site.

The proposed landfill site will ensure that waste is properly disposed, minimising the existence of illegal dumping, especially in informal areas where there are usually limited refuse removal services.

Trigger activities

Geomeasure has been appointed by Envitech Solutions (representing the Newcastle Local Municipality) to carry out an Environmental Impact Assessment which will be undertaken as per the 2010 EIA Regulations issued in terms of section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA").

The application triggers the requirement for a waste management licence which will be undertaken following the requirements of EIA processes as per the requirement for listed activities under Category B of Section 20(b) of the National Environmental Management: Waste Act, 2008 (No. 59 of 2008), Activity (8) and (10) i.e.:

(8) *“the disposal of general waste to land covering an area in excess of 200 m² and with a total capacity exceeding 25 000 tons”*

(10) *“The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity)”*

The proposed development also triggers Category A and Category C of the waste management listed activities:

Category A (3) “ the recycling of general waste at a facility that has an operational area in excess of 500m², excluding recycling that takes place as an integral part of an internal manufacturing process within the same premises”.

Category C (5) “the extraction, recovery or flaring of landfill gas”.

In addition to the waste management licence, the development will also require environmental authorisation for the construction of the landfill access road. Therefore activity 22 of Listing Notice 1 (R544) of the 2010 EIA Regulations is triggered:

(22) *The construction of a road, outside urban areas,*
(i) with a reserve wider than 13,5 meters or,
(ii) where no reserve exists where the road is wider than 8 metres, or
(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.

EIA Process

The application will consist of two phases, namely Scoping and EIA. The Scoping phase will identify I&APs, discuss potential impacts (positive and negative), identify project alternatives which will be explored during the EIA phase as well as identify specialist studies that will be undertaken during the second phase of the project.

I&APs will be given the opportunity to be part of the process from the early stages of the project, hence achieving transparency and sharing of ideas. All reports generated as part of the EIA process will be available for comment by relevant stakeholders before being submitted to the KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA) for review and comment.

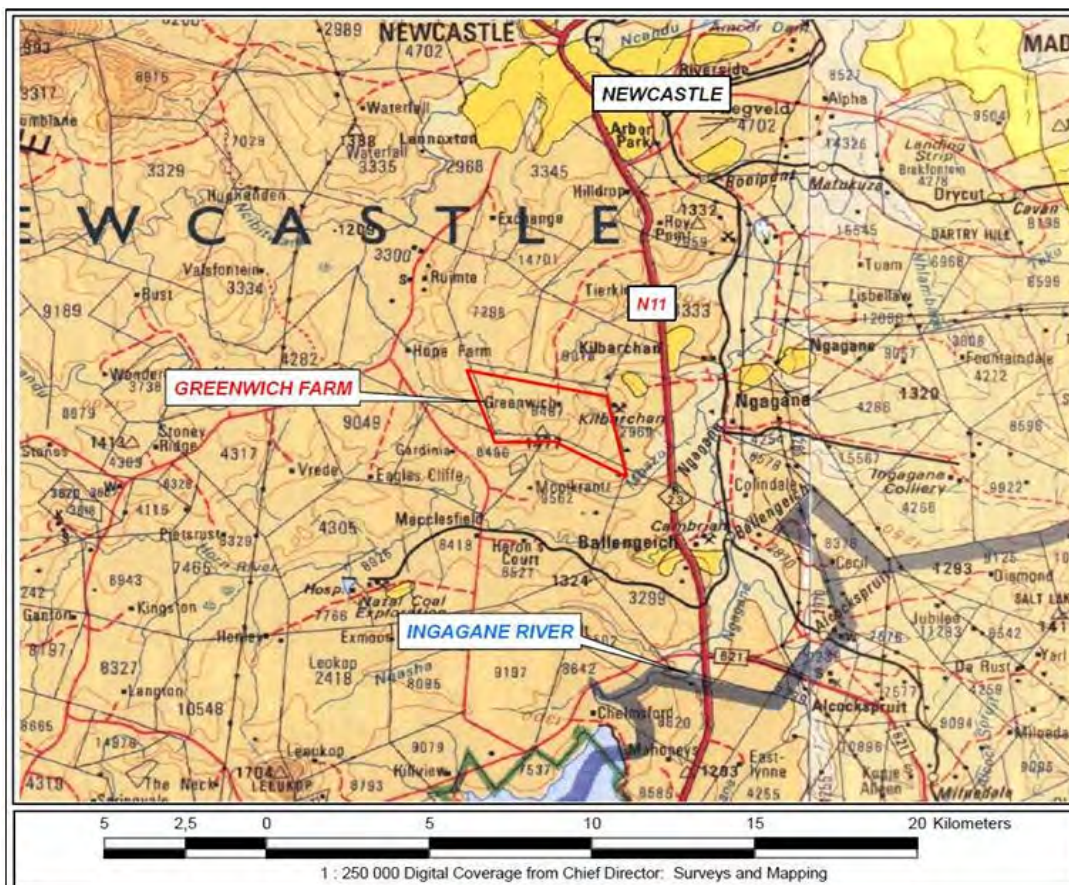
Regular consultation with EDTEA will be maintained to ensure that environmental legislation and regulations are complied with throughout the process.

Continuous consultation with all Interested and Affected Parties (neighbours, NGOs, local conservancies, authorities, public etc.) and assessment of all potential environmental impacts associated with the development will be undertaken as part of the whole assessment process.

Where

The proposed general waste landfill site is to be established within the province of KwaZulu Natal on vacant land in the area of Newcastle. The preferred site is located on a portion of the Farm Greenwich 8784 and the proposed footprint of the actual landfilling area is 80 hectares.

Site coordinates are 27° 50'53.6" S and 29° 55' 12.2" E and the site is located approximately 11 km south of Newcastle Local Municipality in the Amajuba District Municipality of KwaZulu Natal (KZN) (see figure below).



Receiving Environment

The farm Greenwich, on which the proposed candidate landfill site is located, varies in altitude from 1300 m to 1470 m AMSL. Drainage occurs radially away from a central high located in the southern portion of the site, whilst the topography varies from gently to moderately undulating.

The soils in the study area are derived from weathering of the underlying geology, with the outcrops of Quaternary Sands along river beds the most recent addition to the soil profile.

With respect to vegetation and bioclimatic zones, the region falls into the transition between the Sour Sandveld and Tall Grassland zones. The vegetation varies from fine Kakuei grasses to scattered shrubs and small trees, which generally resembles a savannah landscape.

Key stakeholders identified:

KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA)
Department of Water and Sanitation (DWS)
Newcastle Local Municipality
Amajuba District Municipality
KZN Department of Health
Ezemvelo KZN Wildlife
WESSA
KZN Department of Cooperative Governance and Traditional Affairs
Department of Transport
AMAFA
Neighbouring landowners

Next step in the process:

A two week registration period will be allowed for individuals to formally register their full details and thereafter a public meeting will be scheduled in order to discuss the proposed development in detail and further offer the opportunity for interested and affected parties to express their issues and concerns regarding the proposed landfill site.

**ISICELO KOKWAKHIWA KWENDAWO YOKULAHLA IMFUCUZA ENDAWENI YASE
NEWCASTLE, NGAPHANSI KWAMASPALA OBIZWA NGE- NEWCASTLE
MUNICIPALITY**

Iphapha elasiza kabanzi ngesicelo

Okthoba 2014

Inhloso yokubhalwa kwaleliphepha

Leliphepha lihlose lokhu okulandelayo:

- Ukwasiza kabanzi amalunga omphakathi neminyango ka Hulumeni ngaloku okuhlongozwayo endaweni lapho kuzokwakhiwa khona indawo yokulahlwa imfucuza;
- Ukunikeza ulwazi olufingqiwe ngesicelo esifakwe emnyangweni wezeMvelo wakwaZulu Natali;
- Ukunikeza umphakathi nabanye abanesifiso sokwazi kabanzi ngalesi siphakamiso sendawo yokulahlwa kwemfucuza kanye nokuthi kube nethuba lokuthi babeke imibono yabo noma babuze imibuzo lapho bengacaciselekile khona.

Isindlalelo

Umasipala wasendaweni yase Newcastle ubhekane nenkinga enkulu mayelana nendawo yokulahlwa kwemfucuza, lokhu kuphoqa ukuthi kwakhiwe indawo entsha ezokwazi ukufeza lesi sidingo. Indawo yokulahlwa kwadoti ekhona manje isiya ngokuya iphelelwa yisikhathi, lokhu kudalwe nawukuvalwa kwamasayithi ase Madadeni kanye nasendaweni eyaziwa ngokuthi I Osizweni, umnyango wezaManzi wavala lezi zindawo zemfucuza ngenxa yokuhluleka kwazo ukulandela imithetho ebekiwe ephatheleni nokuphathwa kwemfucuza.

Konke lokhu sekudale ukuba kube nodoti omningi olahlwa kulendawo yemfucuza esasebenza nokuyenza igcwale ngokushesha.

Ngenxa yalokhu, indawo yemfucuza ezothatha imfucuza yesifundazwe idingeka ngokushesha. Ngokwezinhlelo zikamasipala wase Newcastle, uMasipala usuqale uhlelo lapho kubhekwa khona indawo efanele ukuthi kungakhiwa kuyo lendawo, ngesikhathi sinye kuzoba nezinhlelo ezifanele zokuvala kanye nokulingisa kwalendawo yokulahlwa kwadoti esizogcwala.

Lendawo ehlongozwayo izosiza ukuba udoti ulahlwe ngendlela, kwehliseke nezinga lokulahlwa kwadoti ngokungemthetho ikakhulukazi ezindaweni ezingenazo izinsiza zokulandwa kwadoti uyolahlwa endaweni efanele.

Isicelo esifakiwe

I Geomeasure Group icelwe yi Envitech Solutions (emele uMasipala wase Newcastle) ukuba kwenziwe izicelo ezifanele emnyangweni wezeMvelo wakwa Zulu Natali ukuze indawo ehlongozwayo ivunyelwe ukube yakhiwe nokuthi isebenze ngokusemthethweni. Isicelo semvume ngokwezemvelo sizokwenziwa ngaphansi komthetho owaziwa ngokuthi ama 2010 EIA Regulations akhishwa ngokwa Section 24(5) womthetho obhekelele ukuphathwa nokuvikelwa kwemvelo owaziwa ngokuthi i- National Environmental Management Act, 1998 (Act No. 107 of 1998) (“NEMA”).

Lesi sicelo siding ukuba kutholakale I layisensi yokuphathwa kwadoti (waste licence) ezokhishwa ngumnyango wezeMvelo wakwaZulu Natali, ukufakwa kwesicelo kuzokwenziwa ngokulandela imithetho yama 2010 EIA Regulations, njengokusho kwa Category B womthetho wokunganyelwa kwadoti owaziwa nge National Environmental Management: Waste Act.

Ngaphansi kwalomthetho, ilisti yemisebenzi ephathelene nodoti iveza ukuthi lesi sicelo sithinta u namba 8 kanye no10:

(8) ‘Ukulahlwa kwemfucuzwa endaweni engaphezulu kwama square mitha angamakhulu amabili 200m² nenani likadoti elingeqi amathani angu 25 000’

(10) ‘Ukwakhiwa kwendawo yokuphathwa kwadoti ebhalwe ku Category B welisti yemisebenzi ephathelene nodoti’

Lokukwakhiwa kwendawo yadoti kuphinde kuthinte u Category A kanye no Category C welisti ekukhulunywe ngayo ngaphezulu, nalapho kuthinteka ukusetshenziswa kabusha kwezinye izinhlobo zikadoti Kanye nokutholwa kwegesi (gas) ekhiqizeka nguwo udoti olahliwe.

Ngaphezu kwesidingo selayisensi, loku okuhlongozwayo kuphinde kudinge imvume emnyangweni wezeMvelo njengoba kuzokwakhiwa umgwaqo ozosetshenziswa izimoto ezizobe zingena kulendawo yokulahla imfucuzwa.

Okuzokwenziwa ngaphansi kwalesi sicelo

Lesi sicelo sizoba nezigaba ezimbili, isigaba sokuqala esaziwa nge Scoping sizothola ukuthi ngobani abanesfiso sokubhalisa ukuze bathole ulwazi ngale projethi, sizophinde sibheke imiphumela okungenzeka ibe khona uma lendawo isiyakhiwa noma isisebenza, izindlela ezahlukile zokubhekana nokulahlwa kwadoti nokuphathwa kwawo nazo zizobhekwa.

Amariphothi azobhalwa azotholakala ukuze umphakathi nabanye abafisa ukuwafunda bawathole bese bebeka imibono ngokubhaliwe kuwo, loku kuzokwenziwa ngaphambi kokuba lemiqingo ihanjise emnyangweni wezeMvelo nokuwuwo ozokhipha isinqumo sokugcina.

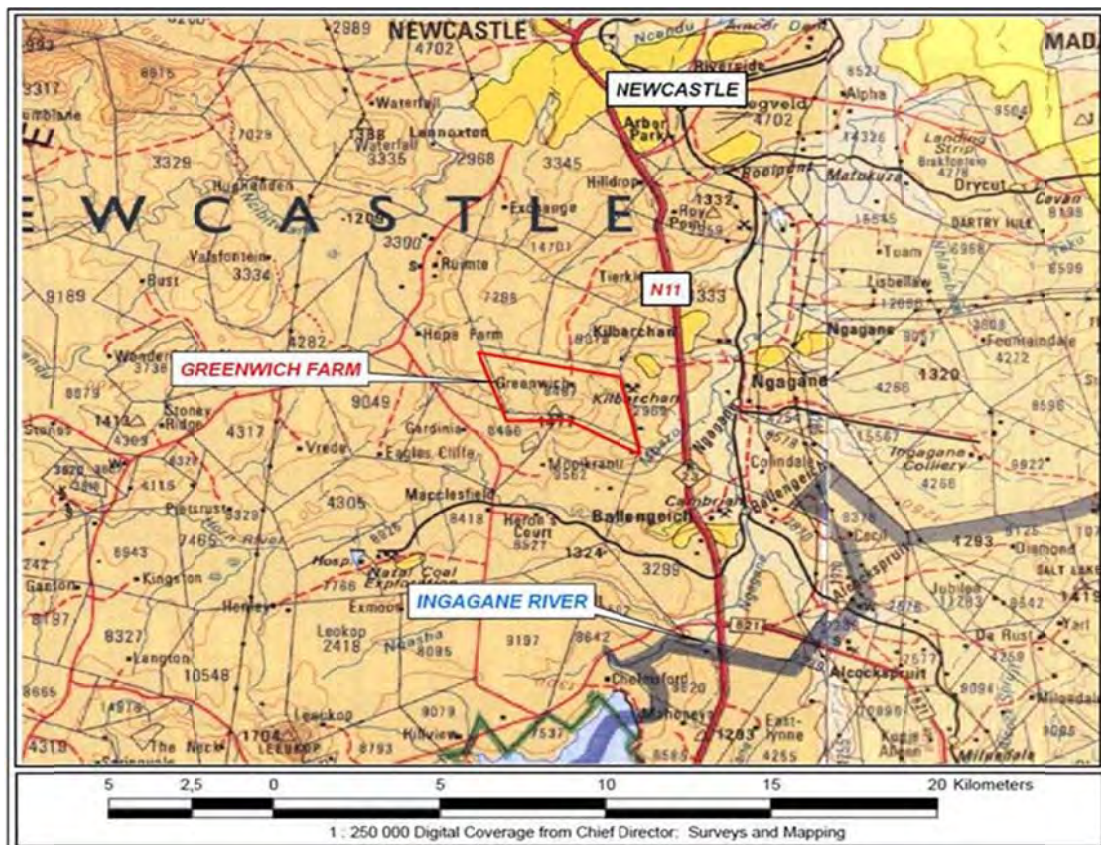
Ukuxhumana kwanjalo neminyango ka Hulumeni kuzokwenziwa, loku kuzofeza ukuba yonke imithetho ilandeleke ngendlela kuze kufike ekugcineni.

Loku kuhlolwa kwesimo semvelo kanye nemiphumela engabakhona kuzobe kudingidwa ngokuvulelekile phakathi kwemiphakathi ethintekayo, abathanda ukuzibandakanya nale projethi, abavikeli bezemvelo kanye nabeminyango kaHulumeni.

Kuphi?

Indawo yokulahla imfucuzo ehlongozwayo itholakala lapha esifundazweni sakwaZulu Natali. Indawo ebonakale ilungele lokwakhiwa yaziwa ngokuthi I Greenwich Farm, udoti uzolahlwa endaweni elinganiselwa kuma hektha angu 80, kuzoba khona nezinye izakhiwo ezizobakhona ezihambiselana nawo lomsebenzi.

Lendawo eqokiwe itholakala kuma coordinate angu 27°50'53.6" S kanye no 29°55'12.2" E, itholakala emakhilomitheni alinganiselwa kwangu 11 ngaseningizumu yendawo yakhona e Newcastle kwaZulu Natali, nasi isthombe ngezansi.



Iminyango ezokwaziswa ngalesi sicelo

Uminyango wezeMvelo wakwaZulu Natal (Department of Economic Development, Tourism and Environmental Affairs)

Uminyango wezaManzi (Department of Water and Sanitation)

Umasipala wase Newcastle

Umasipala omkhulu obizwa nge Amajuba District Municipality

Uminyango wezeMpilo (Department of Health

Ezemvelo KZN Wildlife

WESSA

Uminyango wezamaciko nokuthuthukiswa komphakathi (Department of Cooperative Governance and Traditional Affairs)

Uminyango wezokuthutha (Department of Transport)

Uminyango wezomagugu (AMAFA)

Abanini zindawo eziseduzane

Okulandelayo kulesi sicelo:

Abantu abathanda ukubhalisa ukuze bathole ulwazi olugcwele ngalesi siphakamiso banikezwa isikhathi esingangamasonto amabili ukuba babhalise imininingwane yabo ngokugcwele. Emva kwaloko, kuzokhishwa isimemo somhlangano ukuba kuchazwe kabanzi ngaloku okuhlongozwayo nokuba umphakathi unikezwe ithuba lokuphakamisa uvo lwawo mayelana nalesi sicelo.

SITE NOTICES



SITE PHOTOS

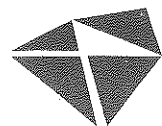


REGISTERED MAIL RECEIPTS

List of REGISTERED LETTERS

Lys van GEREGISTREERDE BRIEWE

(with an insurance option/met 'n versekeringsopsie)



Post Office

Full tracking and tracing/Volledige volg en spoor

Name and address of sender: Gameasure Group
 Naam en adres van afsender: P.O. Box 1194
Hillcrest, 3650



No	Name and address of addressee Naam en adres van geadresseerde	Insured amount Versekerde bedrag	Insurance fee Versekeringsgeld	Postage Posgeld	Service fee Diensgeld	Affix Track and Trace customer copy Plak Volg-en-Spoor-kliëntafskrif
1	S Peterson P.O. Box 369 Newcastle					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RC 029 122 354 ZA CUSTOMER COPY 301028R
2	H J Vosloo PO Box 326 Volksrust					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RC 029 122 368 ZA CUSTOMER COPY 301028R
3	M Mabaso PO Box 288 Utrecht					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RC 029 122 371 ZA CUSTOMER COPY 301028R
4	G Potgieter P O Box 33 Utrecht					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RC 029 122 385 ZA CUSTOMER COPY 301028R
5						
6						
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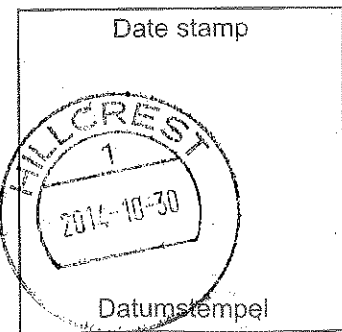
Number of letters posted 4/FOUR Total 4
 Getal briewe gepos 4 Totaal 4

Signature of client [Signature]
 Handtekening van klient [Signature]

Signature of accepting officer
 Handtekening van aanneembeampte

The value of the contents of these letters is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100,00. No compensation is payable without documentary proof. Optional insurance of up to R200,00 is available and applies to domestic registered letters only.

Die waarde van die inhoud van hierdie briewe is soos aangedui en vergoeding sal nie betaal word vir 'n brief wat sonder voorbehoud ontvang word nie. Vergoeding is beperk tot R100,00. Geen vergoeding is sonder dokumentere bewys betaalbaar nie. Opsionele versekering van tot R2 000,00 is beskikbaar en is slegs op binnelandse geregistreerde briewe van toepassing.



List of REGISTERED LETTERS
Lys van GEREGISTREERDE BRIEWE
(with an insurance option/met 'n versekeringsopsie)



Full tracking and tracing/Volledige volg en spoor

Name and address of sender:
 Naam en adres van afsender: Gomeasure Group
P.O. Box 1194
Hillcrest, 3650



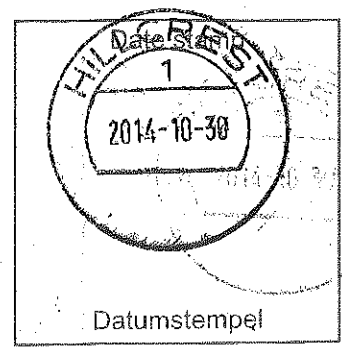
No	Name and address of addressee Naam en adres van geadresseerde	Insured amount Versekerde bedrag	Insurance fee Versekeringsgeld	Postage Posgeld	Service fee Diensgeld	Affix Track and Trace customer copy Plak Volg-en-Spoor-kliëntafskrif
1	M Docest PO Box 23202 Newcastle					REGISTERED LETTER <i>(with a domestic insurance option)</i> ShareCall 0860 111 502 www.sapo.co.za RC 029 122 252 ZA CUSTOMER COPY 30102BR
2	A Burgers PO Box 270 Newcastle					REGISTERED LETTER <i>(with a domestic insurance option)</i> ShareCall 0860 111 502 www.sapo.co.za RC 029 122 266 ZA CUSTOMER COPY 30102BR
3	R.M Adendorfs PO Box 114 Newcastle					REGISTERED LETTER <i>(with a domestic insurance option)</i> ShareCall 0860 111 502 www.sapo.co.za RC 029 122 270 ZA CUSTOMER COPY 30102BR
4	DJ Brown R Bag X6603 Newcastle					REGISTERED LETTER <i>(with a domestic insurance option)</i> ShareCall 0860 111 502 www.sapo.co.za RC 029 122 283 ZA CUSTOMER COPY 30102BR
5	F.R Gonje PO Box 1589 Newcastle					REGISTERED LETTER <i>(with a domestic insurance option)</i> ShareCall 0860 111 502 www.sapo.co.za RC 029 122 297 ZA CUSTOMER COPY 30102BR
6	P Croft PO Box 2234 Newcastle					REGISTERED LETTER <i>(with a domestic insurance option)</i> ShareCall 0860 111 502 www.sapo.co.za RC 029 122 306 ZA CUSTOMER COPY 30102BR
7	L. Bosman PO Box 20194 Newcastle					REGISTERED LETTER <i>(with a domestic insurance option)</i> ShareCall 0860 111 502 www.sapo.co.za RC 029 122 310 ZA CUSTOMER COPY 30102BR
8	J Phillips P.O BOX 2500 Newcastle					REGISTERED LETTER <i>(with a domestic insurance option)</i> ShareCall 0860 111 502 www.sapo.co.za RC 029 122 323 ZA CUSTOMER COPY 30102BR
9	H. van Wiellieh PO Box 761 Newcastle					REGISTERED LETTER <i>(with a domestic insurance option)</i> ShareCall 0860 111 502 www.sapo.co.za RC 029 122 337 ZA CUSTOMER COPY 30102BR
10	P O Box 2320 Newcastle					REGISTERED LETTER <i>(with a domestic insurance option)</i> ShareCall 0860 111 502 www.sapo.co.za RC 029 122 345 ZA CUSTOMER COPY 30102BR
Number of letters posted Getal briewe gepos		Total Totaal	R	R	R	R

Signature of client
 Handtekening van kliënt [Signature]

Signature of accepting officer
 Handtekening van aanneembeampte _____

The value of the contents of these letters is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100,00. No compensation is payable without documentary proof. Optional insurance of up to R200,00 is available and applies to domestic registered letters only.

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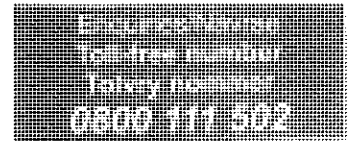


List of REGISTERED LETTERS
Lys van GEREGISTREERDE BRIEWE
(with an insurance option/met 'n versekeringsopsie)



Full tracking and tracing/Volledige volg en spoor

Name and address of sender: Gameasure Group
 Naam en adres van afsender: P.O. Box 1194
Hillcrest, 3650



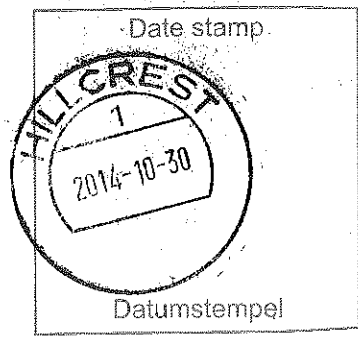
No	Name and address of addressee Naam en adres van geadresseerde	Insured amount Versekerde bedrag	Insurance fee Versekeringsgeld	Postage Posgeld	Service fee Diensgeld	Affix Track and Trace customer copy Plak Volg-en-Spoor-kliëntafskrif	
1	G.S. Grobler PO Box 21369 Newcastle					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RD 871 411 465 ZA CUSTOMER COPY 301028R	
2	N. Ferriek PO Box 1662 Newcastle					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RC 029 122 164 ZA CUSTOMER COPY 301028R	
3	W. Taggart PO Box 171 Newcastle					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RC 029 122 178 ZA CUSTOMER COPY 301028R	
4	J.H. Serfontein PO Box 756 Newcastle					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RC 029 122 181 ZA CUSTOMER COPY 301028R	
5	C. Cronje PO Box 1589 Newcastle					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RC 029 122 195 ZA CUSTOMER COPY 301028R	
6	L.J. Osthysen PO Box 9253 Newcastle					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RC 029 122 204 ZA CUSTOMER COPY 301028R	
7	R. Muller PO Box 113 Newcastle					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RC 029 122 218 ZA CUSTOMER COPY 301028R	
8	T. Nel PO Box 2 Ingogo					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RC 029 122 221 ZA CUSTOMER COPY 301028R	
9	J.L. Kotze PO Box 2852 Newcastle					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RC 029 122 235 ZA CUSTOMER COPY 301028R	
10	G. Hambly P.O. Box 9293 Newcastle					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RC 029 122 249 ZA CUSTOMER COPY 301028R	
Number of letters posted Getal briewe gepos		Total Totaal		R	R	R	R

Signature of client
 Handtekening van kliënt

Signature of accepting officer
 Handtekening van aanneembeampte

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**REGISTERED LETTER
GEREGISTREERDE BRIEF**

(With an insurance option/ met 'n versekeringsopsie)



Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan
Mr P.G. Khumalo
PO Box 141183
Madadeni

28151
 Post code
 Poskode

The value of the contents of this letter is an indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

Die waarde van die inhoud van hierdie brief is soos aangedui en vergoeding sal nie betaal word vir 'n brief wat sonder voorbehoud ontvang word nie. Vergoeding is beperk tot R100.00. Geen vergoeding is sonder dokumentêre bewys betaalbaar nie. Opsionele versekering tot R2 000.00 is beskikbaar en is slegs op binnelandse geregistreerde briewe van toepassing.

Postage paid R _____ C
 Service fee / Diensgeld R _____ C
 Insurance / Versekering R _____ C
 Total / Totaal R _____ C

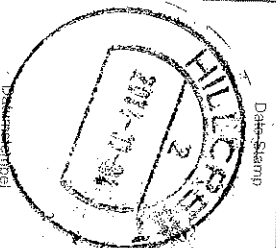
Insured value of contents
 Versekering waarde van inhoud R _____ C

Enquiries/Navrae
 Shereef
 number/nummer
0860 111 502
www.postoffice.co.za

REGISTERED LETTER
 With a postal insurance option/
 Shereef
 number/nummer
RC 029 122 408 ZA

CUSTOMER COPY 301028R
 Klienstaaf

Parat van
 aanneem-
 beampie



**REGISTERED LETTER
GEREGISTREERDE BRIEF**

(With an insurance option/ met 'n versekeringsopsie)



Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan
Mr S.S. Khumalo
PO Box 1816
Bencastle

28150
 Post code
 Poskode

The value of the contents of this letter is an indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

Die waarde van die inhoud van hierdie brief is soos aangedui en vergoeding sal nie betaal word vir 'n brief wat sonder voorbehoud ontvang word nie. Vergoeding is beperk tot R100.00. Geen vergoeding is sonder dokumentêre bewys betaalbaar nie. Opsionele versekering tot R2 000.00 is beskikbaar en is slegs op binnelandse geregistreerde briewe van toepassing.

Postage paid R _____ C
 Service fee / Diensgeld R _____ C
 Insurance / Versekering R _____ C
 Total / Totaal R _____ C

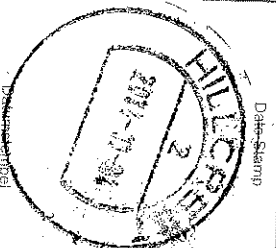
Insured value of contents
 Versekering waarde van inhoud R _____ C

Enquiries/Navrae
 Shereef
 number/nummer
0860 111 502
www.postoffice.co.za

REGISTERED LETTER
 With a postal insurance option/
 Shereef
 number/nummer
RC 029 122 399 ZA

CUSTOMER COPY 301028R
 Klienstaaf

Parat van
 aanneem-
 beampie



Postage paid R _____ C
 Service fee / Diensgeld R _____ C
 Insurance / Versekering R _____ C
 Total / Totaal R _____ C

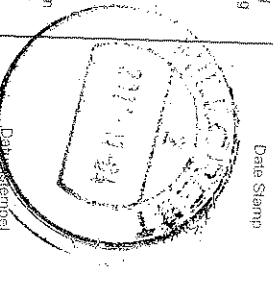
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 Versekering waarde van inhoud R _____ C

Enquiries/Navrae
 Shereef
 number/nummer
0860 111 502
www.postoffice.co.za

REGISTERED LETTER
 With a postal insurance option/
 Shereef
 number/nummer
RC 029 122 399 ZA

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INTERESTED AND AFFECTED PART LIST

NEWCASTLE GENERAL WASTE LANDFILL EIA I&AP LIST

Name	Organisation	Adress	Contact	Fax	Email address
Grant Collyer	Mooirrant Farm		082 493 8528		grantcollyer@gmail.com
Lloyd Phillips	Newcastle Farmers Association	P.O. Box 112 Newcastle 2940	076 722 3345/ 082 255 2285		lloydphillips78@gmail.com
J.C. Joubert			083 271 0826		
N.J. Devenish			072 814 2326		
M. W. van Wrellyl			083 264 6243		matievon@global.co.za
A Bosman		Bus 9394 Halla Heights	083 327 3570		
L Bosman		Bus 20194 Newcastle 2940	082 388 3000		
M.A Vessels			082 614 2005		
M.S. Khumalo	Buiaspas	P.O. Box 141183 Madadeni 2951	076 621 1166		
S.S. Khumalo	Ingogo	P.O. Box 1816 Newcastle 2940	076 621 1200		
L Nkosi	Ingogo		082 697 0706		
A Adermotengs		Bus 2320 Newcastle 2940	083 410 9957		
M Mabaso		Box 288 Utrecht 2980	083 997 9975		
W.P.F. Adendoof	Hope Farm Newcastle		082 428 4126		
H.J. Vosloo		Bus 326 Volkrust 2470	083 290 6237		
H van Wiellie		Box 761 Newcastle 2940	082 572 0369		
W Taggart		Box 171 Newcastle 2940	082 890 9218		
S Peterson		P.O. Box 369 Newcastle 2940	082 885 6370		
C Peterson			071 221 6146		
A Burgers		P.O. Box 270 Newcastle 2940	082 550 0429		
J.L. Kotze		P.O. Box 2852 Newcastle 2940	082 892 1081		
C Cronje		Bus 1589 Newcastle 2940	083 283 6598		
G.J. Grobler		Bus 21369 Newcastle 2940	082 337 2947		
F.R. Cronje		Bus 1589 Newcastle 2940	082 554 6080		
L.J. Oosthysen		Bus 9253 Newcastle 2940	072 117 9404		
N. Ferriek		Box 1662 Newcastle 2940	082 337 5686		
R Muller		Box 113 Newcastle 2940	082 820 4665		
G Potgieter		Posbus 33 Utrecht 2980	082 924 2379		
T Nel		Box 2 Ingogo 2944	083 456 8772		
Julian Phillips	Screenit	Box 2500 Newcastle 2940	082 500 1234	086 693 4368	screenit@gwisa.com
G Hambly		Box 9293 Newcastle 2940	082 413 5850		
D.J. Brown		PBag X6603 Postnet Newcastle 2940	082 337 7457		
J.H. Serfontein		Box 7256 Newcastle 2940	082 808 2602		
P Croft		Box 2234 Newcastle 2940	082 800 7819		
R.M. Adendorff		Posbus 114 Newcastle 2940	082 577 7555		
M Docest		Box 23202 Newcastle 2940	082 755 6664		mydoocrat@gmail.com
K.J.L. Robinson	Krantzkop Farm Dundee		034 212 3730		kilrobinson@telkomsa.net
S.G. Phillips	Modderlaagte Newcastle		072 634 6666		
J Whipp	The Colen Normandien		083 657 4054		
J.F. Smith	Schurwejoury Ingogo		083 327 7233		
R Bollyer	Hanover Normadien		082 419 8332		
Craig Petersen	Norseland Farm	P.O.Box 369 Newcastle 2940	071 221 6146 / 082 885 6370		norselandfarm@yahoo.com
GT van der Merwe	van der Merwe and Associates	P.O. Box 27756 Sunnyside 0132	087 654 0209	012 343 5435	simone@vdmass.co.za
Ms Nothile Mthimkhulu	Amajuba Ditsrict Municipality		034 329 7325		nothilem@amajuba.gov.za
Ms Ntombethu Makwabasa	DWS		082 881 9886		makwabasan@dwa.gov.za

Mr Poovi Moodley	EDTEA	P.O. Box 170 Newcastle 2940	034 315 3936	034 312 9986	poovimoodley@ymail.com
Ms Nonkululeko Mabaso	EDTEA	P.O. Box 170 Newcastle 2940	034 315 3936	034 312 9986	
Ms Xolile Ngobese	EDTEA	P.O. Box 170 Newcastle 2940	0343153936	034 312 9986	
Ms Karen Moodley	DAFF	Private Bag X 9029 PMB 3200	033 392 7731		KarenM@daff.gov.za
Mr B Margot	Dept. of Health	121 Chief Albert Luthuli St, Pietermaritzburg 3200	033 846 7503		bruce.margot@kznhealth.gov.za
Mr Phelelani Ntshingila	Newcastle Municipality	Private Bag X662, Newcastle	(034) 328 3379		Phelelani.Ntshingila@newcastle.gov.za
Cllr Shadrack Kubheka	Ward Councillor	P.O. Box 54 Ingogo 2944	072 127 4055		Shadrack.Kubheka@newcastle.gov.za
Mr Dominic Wieners	Ezemvelo KZN Wildlife	PO Box 13053 Cascades 3202	033 845 1455		Dominic.Wieners@kznwildlife.com
Mr Roy Ryan	KZN Dept of Transport		033 355 8097		roy.ryan@kzntransport.gov.za
Pieter Burger	WESSA		031 573 1054 /083 630 5378		pieter@burgerip.co.za
Mr T Willemse	Landowner				tembaw@gmail.com
Mr John Gama	Resident		079 396 7237		
Mr Meshack Nhlapho	Resident		082 702 4964		
Mr Geoffrey Shabalala	Resident		076 662 1683		
Irshaad Peer	Shabir Goga Inc				Irshaad@sgi.za.com
Shabir Goga	Shabir Goga Inc				Shabir@sgi.za.com
DT Pretorius	Smallholding on Hilldrop Meadowstreams 1	PO Box 8779 Newcastle 2940	083 539 9774		dtpretorius@yahoo.com
Suliman Lakhi	Neighbouring resident	P.O. Box 132 Newcastle 2940	082 786 8886	034 326 3347	solly@freshfields.co.za
Ahmed Lakhi		P.O. Box 132 Newcastle 2940	082 478 8686	034 326 3347	haseena@freshfields.co.za
Esmeralda Visser	Normandien Farms (Pty) Ltd	P39 Road, Normandien; Newcastle	0343149800 / 087 285 0845	034 314 9802	adminnf@normandien.co.za
Herman Schoeman	Hofina Poultry	PO Box 2869 Newcastle 2940	082 800 7818	086 600 9289	hofinas@gmail.com
PJ Conradie					skaterwater@gmail.com
Gert Strydom	Afriforum Newcastle		082 444 3005 / 034 325 0901		gertstrydom22@gmail.com
Serfie Serfontein	Farmer	P.O. Box 7256 Newcastle 2940	082 808 2602		ansaserfontein@tekomsa.net
Ethel von Abo		P.O. Box 100123 Scottsville 3209	033-3429393	033-3457141	Ethel@kwanalu.co.za
Chris Fourie	Afri Forum	P.O. Box 17216 Lyttelton 0140	072 428 2465 / 012 644 3904	086 559 5294	chris@afirforum.co.za
Mr Haroun Jamalooden	HR Jamalooden Trust	P.O. Box 281 Newcastle 2940	034 375 81111/ 083 444 9786		jamaloodenh@yahoo.com
A Peens					alisiadbmlaw.com
T Botha			082 880 9010		bothahuis@hotmail.com
Carel Boshoff	Meadowstream		082 802 1237		carel@vukatell.com
D Pretorius	Landowner		083 539 9774		dtpretorius@yahoo.com
H Scheepers	Carrick Farm		082 836 2627		henk.scheepers@vodamail.com
H Liebenberg					hannes@vsc.co.za
N Rautenbach					nnc1@tekomsa.net
J Scheepers					johan@newcastle.co.za
B Wade	Farm land owner	P.O. Box 794 Newcastle 2940	034 312 3231/ 082 809 9518		bradmwade@gmail.com
R Adendorff					ruanadendorff@yahoo.com

Stephen Wade	Landowner	P.O. Box 794 Newcastle 2940	034 312 3231/083 625 9642		redrocks@telkomsa.net
Dr Ahmed Jamalooddeen	Resident	P.O. Box 281 Newcastle 2940	072 889 2581	034 375 6660	exportinl@aol.com
Dr Regina Hurley	Resident	P.O. Box 281 Newcastle 2940	072 889 2539	034 375 6660	bikingregina@aim.com
Dr Hyder Seedat	B&H Prperty Inv.	P.O. Box 25029 Newcastle 2940	034 315 3750/ 083 788 6875	086 218 0889	sseedat6@gmail.com / hayseedat@gmail.com
Mrs Kirsten Phillips	Gardenia Farm, Newcastle	P.O. Box 112 Newcastle 2940	071 243 7911	034 312 1401	kirstdawnped@hotmail.com
Mr Michael Phillips	Sunflower Estates	P.O. Box 112 Newcastle 2940	082 255 2285		sunstate@mweb.co.za
Mr Ahmed Randeree	Fine Cash & Carry	P.O. Box 374 Newcastle 2940	034 312 1482/ 082 923 4031	034 312 1484	ahmed@finecc.co.za
Mr Suliman Paruk	Move On Up 208 (Pty) Ltd		082 440 0580		sol@tansafrica.com
Mr Riaz Choonawala			083 786 8761		riazc@tansafrica.com
Sieghard Knöcklein	Yethu Development Team		27(73) 862 6211 /+27(81) 797 6211		yethu.newcastle@gmail.com
Brigitte Lauterbach	Land Surveyors		034 312 5761		sel@intekom.co.za
Amos Khumalo	Indian Village		083 862 6428		
Jessie			082 836 5909		
Gcinile Madlala			076 196 9374		
Thembi Mlethu			082 702 7440		
Nomcebo Ngema	Indian Village		072 044 0496		
Snethemba Simelane			072 839 1154		
Sindisiwe Shabalala			071 137 1159		
Zinhle Sithole	Indian Village		083 176 7192		
Scelo Msomi	Indian Village		072 703 4734		
Bongani Shabalala			079 592 3638		
N Swanepoel			083 625 9394		nick.swanepoel@newcastle.gov.za
Thandiwe Gama	Kilbarchan		060 617 6192		
Nash Dookhi	Envitech Solutions		082 823 3000		nash@envitech.co.za
Zikhona Duma	Indian Village		071 256 3290		
Hlaliswa Mngadi	Indian Village		083 504 4405		
Thulani Shabalala	Indian Village		072 381 4169		
Ayanda Mnyandu	Indian Village		071 758 6288		
Thulani Nkomonde	Indian Village		079 929 4960		
Perceverance Mnyandu	Indian Village		073 766 5417		
Thandazile Vilakazi	Indian Village				
Sandra Khumalo	Indian Village		073 121 7049		
Bonga Xaba	Indian Village		079 320 0493		
Londiwe Xaba	Indian Village		076 092 7204		
Virginia Khumalo	Indian Village		079 662 5726		
Phumzile Ngema	Indian Village		082 055 7604		
Diego Vere	Indian Village		060 612 3142		
Xolani Mbewu	Indian Village		083 348 7433		
Busi Ndebele	Indian Village		079 451 3825		
Anthony	Indian Village		073932916		
Tebekgo Makwa	Village		083 539 3942		
Sma Shabalala	Village		0711131159		
Sbongile Ranko	Village		073 371 3205		
Sfiso Khumalo	Village		079 264 9805		
Bhutiza Ranko	Village		076 966 9242		
Jabu Jele	Village		079 686 7222		

HC Hugo	3 de Laan Ngagane		082 924 5052		
AJ Hugo	3 de Laan no 10 Ingagane		082 222 1745		
F Landman	Clifford Plaas Normandien		082 343 8518		
HJ Geldenburgh	Doonpoort Normandien		083 675 6424		
C Koen	1 Venus Flat Hutten Hoogle		071 689 8011		
R Saayman	Erikaalaan		079 299 2175		
Chris Green	Two water Farm		076 412 4848		
Naomi Botha	Newcastle		034 312 6776		
JP Pretorius	Newcastle		034 318 4649		
J Grossmark	Heuwelin		034 312 6776		
D Clato	Normandien		082 573 5834		
JC Booysen	Newcastle		034 312 4898		
Angie Green	Two water Farm		084 488 4848		
AA Geldahuas			082 335 8456		
Nqobile N	Greenwich		083 580 0287		
Nkosinathi	Greenwich		071 976 6440		
Themba A	Greenwich		073 565 2005		
Manqoba J	Greenwich		072 977 0101		
Sphamandla N	Greenwich		073 161 4267		
Nqobi N	Greenwich		079 733 8061		
Gcinile G	Greenwich				
Hlengiwe G	Greenwich				
Mike N	Greenwich		072 325 1192		
Thobile N	Greenwich		076 262 1811		
Nathi N	Greenwich		079 164 8262		
Buyisiwe N	Greenwich		076 750 3388		
Zama N	Greenwich		078 639 5224		
Heinrich von Wielligh	Afri		082 572 0369		heinrich.vonwielligh@hinterland.co.za
Tracy Rautenbach	Meadowstream		079 509 0043		tracyjane.smit8@gmail.com
Clive Ponter	15 A Hilldrop		082 922 7172		clivep@telkomsa.net
Francois Erlank	Meadowstream		082 892 8288		vlampb@telkomsa.net
Ahmed I.M. Docrat	6 Hilldrop		083 250 7861		ahmed@midasmall.co.za
MJ Gregory			084 491 0251		
Mr Menno Klapwijk	Bapela Cave Klapwijk Landscape Architects and Environmental Planners		012 362 4684		menno@cka.co.za

COMMENTS AND RESPONSES TABLE

PROPOSED NEWCASTLE GENERAL WASTE LANDFILL SITE- COMMENTS AND RESPONSES REPORT

Date of comment	Raised by	Comment/concern	Response
27 August 2014	Landowners	<p>Petition against the establishment of a municipal dump site on the farm Greenwich which borders:</p> <ul style="list-style-type: none"> • Hilldrop area • Hofina Poultry • Newcastle farmer's association • Various other farms <p>The Newcastle Municipality have acquired the Farm Greenwich with the intention of establishing a municipal dump/refuse site. Should the dump site be established it will have the effect of:</p> <ul style="list-style-type: none"> • Reducing the value of all properties in the greater surrounding area; • Make it close to impossible to sell properties in the area; • Cause pollution in the area both through windborne odours and refuse as well as contaminating groundwater and streams (the proposed site is situated on the rainfall catchment area for feeder streams that lead into the Ncandu and Horn rivers); • Animal eating the wind borne plastic will perish; • Squatters will establish housing in the surrounding area with the obvious resultant increase in crime; • The area is the natural habitat for various endangered local species including the Oribi which will either be hunted to extinction or perish through loss of habitat, 	<p>The impacts likely to result from the establishment of the landfill have been identified during the current scoping process. However, the EIA phase of the process will include specialist studies that will investigate and report in detail on the negative impacts that the landfill will have on the environment, property as well as the community. Thereafter, mitigation and management measures will be recommended in order to minimise the identified negative impacts, hence having minimal impact on the environment and its surroundings.</p> <p>The competent Authority will make a decision at the end of the process with regard to whether the landfill will be authorised or not. This decision will be taken based on the findings of the EIA, regardless</p>

		<ul style="list-style-type: none"> • Other not mentioned <p>The signatures appended below represent the names of people/organisations who are opposed to the establishment of the refuse site on what is currently pristine land in the midst of productive farm land and adjoining the upmarket residential area of Hilldrop (please refer to Appendix C for signatures).</p>	of whether the Municipality own the property or not.
23 October 2014	DT Pretorius	I would like to be registered as an affected party. I want more information and a map of the farm Greenwich 8784 where you are planning to make a waste landfill.	The I&AP was registered and the map of the proposed landfill site was forwarded.
28 October 2014	Mr C Peterson	We own land adjoining the proposed site (Carrick Farm) and are in the process of establishing commercial aquaculture. The run off from the dump site will enter into and pollute our streams/dams. In addition, we have identified a site to erect a house which faces onto the proposed landfill site. I strongly object to the establishment of the site.	It must be noted that as part of the landfill design, there will be a leachate management system as well as a stormwater system in place. These systems will ensure that any contaminated runoff and leachate is properly managed and contained within the boundaries of the landfill and ensure that no contamination takes place offsite.
28 October 2014	KwaZulu Natal Agricultural Union	The KwaZulu Natal Agricultural Union would be grateful if you could let us have a copy of this application for our perusal.	<p>The application is currently in the initial stages, where interested and affected parties are given an opportunity to register their details so that information regarding the application is communicated to them as well.</p> <p>Your details will be registered so that you automatically receive correspondence regarding this application and when there are reports out for public comment they will be sent to you for review and comment.</p>

			A background Information Document was attached in the email briefly describing the proposed development.
01 November 2014	Dr Regina Hurley	<p>As a resident of Hilldrop Drive I am writing to discuss the problems with the proposed placement of a general waste landfill.</p> <ol style="list-style-type: none"> 1. The wind will blow debris on top of the houses below. 2. The smell will permeate the air of the residents/pollute 3. The trucks will destroy the road into Hilldrop, drop waste along the road 4. Reduce property value 5. Health risk to the residents of Hilldrop 6. Will also pollute the Newcastle Mall and the Blackrock Casino- 2 attractions for Newcastle 7. Rainwater runs downhill from Hilldrop will be polluted and contaminated. 	<ol style="list-style-type: none"> 1. A mesh wire fence will be installed around the boundary of the landfill to ensure that no windblown litter exits the site. 2. The waste will be compacted on a daily basis and cover material be placed over it in order to avoid negative odour impacts. 3. As part of the design, an access road will be established and be used by the trucks for delivering waste. 4. A property evaluation assessment (forming part of the social impact assessment) will be undertaken during the second phase of the process to investigate the potential impact that the establishment of the landfill will have on the properties in the area. 5. No adverse health risks are anticipated for the residents as the landfill will be constructed and managed according to

			<p>the Minimum Requirements for Waste Disposal by Landfill, 2nd Edition, 1998 and relevant waste management legislation.</p> <p>6. Waste management activities will be confined to the landfill area and it is unlikely that the landfill will pollute the mentioned attractions.</p> <p>7. Stormwater runoff will be managed as part of the stormwater management system which will also separate clean water from contaminated water.</p>
01 November 2014	Dr Ahmed Jamalodeen	Traffic, risk to children on road, horse-riding, jogging thus increasing liability to Municipality of Newcastle.	A traffic impact assessment will be undertaken during the EIA phase in order to assess possible traffic impacts that may occur during the construction and operation of the landfill.
		The health risk to residents will open municipality to litigation.	<p>No adverse health risks are anticipated for the residents, as the landfill will be constructed and managed according to the National Norms and Standards compiled by the Department of Environmental Affairs as well as the relevant waste management legislation.</p> <p>The EIA phase (second phase of the assessment) will involve specialist studies which will be undertaken to assess and investigate in detail the impacts the landfill is likely to result on, the studies will also recommend management and mitigation</p>

			measures in order to minimise the significance of each negative impact.
		Drop property value in exclusive neighbourhood municipality will be exposed to lawsuit directly.	As mentioned above, a property evaluation assessment (forming part of the social impact assessment) will be undertaken during the second phase of the process to investigate the potential impact that the establishment of the landfill will have on the properties in the area.
		Area has multiple bed and breakfast for visitors of Newcastle who will be exposed to pollution from landfill.	Noted. Additional studies will be undertaken in the EIA phase and will assess in detail the aspects the landfill development has potential to impact on, if the landfill will result in pollution for visitors in the area, the social impact study will make mention of it as well as offer management measures required.
03 November 2014	Dr Hyder Seedat	<p>The landfill site will affect the underground water table of the area. At present, the water supply of many of the farms in the area depends on natural spring water for both domestic and agricultural use. This area (i.e. proposed landfill site) is one of the catchment areas for the underground water supply.</p> <p>It will cause health problems to the local community i.e. the farm dwellers and the inhabitants of Kilbarchan, Tigerskloof and surrounds like Hilldrop.</p>	<p>The landfill design requirement state that a landfill is lined with a 150 mm base preparation layer, 600 mm compacted clay liner, 100 mm protection layer of silty sand or a geotextile of equivalent performance 1,5 mm HDPE Geomembrane in order to prevent the pollution of underground soils and groundwater.</p> <p>The location of the landfill is also chosen at areas with the appropriate geology which further reduces the risk of pollution.</p> <p>During the operation of the landfill, the surface and groundwater will be monitored and findings be incorporated into a report</p>

			which will be available for public and authority review. The analysis will be for determinants specified in the waste licence and if there are signs of contamination, the results will immediately reflect this and mitigatory action can be undertaken.
		Our children and grandchildren already have chest problems due to the proximity of the Karbochem Chemical Plant. Your proposed landfill sit will further aggravate these existing health problems.	No adverse health risks are anticipated for the residents as the landfill will be constructed and managed according to the National Norms and Standards for Disposal of Waste to Landfill as well as National Norms and Standards for the Storage of Waste and relevant waste management legislation. EIA etc.
		Rodents, flies, mosquitos will further add to other health problems.	As part of the daily operations, the waste will be compacted and covered with soil material in order to avoid the occurrence of pests and dispersion of odour. A well managed landfill site should not attract these pests.
		South Africa is a dry country by world standards and every drop of underground water is precious. Please don't aggravate this situation by interfering with our catchment area.	Noted. See above.
		Due to proximity of the landfill site to the Ingagane River, there is a very strong possibility that contamination of the river can and may take place. The effects on the wildlife in the area will be disastrous. Contamination will be in the form of seepage.	The construction of the landfill site is in accordance to the relevant waste and environmental management regulations. The possibilities of contamination to the nearest water resources are very low, and it will be ensured that the operations of the site are undertaken in an acceptable manner.

		Another foreseeable problem is the value of property in the area will be drastically affected. Will homeowners be compensated for potential loss of value on their properties?	A property evaluation assessment will be undertaken during the second phase of the process to investigate the potential impact that the establishment of the landfill will have on the properties in the area.
04 November 2014	Kirsten Phillips	I am living on a farm which is in close proximity to the “waste landfill” site proposed location. I am not prepared to have the air I breathe in everyday completely polluted by the waste landfills site, certain plastic will be burnt and can produce toxic substances- which I and many others will have to be living with. Air pollution which is effected can contribute to acid rain which can ruin and damage certain crops being planted in the area close to the landfill site. It is not fair to place such an establishment so close to the farms and farmers which work so hard to produce crops which most of us eat. I am not happy with future food I put into my mouth being dangerous.	There will be no burning permitted on the landfill. An air quality and health risk assessment will be undertaken as part of the EIA phase of the project. This will determine whether air emissions could be a problem for surrounding residents. However, it should be noted that this is a general landfill site and therefore emissions of dangerous toxins are unlikely.
04 November 2014	Lloyd Phillips	As vice Chairman of the Newcastle Farmers Association I feel it is my duty to express my concerns about the proposed landfill site. Firstly, badly managed landfill sites may attract vermin and cause litter which is a problem to our environment especially as many neighbours have live stock on their farms. Secondly, waste eventually rots and causes a terrible smell in the air and may generate methane gas which is explosive, which is putting people close by the waste landfill site in danger.	It is the intention of the applicant to manage the landfill in an acceptable manner and in compliance to the relevant legislative requirements. The operation of the site will also be monitored in order to identify any impacts that might be taking place as a result of the landfilling operations. Gas produced as result of the landfilling process will be captured using the prescribed methods in the Standards for Extraction, Flaring or Recovery of Landfill Gas 2013, this serves to both reduce risks and odours associated with the methane.

			An air quality assessment has been proposed during the EIA phase in order to detail the landfill area's receptors and the scenarios to which the operations at the landfill will impact the community in terms of odour.
04 November 2014	Michael Phillips	I am an owner of a fully functional Dairy stud farm which is the closest affected farm to the waste landfill site. I object to any further establishment as certain bacteria from the landfill site will be carried and will contaminate the milk we produce as well as our cattle. We will then in turn have a bad effect on the production of the milk and we are most concerned about the health of our cattle on our farm. There will be stray dogs visiting the site which carry diseases and they can also be a problem to other neighbouring animals.	Access to the site will be strictly controlled with guardhouses at the access gate and a perimeter fence will ensure that no access of stray dogs and scavengers takes place. The potential impacts on the dairy operation will be assessed in the EIA report.
10 November 2014	Ahmed Randeree	I object to landfill site being so close to my home (Hilldrop).	Noted.
14 November 2014	Sieghard Knöcklein	<p>The EIA process with regards to the proposed landfill site on the farm Greenwich for the Newcastle Municipality has reference.</p> <p>On behalf of the landowner we like to establish progress with the assessment of the viability of the development of the landfill site. The land owner is in the process of selling adjacent farms for development and the proposed landfill site has an impact on the proposal and the selling of adjacent land.</p> <p>The Municipality has not adhered to the purchase agreement for the Greenwich Farm and the land owner</p>	<p>The landowner was notified of the proposed development as per requirements of regulation 56 (b) (i) of the 2010 EIA Regulations.</p> <p>Kindly note that the issues relating to the purchase of the land are being dealt with by</p>

		<p>received notification from the Municipality to postpone the purchase of the land, which per implication has an effect on the adjacent proposed developments.</p> <p>Kindly provide us with progress on the assessment. As landowners, we are of the opinion that the landowner is to be informed directly on any progress and acknowledge that all information will be handled as confidential.</p>	<p>the Municipality outside of this process, during the EIA Phase, a property valuation assessment will be undertaken in order to assess the potential impacts that the establishment of the landfill will have on the surrounding properties.</p>
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CONCERNS RAISED BY VAN DER MERWE & ASSOCIATES REGARDING THE DEVELOPMENT OF THE NEWCASTLE LANDFILL SITE

Correspondence dated 19 September 2014 was received from van der Merwe & Associates (who are representing a group of interested and affected parties), the following main concerns were raised:

- Availability of waste management licence documentation for public perusal
- Acquisition of land (Greenwich farm)
- Filing of the Draft Basic Assessment Report on the National Environmental Authorization System
- Request for copies of the Basic Assessment Report including the Environmental Management Plan (EMP)
- Request for documentation relating to the appointment of the Environmental Assessment Practitioner
- Request for copy of the Background Information Document and copies of plans, locality maps and diagrams indicating the coordinates and any possible affected areas
- Documentation pertaining to the appointment of specialists, engineers and scientists
- Proof of compliance with the requirements of the public participation process
- Copies of documentation pertaining to alternative sites considered

In response to the above, the Newcastle Municipality prepared correspondence stating that the Municipality had not commenced with the public participation process at the time the letter was received. The letter also made mention that the EIA application for the proposed development had been submitted to the KZN Department of Economic Development, Tourism and Environmental Affairs and that all necessary processes pertaining to public participation would follow.

CORRESPONDENCE AFTER THE PUBLIC MEETING WAS HELD

A public meeting was held on the 25th November 2014 to discuss the proposed development and to which interested and affected parties were invited to attend. On the 26th November 2014, a letter was received from van der Merwe & Associates and mentioned the following main concerns:

- No recording apparatus and concern that the minutes produced will be extremely inaccurate;
- Request for clarity on why the other investigated sites were rejected;
- Concern that answers provided by the representatives of the Newcastle Municipality; Geomeasure Group and Envitech Solutions were not forthcoming;
- Concern relating to the purchasing of land for the development of the landfill

It must be noted that issues relating to the acquisition of land for the proposed development is being dealt with by the Newcastle Municipality. In terms of the public participation process as defined in Section 54-57 of the 2010 EIA Regulations, GNR543, the public participation consultant is not obliged to respond directly or immediately to issues raised by I&APs. The

purpose of the public meeting that was held on Tuesday, the 25th November 2014 was for notifying the interested and affected parties regarding the proposed development and allow the opportunity for concerns to be raised and recorded so that they are identified at the early stages of the development, have them assessed and then provide relevant management and mitigation measures.

Queries relating to the circulation of the reports for public comment, notification of the interested and affected parties, proposed design specifications were all responded to at the meeting. Questions relating to the alternative sites considered for the development and the reasons why the Greenwich site was chosen as the preferred site were clearly explained. In addition, the criteria used for identifying sites suitable for landfill development were clearly explained.

Public meeting minutes were prepared and circulated to all interested and affected parties; no requests for additions or corrections of the minutes were received.

**PUBLIC MEEETING PRESENTATIONS, MINUTES
AND ATTENDANCE REGISTER**



PROPOSED NEWCASTLE GENERAL WASTE LANDFILL SITE

**● Scoping Phase- Public Meeting
10:30 am, 25 November 2014
Newcastle Town Hall, Scott Street**

PURPOSE OF THE MEETING

- To meet and inform the I&APs regarding the proposed development;
- To discuss legislation that is triggered by the proposed landfill establishment;
- Give an overview of the proposed landfill design specification;
- Give I&APs an opportunity to raise concerns or comments after the presentation.



AGENDA

- Applicant and EAP details
- Trigger activities (Waste Act and EIA Regulations)
- Activities undertaken to date
- Project Background
- Planned design specifications
- Issues identified already
- Question and answer session
- Next steps in the process
- Closing



APPLICANT AND EAP DETAILS

- Project Applicant: Newcastle Local Municipality represented by Mr Phelelani Ntshingila
- Environmental Assessment Practitioner: Geomeasure Group represented by Ms Nokukhanya Gasa



ACTIVITIES UNDERTAKEN TO DATE

- Application forms submitted to EDTEA;
- The application was advertised in English and isiZulu and appeared in the Daily News, Newcastle Advertiser and Isolezwe newspapers;
- Ongoing compilation of the Interested and affected party list;
- Site notices were placed at the site on the 21st October 2014;
- The Background Information Document was compiled and distributed to authorities and I&APs
- Drafting of Draft Scoping Report is underway



TRIGGER ACTIVITIES (WASTE ACT AND EIA REGULATIONS)

The application triggers the requirement for a waste management licence which will be undertaken following the requirements of EIA processes as per the requirement for listed activities under Category B of Section 20(b) of the National Environmental Management: Waste Act, 2008 (No. 59 of 2008), Activity (8) and (10) i.e.:

(8) “the disposal of general waste to land covering an area in excess of 200 m² and with a total capacity exceeding 25 000 tons”

(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)”



CONTD.

- It is currently estimated that the proposed landfill site will handle approximately 11 400 tons of general waste on a monthly basis.
- The landfill will also have associated infrastructure including access road, on-site roads, perimeter fence, guard house, weighbridge, stormwater management infrastructure, leachate management infrastructure, site offices, staff ablutions, canteen , workshop as well as groundwater monitoring boreholes.



CONTD.

In addition to the requirement of a waste management licence, the proposed development also requires environmental authorisation for the construction of the access road which will be used by the waste delivery vehicles. The application for environmental authorisation and the WML are taking place concurrently.

As part of the objectives of the national waste management strategy, it is expected that the landfill will have recycling programme in place to promote the reuse of materials and minimise the amounts of waste disposed, directly extending the landfill's life span.



CONTD.

As part of the operations at the site, the recovery of landfill gas may take place given that there is sufficient waste disposed at the site.

Leachate generated as part of the process will be managed as per the leachate management system which will be explained further as part of the planned design specifications.

Further details on the landfill and planned activities will be provided in detail in the Draft Scoping Report that will be available for public comment.



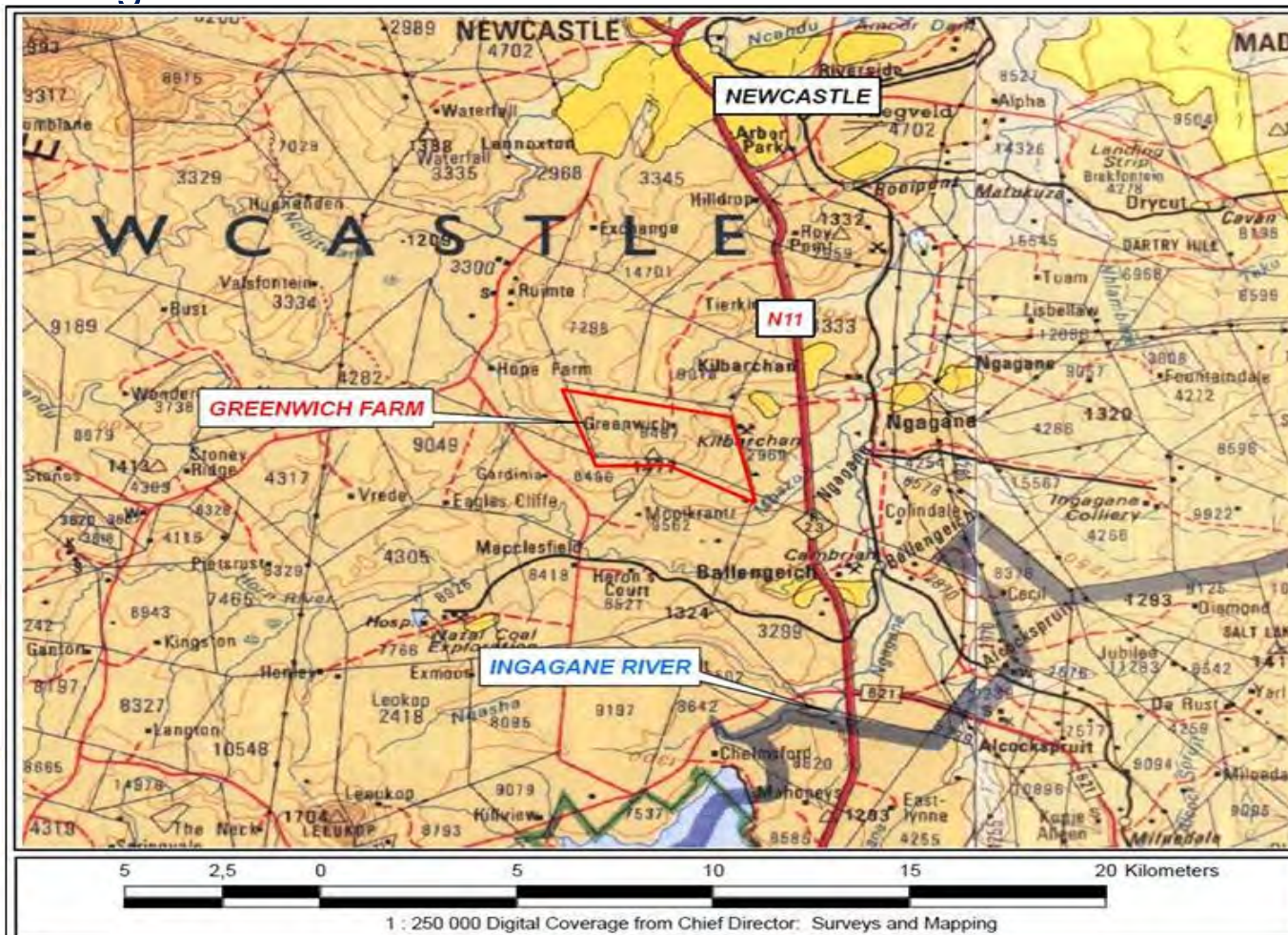
PROJECT BACKGROUND

The Newcastle Municipality is proposing to develop a new landfill site in the area due to the existing landfill site rapidly reaching the end of its design life. This is due to the closure of the Madadeni and Osizweni Landfill Sites by the Department of Water Affairs (DWS, previously known as DWA) as a result of non-compliance to the governing legislation. This event resulted in an influx of solid waste to the existing landfill site, which in turn further reduced its anticipated design life.



CONTD.

The proposed site for the development is located on a portion of the Farm Greenwich 8784 and the proposed footprint of the actual landfilling area is estimated to be 80 hectares.



CONTD.

- Greenwich Farm is approximately 844 ha in size, and is accessible via a gravel road off the N11 main road.
- Geohydrological, geotechnical and ecological assessments have been undertaken in order to further investigate the appropriateness of the site for the proposed development. Findings indicate that the site is indeed suitable for such a development.
- Full copies of these assessments will be attached with the draft Scoping Report which will be circulated to I&APs for review and comment for a period of 40 days.



PLANNED DESIGN SPECIFICATIONS

Envitech Solutions (Pty) Ltd to give presentation



ISSUES IDENTIFIED ALREADY

- Reduction of property value
- Contamination of groundwater
- Odour impacts
- Occurrence of scavenging activity
- Health risks
- Loss of habitat for species
- Occurrence of pests



QUESTION AND ANSWER SESSION

????



NEXT STEPS IN THE PROCESS

- Additional comments (in writing please) by 10 December 2014
- Comments can be forwarded via fax on 031 765 1935 or email khanya@geomeasuregroup.co.za
- Comments received will be incorporated into the Draft Scoping Report and the report will be made available to I&APs for review and comment (40 days)
- The Draft Scoping Report will include a Plan of Study detailing the tasks that will be done during the EIA Phase, as well include a list of the specialist studies will be undertaken.
- The Final Scoping Report (incorporating comments of the Draft Report) will be circulated for public comment (21 days) and then be submitted to the Department for review and comment.



**THANK YOU FOR
ATTENDING**





Identification, Planning, Permitting and Design of a Regional Landfill Site



Nash Dookhi, Pr Tech Eng, MSc. Eng.

25 November 2014

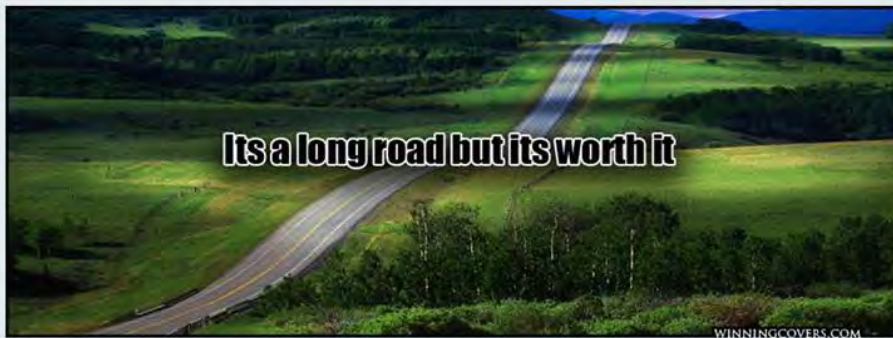


Environmental Engineering Technology Specialists
www.envitech.co.za



Brief Project Background

- Envitech Solutions were appointed by Newcastle Municipality in late 2009.
- Commenced with candidate site selection in 2010.
- To date 18 sites have been considered during the desk studies investigations and limited geotechnical investigations were carried out on 4 of the sites.



Brief Project Background



Brief Project Background

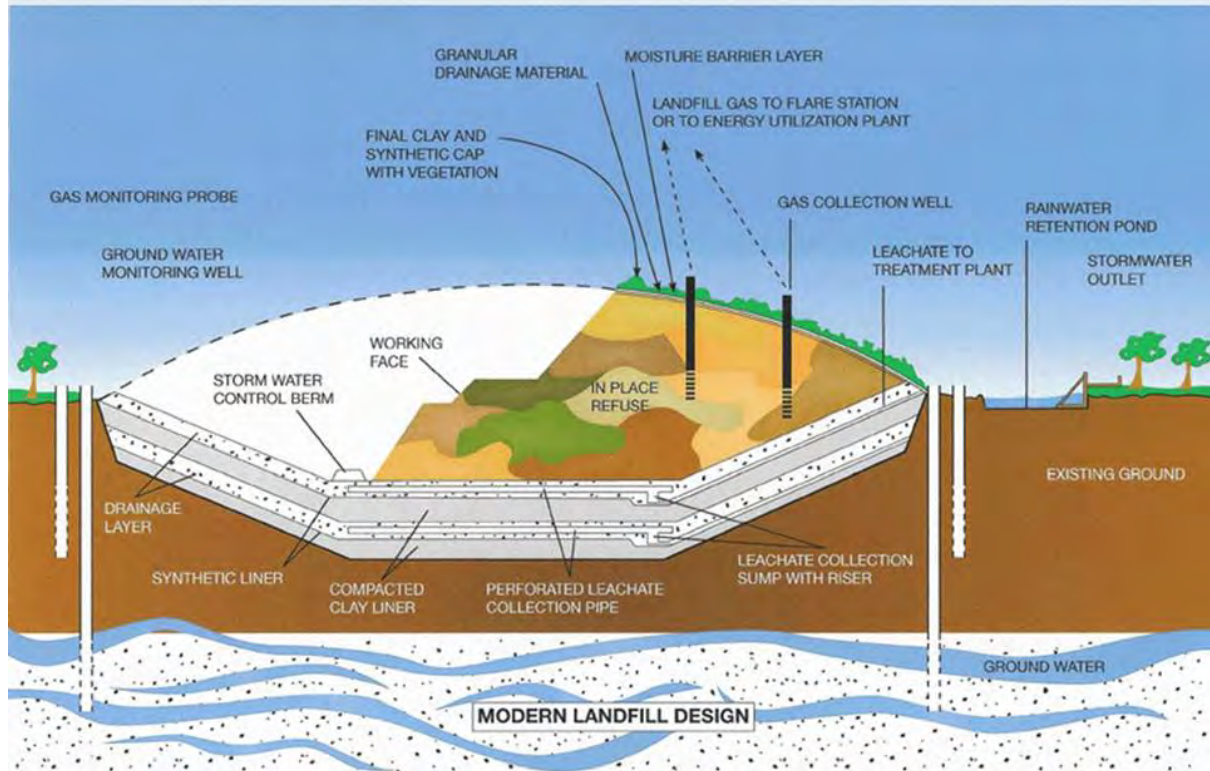
- The existing landfill site has reached capacity and has minimal airspace available.



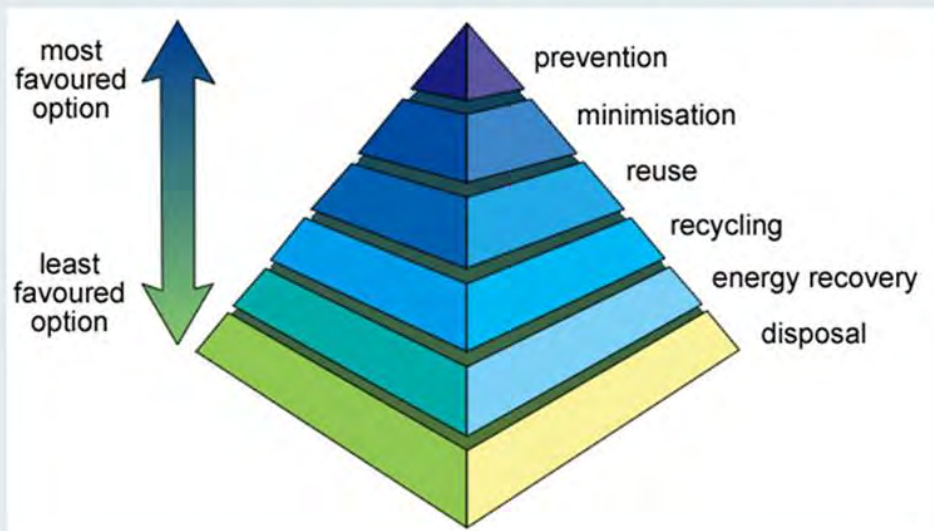
- There is an urgent need for a new landfill site.
- Some people may say a new “dump” but we say...



Modern Landfills are *Engineered* Facilities...



Modern Landfills also promote the...



WASTE MANAGEMENT HIERARCHY

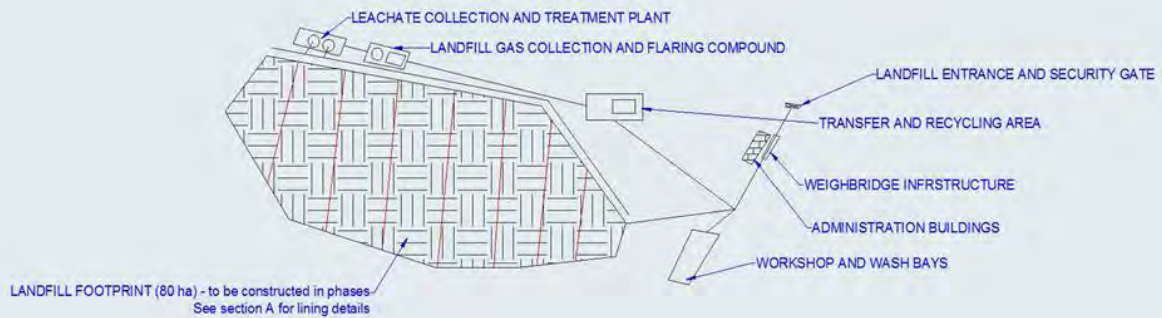
Section	Description	Legislation/Specification	Notes
Access Roads	<ul style="list-style-type: none"> External access road from the N11 to the site. This road will be designed for heavy vehicles. Internal access roads for access to the active cell and site facilities. 	TRH 14 – Guidelines for road construction materials TRH 15 – Subsurface drainage for roads TRH 16 – Traffic loading for pavement and rehabilitation design SANS 1200 DM – Earthworks (Road, Subgrade) SANS 1200 ME – Subbase SANS 1200 MM – Ancillary Road Works	The road surface will be determined during the detail design phase; It is envisaged that an asphalt and/or concrete surfaced road will be constructed since the expected design life of the landfill is 40 years. The current condition of the existing access road is not suitable for heavy vehicles and the land does not currently belong to the Municipality, this is still to be discussed and finalized.
Access Control	<ul style="list-style-type: none"> Security gates and guard facilities including guard houses. 	SANS approved supplier for the security gates SANS 10400XA National Building Regulations And Building Standards Act No. 103 Of 1977	Access control and security facilities will be required at the entrance to the site. This could either be boom gates and/or aluminium gates.
Surveillance	<ul style="list-style-type: none"> Security cameras and monitoring system. 	N/A	Specialised service.
Weighbridge	<ul style="list-style-type: none"> 2 No weighbridges to enable accurate tariffs to be charged to landfill users and to allow the owner to record and monitor the incoming waste volumes. 	SANS 1200 G – Structural Concrete SANS 1200 H – Structural Steelwork	The installation of the weighbridges will be a specialised service but the foundation will be constructed using reinforced concrete.
Administration Buildings	<ul style="list-style-type: none"> Landfill operations control room and building Offices for site staff Boardroom Kitchen/Canteen Ablution facilities 	SANS 10400XA National Building Regulations And Building Standards Act No. 103 Of 1977	The size and layout of the buildings will be determined during the detail design.

Workshop Area	<ul style="list-style-type: none"> Landfill Operation equipment service and laydown area. Wheelwash bay/s 	SANS 1200 G – Structural Concrete SANS 1200 H – Structural Steelwork SANS 1200 HB – Cladding and Sheeting	The workshop will be a structural steel structure on a concrete slab.
Perimeter Fencing	<ul style="list-style-type: none"> Concrete Palisade fencing around the perimeter of the site to prevent any unauthorised access to the site. 	SANS 1200 G – Structural Concrete SANS 1200 H – Structural Steelwork	Supplier to provide SANS approved fencing and to provide required quality test results for any materials cast on site.
Stormwater Management System	<ul style="list-style-type: none"> A system of stormwater drains to ensure that stormwater on the catchment area of the site is managed. 	SANS 1200 LE – Stormwater Drainage SANS 1200 DK – Gabions and Pitching	Clean stormwater needs to be separated from the landfill cell preventing contamination and reducing the amount of leachate and/or contaminated stormwater. The stormwater drains will be positioned and sized during the detail design. Typically the drains will be constructed and/or lined with structural concrete.
Landfill Cell Construction & Lining	<ul style="list-style-type: none"> The landfill will be constructed in phases and will be lined according to the requirements for a Class B landfill according to the legislation: 	National Environmental Management: Waste Act 2008: National Norms and Standards for Disposal of Waste to Landfill Minimum Requirements for Waste Disposal to Landfill (DWAF) SANS 1200 D – Earthworks SANS 1200 L – Medium pressure pipelines SANS 1200 LB – Bedding (Pipelines) SANS 1200 C – Site Clearance	Phased landfill sizes to be confirmed during detail design. The site will be a GLB+ (Class B) site for non-hazardous waste.
Leachate Management System	<ul style="list-style-type: none"> System designed to collect, store and contain the leachate produced within the cell 	National Environmental Management: Waste Act 2008: National Norms and Standards for Disposal of Waste to Landfill	Hazardous leachate generated by the site must be contained and not contaminate the environment. The

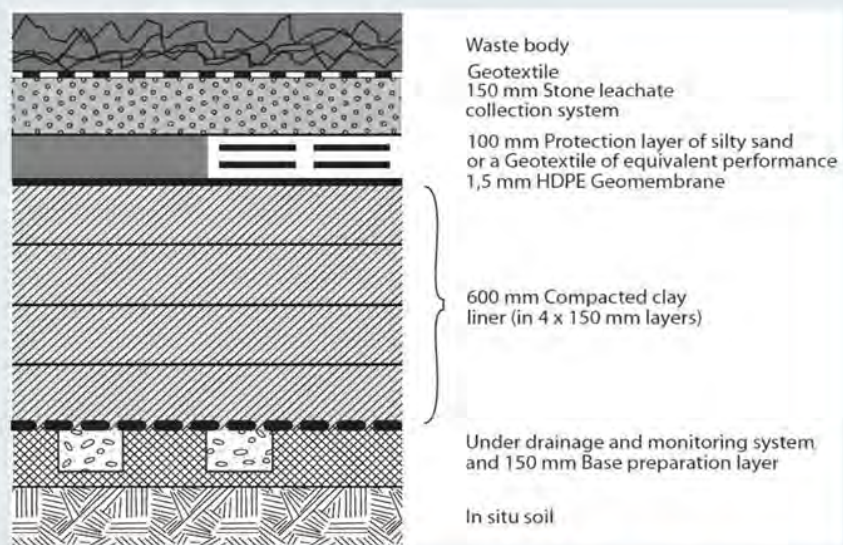
	until it can be disposed using the approved disposal method.	SANS 1200 D – Earthworks SANS 1200 L – Medium pressure pipelines SANS 1200 LB – Bedding (Pipelines)	quantity and quality of the leachate can only be confirmed once the site is operational.
Leachate Treatment Plant	<ul style="list-style-type: none"> Depending on the characteristics of the leachate generated by the landfill, a treatment plant could be used to treat the leachate to an acceptable standard were it could be reused for various purposes and/or discharged downstream of the site. 	SANS 1200 G – Structural Concrete SANS 1200 H – Structural Steelwork SANS 1200 L – Medium pressure pipelines SANS 10400XA National Building Regulations And Building Standards Act No. 103 Of 1977	
Landfill Gas extraction & flaring system	<ul style="list-style-type: none"> Extract landfill gas from the landfill using a series of wells. This gas can be flared or used to create energy, depending on the quantity and quality. 	SANS 1200 D – Earthworks SANS 1200 L – Medium pressure pipelines SANS 1200 LB – Bedding (Pipelines)	Recovery and usage of the landfill reduces the carbon footprint of the landfill.
Litter Control Fencing	<ul style="list-style-type: none"> Wire mesh fencing used to contain air blown litter 	SANS approved fence	The specification of the fence will be supplied by the supplier for approval.
Signage	<ul style="list-style-type: none"> OHS signage and direction and road signage. 	SANS approved signage.	
Environmental Monitoring	<ul style="list-style-type: none"> Boreholes for groundwater monitoring Surface water monitoring from adjacent streams, if applicable Gas monitoring probes for landfill gas migration monitoring 	Minimum Requirements for Waste Disposal to Landfill SANS Water Quality Monitoring for Drinking Water and Agricultural Water	Environmental monitoring of the landfill site will be carried out at regular intervals to determine the environmental impacts of the landfill, and relevant mitigation measures will be carried out.

WASTE MINIMIZATION AND REUSE OPTIONS			
Chipper	<ul style="list-style-type: none"> Turning garden refuse into mulch that can be reused in the agricultural industry 	-	Optional (A Feasibility Study may be required)
Recycling Centre	<ul style="list-style-type: none"> Material recycling facilities are used to separate recyclable material from the waste stream. These recyclables can then be sold to end users. 	-	Recommended (A Feasibility Study may be required)
Incineration	<ul style="list-style-type: none"> Selected waste can be burnt in an incinerator, the residue that remains is fractionally smaller and this reduces landfill airspace usage 	-	Optional (A Feasibility Study may be required)
AD plant	<ul style="list-style-type: none"> Anaerobic Digestion Plant is a chemical biological process that uses organic waste to generate energy either in the form of heat or electricity. 	-	Optional (A Feasibility Study may be required)
Composting	<ul style="list-style-type: none"> Organic waste can be used to create compost which can be reused in the agricultural industry. 	-	Optional (A Feasibility Study may be required)

Proposed Preliminary Site Layout



Proposed Containment Barrier Design



Class B Landfill (Government Gazette, No. 36784, 2013)





CQA for Liner Installations

- **CQA inspection services**
- **CQA plans**
- **CQA laboratory testing services**
- **Leak detection services**

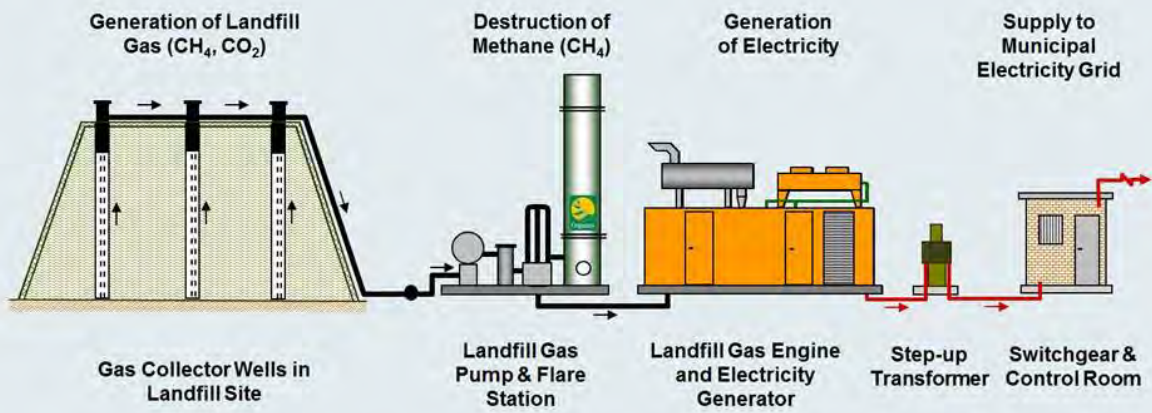




Only in the desert

Landfill Gas Management

- Landfill gas monitoring
- Landfill gas modelling
- Landfill gas extraction & flaring systems
- Alternative uses – Power Generation
- CDM projects



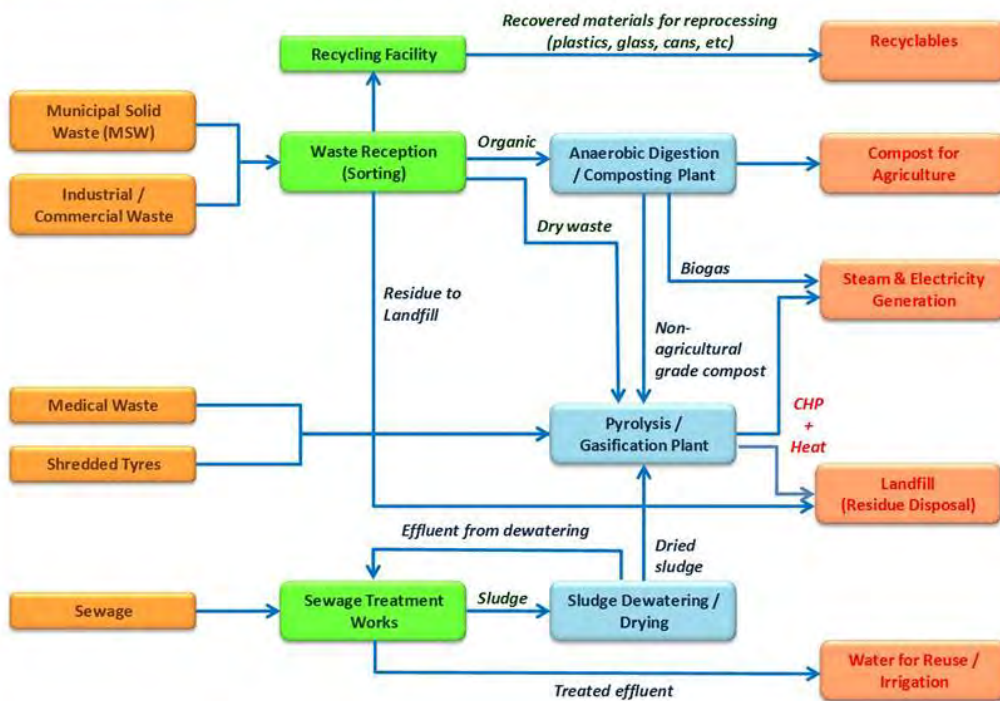
Schematic Layout of Landfill Gas-to-Electricity Scheme

Construction value of ~ R 20-25m/MW





INTEGRATED WASTE TREATMENT & DISPOSAL



MUNICIPAL SOLID WASTE



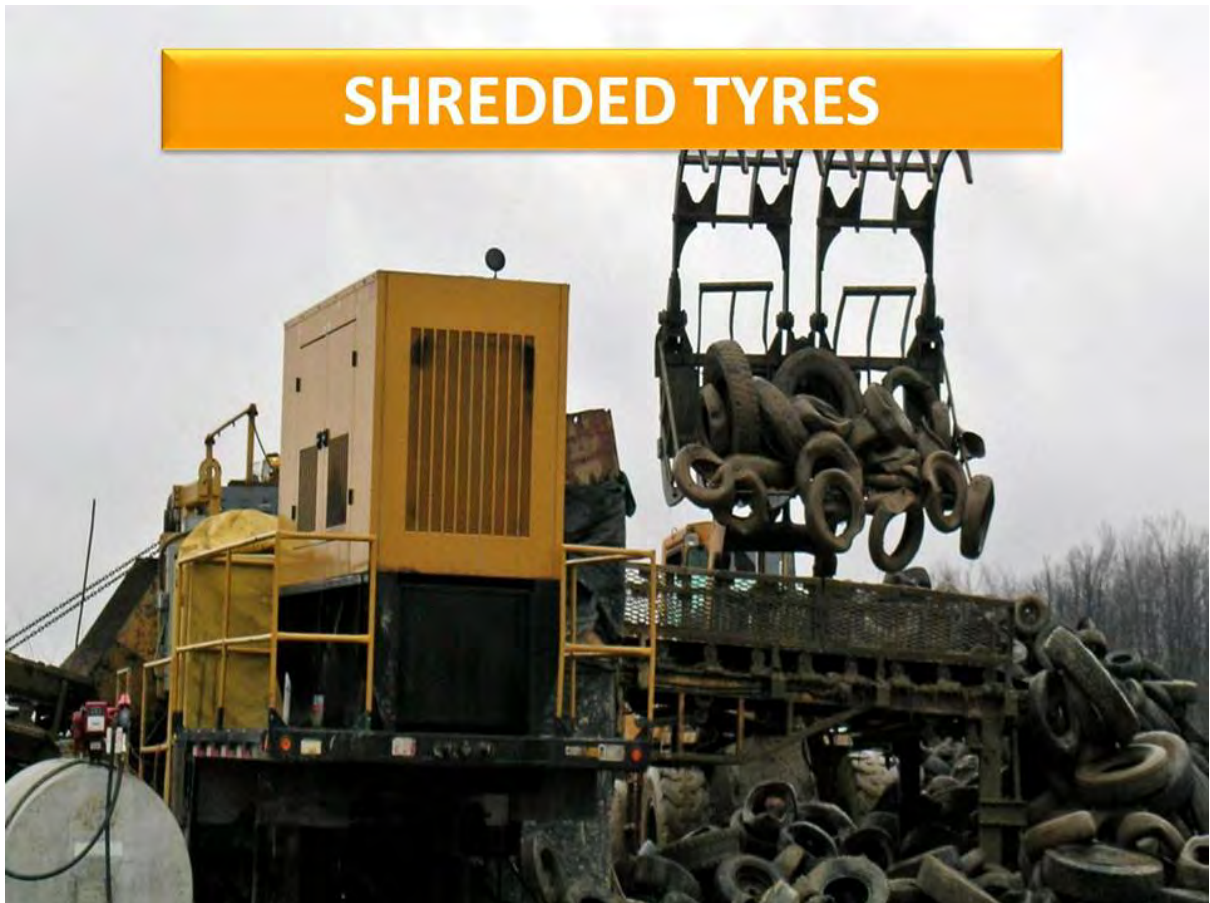
INDUSTRIAL/COMMERCIAL WASTE



MEDICAL WASTE



SHREDDED TYRES



WASTE RECEPTION



RECYCLING FACILITY



GLASS SORTING



PAPER SORTING



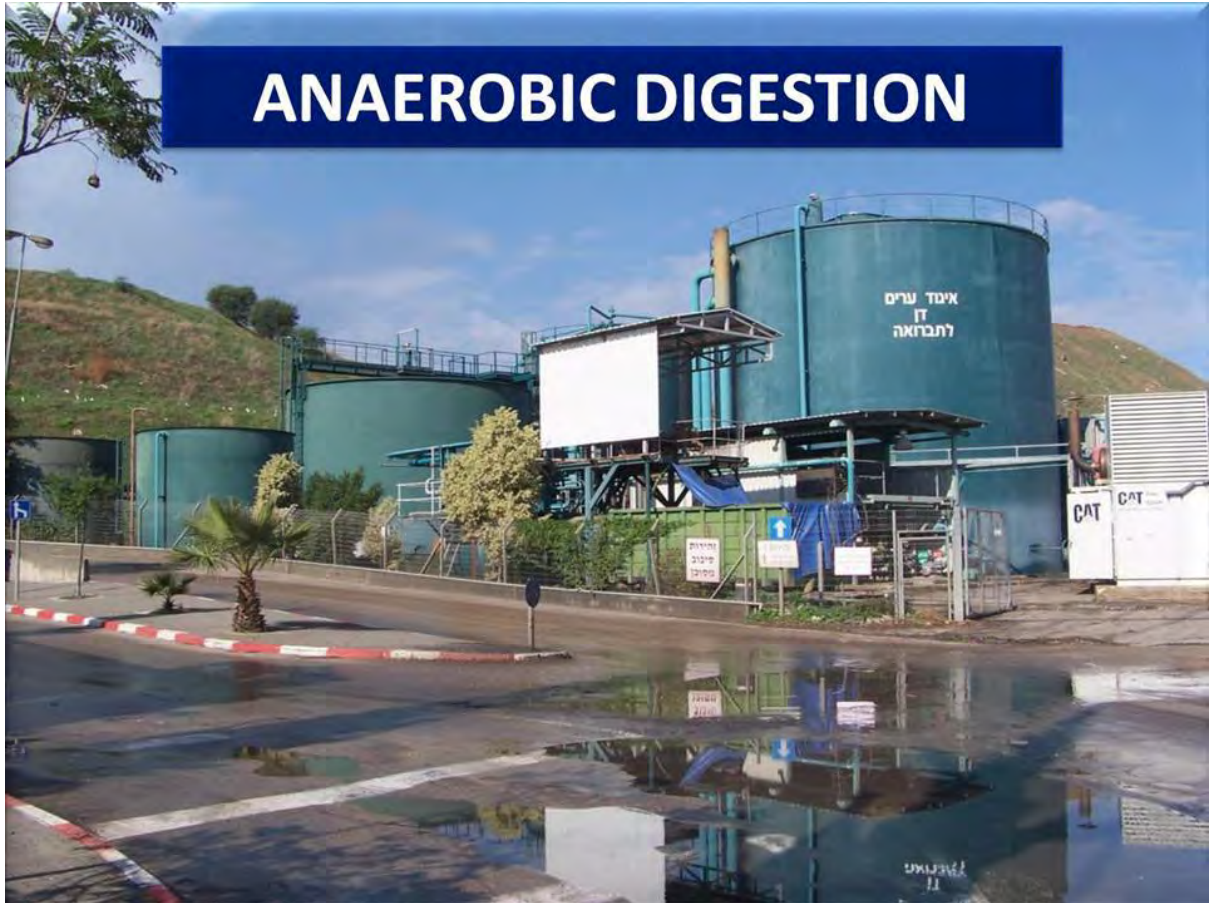
TIN SORTING



SEWAGE TREATMENT WORKS



ANAEROBIC DIGESTION



SLUDGE DEWATERING/DRYING



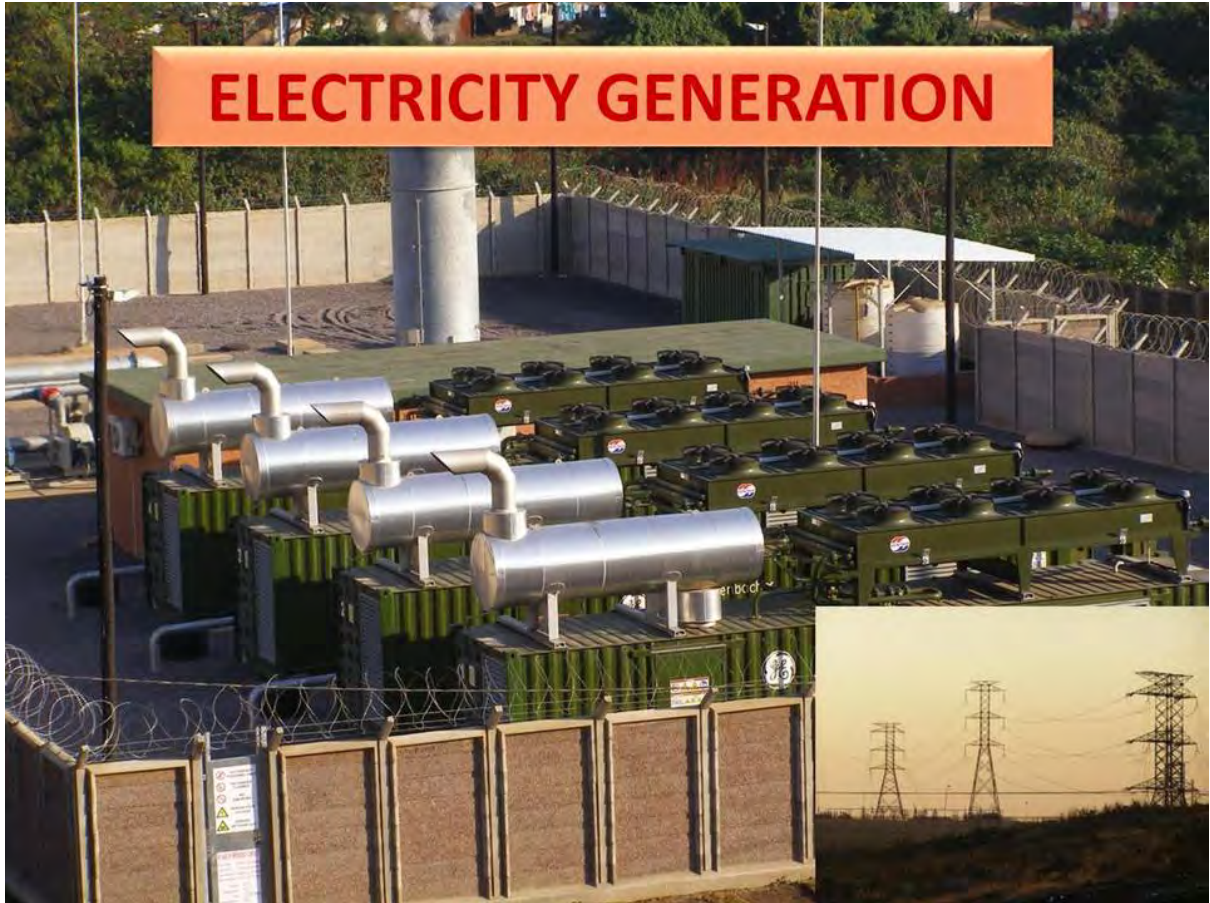
GASIFICATION



COMPOSTING



ELECTRICITY GENERATION



RESIDUE TO LANDFILL



WATER FOR RE-USE/IRRIGATION



A Few Successful Projects...







Uthungulu District Landfill Site, Empangeni, South Africa

ITEM LIST & DWG. No.

ITEM NO.	DESCRIPTION
01	Site Plan
02	Site Plan
03	Site Plan
04	Site Plan
05	Site Plan
06	Site Plan
07	Site Plan
08	Site Plan
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11	Site Plan
12	Site Plan
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50	Site Plan

LEOMAT UTHUNGULU

Uthungulu District Municipality
Uthungulu District Munisipaliteit
Munisipala Westfunda Waso Thungulu

envitech solutions

DRAWN BY: [Blank]		CHECKED BY: [Blank]		DATE: [Blank]		SCALE: [Blank]		SHEET NO. OF [Blank]		SHEET TOTAL: [Blank]		PROJECT NAME: Uthungulu District Municipality		CONTRACT NUMBER: UDM/04/2013		PROJECT TITLE: Rehabilitation of Cell 1 and Ancillary		DRAWN BY: [Blank]		CHECKED BY: [Blank]		DATE: [Blank]		SCALE: [Blank]		SHEET NO. OF [Blank]		SHEET TOTAL: [Blank]	
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New England Road Landfill Site, Pietermaritzburg, South Africa

Comments and Conclusions

- A new landfill site for Newcastle Municipality is required.
- A “dump” site or an engineered landfill site???
- Work together towards a legally compliant, socially acceptable and environmentally friendly landfill site to promote sustainability.



Thank-you



envitech
solutions

www.envitech.co.za

PROPOSED ESTABLISHMENT OF A GENERAL WASTE LANDFILL SITE IN NEWCASTLE, EIA MEETING

MINUTES OF THE MEETING HELD ON 25/11/2014 AT 10H30 AT THE NEWCASTLE TOWN HALL

PRESENT

Nokukhanya Gasa	Geomeasure Group
Taryn Swales	Geomeasure Group
Michael Jaca	Geomeasure Group
Nash Dookhi	Envitech Solutions
Stephen Wade	Landowner
Bradley Wade	Landowner
Brigitte Lauterbach	Land Surveyor
Danie Pretorius	Landowner
Dr H.A. Seedat	Landowner
Ahmed Randere	Landowner
Mohammed Docest	Landowner
Lloyd Phillips	Norseland Farm
Sally Phillips	Norseland Farm
Grant Collyer	Mooirant Farm
Herman Schoeman	Hofina Poultry
Gert Strydom	AfriForum
Julian Phillips	Modderlaagte Farm
Gert van der Merwe	van der Merwe & Associates
N Swanepoel	Newcastle Municipality
H.A. Scheepers	Carrick Farm
Phelelani Ntshingila	Newcastle Municipality
Thandiwe Gama	Kilbarchan
Shabir Coga	SGI
Irshaad Peer	SGI
Amos Khumalo	
Meshack Nhlapho	
G.M. Gama	
Jessie	
Gcinile Madlala	
Thembi Mlethu	
Nomcebo Ngema	
Snethemba Smelane	
Sindisiwe Shabalala	
Zinhle Sithole	
Suliman Paruk	
Riaz Choonawaca	
Scelo Msomi	
Bongani Shabalala	

APOLOGIES

Mr Chris Fourie AfriForum

1. WELCOME & INTRODUCTION

The Environmental Assessment Practitioner (EAP) Ms. Nokukhanya Gasa welcomed all present and thanked them for attending. Representatives from Geomeasure Group as well as Envitech Solutions were also introduced.

The EAP requested that all questions be raised during the question and answer session which will be provided for at the end of the presentation.

2. PURPOSE OF MEETING

The EAP explained that the purpose of the meeting was to meet with Interested and Affected Parties (I&AP's) and to capture any additional concerns and issues with the proposed development for discussion and inclusion in the Draft Scoping Report which will be circulated for public comment.

3. PROPOSED NEWCASTLE GENERAL WASTE LANDFILL PRESENTATIONS

The EAP proceeded to give a presentation on the proposed establishment of the general waste landfill site at Greenwich Farm in Newcastle, the presentation outlined the individuals involved in the application, overview of the proposed development, legislative framework, EIA activities which have been undertaken to date, planned design specifications (as presented by Mr. Dookhi), issues identified already as well as forthcoming activities under the process.

NB: Please see copy of the presentations attached.

4. QUESTIONS ARISING FROM PRESENTATION

Following the presentations given by the EAP and the consulting engineer, the EAP proceeded to open discussion on the proposed development to those present. The following concerns/issues were put forward:

Mr. Phillips requested Mr. Dookhi from Envitech to go back in his presentation specifically on the slide showing the proposed development site and its surroundings. Mr. Phillips then asked what Mr. Dookhi sees in the image.

Mr. Phillips then pointed out that the proposed development site is located next to his property which was impacted by the veld fire which originated on Greenwich Farm. He then mentioned that the planned landfill design specification presentation did not mention anything about firebreaks and how his property would be protected from future veld fires.

Mr. Dookhi responded that fire breaks are a requirement for inclusion in landfill design and that the final design specifications will offer detail in the development of fire breaks.

Mr. Phillips then queried the criteria for establishment of a landfill and requested to know if there were other sites considered. It was also mentioned that this area was prime agricultural land.

Mr. Dookhi requested Mrs. Swales from Geomeasure to mention the names of the 18 other sites that were investigated.

Mrs. Swales replied that the following sites were investigated since 2010: Kromellemboog, Vaalspruit, Vaalspruit East, Jobstown, Madadeni South, Braak Fontein, New Hope, Meadowstreams, Carrick, Meadowstreams West, Waterfall, Gordon, Wykhom, Dartry, Schaap Vlakte, Tiger Kloof, Knockbex and Greenwich Farm were all investigated and were not suitable for the development when being compared against the criteria for site selection. It was mentioned that reports have been compiled for each of these investigations.

Mr. Peterson requested Mr. Dookhi to show an accurate google map displaying the footprint of the proposed landfill site.

Mr. Dookhi then displayed the map, from the map, Mr. Peterson highlighted that the area to which the landfill is proposed is a watershed.

Mrs. Swales responded that at the time of the investigations, no wet areas were identified within the site.

Mr. Peterson explained that the dams on his property were used for breeding fish and that any contamination from the site would migrate towards the ponds and result in fish deaths. He elaborated that this tributary was an important tributary which ultimately flowed into one of the major rivers in the area.

The elevation of the site was also mentioned as a concern especially as it was seen that it may cause wind pollution and odours to the surrounding community.

Mr. Peterson then highlighted that the EIA presentation made mention that the two landfill sites at Osizweni and Madadeni were closed due to non-compliance. He then queried why those sites are not being rehabilitated and be used again for disposal of waste as it is likely that the new proposed site will not be managed appropriately as well.

In response, Mr. Ntshingila from the Newcastle Municipality responded that he is not in a position to answer why the two sites are not being rehabilitated but mentioned that he will note the question and seek response from the Municipality's Community Services Section.

Mr. Collier then queried what will happen when plastic materials get blown onto his property and when his stud cattle ate the plastics, in instances where the waste is not covered.

Mr. Dookhi responded that normally waste should be covered on a daily basis but there may be occasional instances when it is not, in that event, litter control fences surrounding the landfill site will prevent windblown litter from escaping the site.

Mr. Peterson then queried how sure is the engineer that waste will be covered on a daily basis and how can they as the community be expected to accept the landfill if the municipality is failing to maintain the present one.

Mr. Dookhi responded that as part of their recommendations for the operation of the landfill site, they will advise the municipality to outsource the landfill operations and maintenance, so as to ensure that the operations are undertaken accordingly and environmentally compliant.

Mr. Wade queried why the other investigated sites were rejected.

Mrs. Swales responded that the site investigation began about 4 years ago and that 17 other sites were investigated; she then went through the list of aspects which contribute as fatal flaws, hence making a site not suitable for landfill development. She continued to mention that if a fatal flaw was identified on a site, it was immediately eliminated from the list; however, sites were also eliminated due to the landowners not giving consent to undertake the investigations on their land.

Mr. Scheepers mentioned that the statement that site selection investigations began four years ago is not correct.

Mr. Dookhi responded that reports for all site investigations undertaken were compiled and submitted to the Municipality.

Mrs. Swales added that the report she had just referenced was dated October 2010 and that the reports could be provided as proof.

It was then queried why so much money has been spent by the Municipality on buying the land.

Mr. Ntshingila responded that as far as he was aware the purchase of land had not been finalised but he promised to liaise with the Real Estates Section.

Mr. van der Merwe mentioned that an amount of R 3, 8 million was spent on acquiring the land; he then asked if the proposed development is a possibility or if it definite that the landfill will be established.

It was responded that the competent authority will make the decision of whether the site can be established or not.

Mr. van der Merwe then asked why the Municipality has paid the money if that is this the case.

Mr. Ntshingila responded that the purchase of land was not yet finalised.

Mr. van der Merwe then requested that they get an undertaking from the Municipality stating that land would not be purchased until final approval is received from the Department of Economic Development, Tourism and Environmental Affairs.

Ms. Gasa requested that all issues relating to the purchase of land be raised outside of the EIA process as the public meeting was for the proposed development in terms of the EIA and not to answer questions relating to the purchase of land.

Mr. van der Merwe responded by stating that he had written two letters to the Newcastle Municipality regarding the matter and received response stating that he must attend the public meeting in order to get answers regarding the land purchase. He then highlighted concerns that no senior management was available to answer the questions.

Mr. Phillips reiterated that the Newcastle Municipality should have sent Senior Management to answer their questions and considers the meeting closed.

Mr. Peterson queried why the landfill was being proposed on a hill.

Mr. Dookhi responded that the landfill site can be engineered making it possible to develop a site on a hill although the proposed landfill footprint is located on the lower lying area of the Greenwich Farm.

Mr. Peterson then requested that other appropriate sites be assessed as the proposed development site has many flaws not identified and can assure that there are better sites for a landfill establishment.

Mr. Schoeman mentioned that the land had been previously undermined for coal and stated that he had documentation to prove this. Mrs. Swales responded that no information of the sort was forthcoming from the land owner. However, core samples had been discovered on site during her investigation and these cores were identified as sandstone. She also added that no coal was intersected during the drilling of the up-gradient and down-gradient boreholes on site and pointed out the locations of these boreholes on the map. Mrs. Swales requested Mr. Schoeman to forward her the information regarding the previous mining on site.

The issue of road access to the site was also raised and the Municipality was asked to provide clarity of where the road was to be situated and whether the costs associated with the access road had been estimated as yet.

Mr. Ntshingila responded that the route of the access road could not be confirmed at that stage, but explained that they had already visited the site to get an idea of the access road route.

Mr. Dookhi added that the length of the possible access road is approximately 4 kms but that this alignment and length has not been confirmed.

Mr. Schoeman stated that he had calculated an estimated cost in the region of R5 million.

Mr. van der Merwe then asked the attendees if there was any single person that received a sufficient answer to the questions asked.

The attendees replied no.

Mr. Nhlapho then mentioned that their questions as the community were not being answered and that he is of the opinion that he should not ask any further questions because they will not be answered.

Mr. van der Merwe then queried when the responses to their questions should be expected.

Ms. Gasa replied that it is impossible to state at the meeting the exact dates responses would be received because most of the responses would have to come from the Municipality.

It was therefore suggested that the appointed consultants do not continue with the work until the transfer of land issue has been clarified and it was requested that at the next meeting the Municipality should send a representative from Senior Management.

Mr. Peterson mentioned that the process of notification to landowners was not done properly.

Ms. Gasa responded by stating that the Background Information Documents were given to the landowners residing on the farm, but that due to the unclear access to the farm located across from the site, the English BIDs were given to Mr. Gama to share with the farmers. She also added that requests for landowners wishing to register as Interested and Affected parties for the process were received.

Mr. Dookhi queried if the landowners were opposing the proposed landfill site because the site is not suitable to be developed as a landfill or because the landowners were not notified prior to land purchase.

Mr. Peterson responded that both scenarios were applicable as the site was not technically suitable for the development and that they as landowners were not notified of the process.

5. CLOSURE

Ms. Gasa proceeded to thank the attendees for attending the meeting and assured them that all relevant issues and concerns will be incorporated into the Draft Scoping Report which will be circulated for comment for a period of 40 days.

The meeting concluded at 12:42 pm


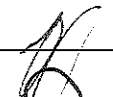
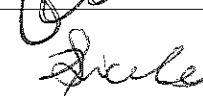

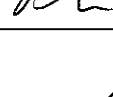







Prepared by: Nokukhanya Gasa

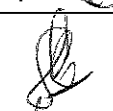
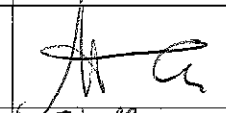
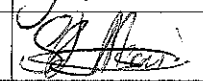


Taryn Swales


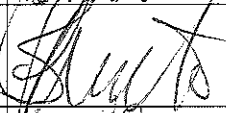







NEWCASTLE GENERAL WASTE LANDFILL EIA- SCOPING PHASE MEETING- 25 NOVEMBER 2014

No	Full Names	Organisation	Contact details	Email address	Signature
1	NOKUCHANYA CIASA	GEOMEASURE GROUP	031 765 1900	khanya@geomeasuregroup.co.za	
2	MICHAEL JACA	GEOMEASURE GROUP	031 765 1900	michaelj@geomeasuregroup.co.za	
3	Stephen Wade	LAND OWNER	083 525 9642	redrocks@telkom.co.za	
4	Taryn Swales	Geomeasure Gp	031 765 1900 082 721 1816	taryn@geomeasuregroup.co.za	
5	BRADLEY WADE	LAND OWNER	082 8099518	BRADMWADE@GMAIL.COM	
6	Brigitte Lauterbach	Land Surveyors	0343125761	sel@intekom.co.za	
7	DANIE PRETORIUS	LAND OWNER	0835399774	dpretorius@yahoo.com	
8	DR H. A. SEEDAT	LAND OWNER	0837886875	hayseedat@gmail.com	
9	AHMED RAMSOOL	LAND OWNER	0829254031	ahmed@finecc.co.za	
10	Mohammed Doest	Land owners	0827556664.	mydoest@gmail.com	
11	amos khumalo		0278626428		


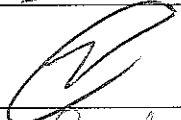

NEWCASTLE GENERAL WASTE LANDFILL EIA- SCOPING PHASE MEETING- 25 NOVEMBER 2014

12	Mishack Nhlape		082 7024 964	M Nhlape
13	G M Gamo		079 396 7237	
14	JESSIE		0828365909 079 826	JESSIE
15	Gwinete Madlala		076196 9374	G.M Madlala
16	Thembi Mlethu		0827027440	Te Mlethu
17	Nomcebo Ncema		0720440496	N Ncema
18	Sonwembera Smeleane		0728391154	S Smeleane
19	Sindisiwe SHABALALA		0711371159	S.H SHABALALA
20	Zinhle Sithole		063 176 7192	ZP. S Sithole
21	SULIMAN PARUK		082 44 00580	
22	RIAZ CHOONAWALA		083 786 8761	
23	Seelo Ntomi		0727034734	

NEWCASTLE GENERAL WASTE LANDFILL EIA- SCOPING PHASE MEETING- 25 NOVEMBER 2014

24	Borogani Shabalala	0795923638			
25	PETERSON, Craig / Suzy	082 8856370	NORSELAND FARM	norselandfarm@cape.co.za	
26	Phillips, Lloyd	0822552285 0767223345	Gardenia Farm	sunstate@mweb.co.za lloydphillips78@gmail.com	
27	COLLYER GRANT	0824938528	NOORIKRANTZ FARM	grantcollyer@gmail.com	
28	Heerema Schoeman	0828007818	Hotina Potray Carriek Farm	hotinas@gmail.com	
29	GERT STRYDOM	0824448005	AFRIFORUM	gertstrydom22@gmail.com	
30	PHILLIPS JULIAN	0825001234	MOTDELLINGTE FARM	SCREENIT@GWISA.CO.ZA	
31	GERT V D MERWE VAN DER MERWE + ASS ATTORNEYS also various Interested / Affected Parties.	0876546209 simone@vdmccs.co.za	62 RIGALL AVE WATERLOOF PLETONIA		
33	M SWANE POEL	0836259394	NEWCASTLE MUNICIPALITY	MICH. SWANE POEL @ NEWCASTLE.GW.ZA	
34	HA SCHEEPERS	082 386 2627	CARRIEK FARM NEWCASTLE	henk.scheepers@vodanail.co.za	

NEWCASTLE GENERAL WASTE LANDFILL EIA- SCOPING PHASE MEETING- 25 NOVEMBER 2014

35	Phelelani Ntshingila	Newcastle Municipality	034 328 3300	phelelani.ntshingila@newcastle.gov.za	
36	Thendliwe Gama	Killbarchan	0606176192		T.L. Gama
37	Sihamba GOLA	SGI	034 3128 678		<u>Lozi</u>
38	Irsheed Peer	SGI	034 3128678	irsheed@sgi.za.com	
39	Nash Dookhi	Envitech Solutions	082 823 3000	nash@envitech.co.za	 PP
40					
41					
42					
43					
44					
45					

REQUEST FOR I&AP REGISTRATION

YOUR INVITATION TO COMMENT

You are invited as an Interested and Affected Party (I&AP) to register and comment on the proposed establishment of a general waste landfill site to be located in Newcastle. Please return the completed registration form to Nokukhanya Gasa before **05 November 2014**.

PLEASE NOTE - IF YOU DO NOT REGISTER AS AN I&AP, YOU WILL NOT AUTOMATICALLY RECEIVE FURTHER INFORMATION ON THE PROJECT

Ms. N Gasa
Fax: (031) 765 1935

e-mail: _____

Title: <i>M.R.</i>	First name: <i>SULIMAN</i>	Surname: <i>LAKHI</i>	Initials: <i>S.A.</i>
Organisation:		Designation: <i>NEIGHBOURING RESIDENT</i>	
Postal Address: <i>PO-Box 132</i>		<i>NEWCASTLE</i>	
Postal Code: <i>2940</i>			
Tel No: <i>034 3121427</i>		Cell No: <i>0827869886</i>	
Fax No: <i>034 3263347</i>		E-mail: <i>soly@freshfields.co.za</i>	

COMMENTS

Kindly forward us details of I&APs that you think might have interest in the proposed development. Thank you for your participation.

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Ms. N Gasa
Fax: (031) 765 1935
e-mail: nokukhanya@freshfields.co.za

Title: MR	First name: Ahmed	Surname: LAKH	Initials: AS
Organisation:	Designation:		
Postal Address: P O BOX 132 - NEWCASTLE			
Postal Code: 2940			
Tel No: 034 212 1427		Cell No: 082 478 8686	
Fax No: 034 226 8347		E-mail: hassan@freshfields.co.za	

COMMENTS

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Ms. N Gasa
Fax: (031) 765 1935
e-mail: khanya@geomeasuregroup.co.za

Title: MR First name: GERT Surname: VAN DER MERWE Initials: GT
 Organisation: VAN DER MERWE Designation: ATTORNEY
 Postal Address: _____
 Postal Code: _____
 Tel No: 0876540209 Cell No: _____
 Fax No: (012) 3435435 E-mail: simone@dmass.co.za

COMMENTS

Representing a group of interested and affected parties.

Kindly forward us details of I&APs that you think might have interest in the proposed development. Thank you for your participation.

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Ms. N Gasas
Fax: (031) 765 1935
e-mail: khanya@geomeasuregroup.co.za

Title: MR	First name: CRAIG	Surname: PETERSEN	Initials: C
Organisation: NORSELAND FARM	Designation: CO-OWNER		
Postal Address:	PO BOX 369, NEWCASTLE, 2940		
Postal Code:	2940		
Tel No:	Cell No: 071 221 6146		
Fax No:	E-mail: norselandfarm@yahoo.com		

COMMENTS

WE OWN LAND ADJOINING THE PROPOSED SITE (CORRIER FARM) AND ARE IN THE PROCESS OF ESTABLISHING COMMERCIAL AQUACULTURE. THE RUN OFF FROM THE DUMP SITE WILL ENTER INTO AND POLLUTE OUR STREAMS/DAMS. IN ADDITION WE HAVE IDENTIFIED A SITE TO ERECT OUR HOUSE WHICH FACES ONTO THE PROPOSED LANDFILL SITE.

I STRONGLY OBJECT TO THE ESTABLISHMENT OF THE SITE.

Kindly forward us details of I&APs that you think might have interest in the proposed development. Thank you for your participation.

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Ms. N Gasas
Fax: (031) 765 1935
e-mail: khanya@geomeasuregroup.co.za

Title: MR	First name: AHMED	Surname: LAURENCE	Initials: ASC
Organisation: FINE CASH & LARRY	Designation: DIRECTOR		
Postal Address: P.O. BOX 374			
Postal Code: 2940			
Tel No: 03431 21482	Cell No: 0829234031		
Fax No: 03431 21484	E-mail: ahmed@finecc.co.za		

COMMENTS

I OBJECT TO LANDFILL SITE BEING SO CLOSE TO MY HOME (S. HILLTOP)

Kindly forward us details of I&APs that you think might have interest in the proposed development. Thank you for your participation.

YOUR INVITATION TO COMMENT

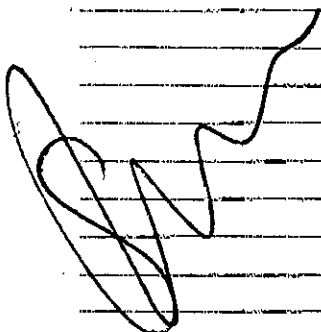
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Ms. N Gasa
Fax: (031) 765 1935
e-mail: khanya@geomeasuregroup.co.za

Title: Mr	First name: Stephen	Surname: Wade	Initials: STM
Organisation: Land owner	Designation: Private		
Postal Address: P.O. Box 794			
Postal Code: 2940			
Tel No: 034-3123231	Cell No: 083 6259642		
Fax No: 034-3127154	E-mail: redrocks@telkom.co.net		

COMMENTS



Kindly forward us details of I&APs that you think might have interest in the proposed development. Thank you for your participation.

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Ms. N Gasa
Fax: (031) 765 1935
e-mail: khanya@geomeasuregroup.co.za

Title: DR	First name: HYDER	Surname: SEEDAT	Initials: H.A.
Organisation: B&H PROPERTY INV.		Designation: DIRECTOR	
Postal Address: P.O. BOX 25029, NEWCASTLE			
Postal Code: 2940			
Tel No: 034 315 3750		Cell No: 083 788 6875	
Fax No: 086 218 0889		E-mail: sseedat6@gmail.com	

COMMENTS

1. The landfill site will affect the underground water table of the area. At present, the water supply of many of the farms in the area depend on natural spring water for both domestic and agricultural use. This area (i.e. the proposed landfill site) is one of the catchment areas for the underground water supply.
2. It will cause health problems to the local community i.e. the farm dwellers and the inhabitants of Kilbarchan, Tigerskloof and surrounds like Hilldrop.
3. Our children and grandchildren already have chest problems due to the proximity of the Karbochem Chemical Plant. Your proposed landfill site will further aggravate these existing health problems.
4. Rodents, flies, mosquitos will further add to other health problems.
5. South Africa is a dry country by World standards and every drop of underground

Kindly forward us details of I&APs that you think might have interest in the proposed development. Thank you for your participation.

please see page 6...

water is precious. Please don't aggravate this situation by interfering with our catchment areas.

6. Due to the proximity of the landfill site to the Ingagane River, there is a very strong possibility that contamination of the river can and may take place. The effects on the wildlife in the area will be disastrous. Contamination will be in the form of seepage.

7. Another foreseeable problem is that the value of property in the area will be drastically affected. Will homeowners be compensated for this potential loss of value on their properties'?

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Ms. N Gasa
Fax: (031) 765 1935
e-mail: khanya@geomeasuregroup.co.za

Title:	DR	First name:	Ahmed	Surname:	Jamalooden	Initials:	
Organisation:	Resident	Designation:					
Postal Address:	PO Box 281, Newcastle						
Postal Code:	2940						
Tel No:	0728892581	Cell No:	0728892581				
Fax No:	0343756660	E-mail:	exportin1@aol.com				

COMMENTS

- ① Traffic, risk to children on road, horse riding, jogging, thus increasing liability to Municipality of Newcastle
- ② the health risk to residents will open municipality to litigation
- ③ Drop property value in exclusive neighborhood. Municipality will be exposed to lawsuit directly
- ④ area has multiple bed and breakfast for visitors of Newcastle - who will be exposed to pollution from landfill.

Kindly forward us details of I&APs that you think might have interest in the proposed development. Thank you for your participation.

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Ms. N Gasa
Fax: (031) 765 1935
e-mail: khanya@geomeasuregroup.co.za

Title: DR	First name: Regina	Surname: HURLEY	Initials: S
Organisation:	Resident	Designation:	Occupant
Postal Address:	PO Box 281, Newcastle		
Postal Code:	2940		
Tel No:	072 889 2539	Cell No:	072 889 2539
Fax No:	034 375 6660	E-mail:	bikingregina@aia.com

COMMENTS

AS A Resident of Hilldrop Drive I am writing to discuss the problems with the proposed placement of general waste landfill.

- ① the wind will blow debris on top of the houses below
- ② the smell will permeate the air of the residents/pollute
- ③ the trucks will destroy the road into Hilldrop, drop waste along the road
- ④ reduce property value
- ⑤ Health risk to the residents of Hilldrop
- ⑥ Will also pollute the Newcastle Mall and the Blackrock Casino - 2 attractions for Newcastle

Kindly forward us details of I&APs that you think might have interest in the proposed development. Thank you for your participation.

- ⑦ Rain water runs down hill from Hilldrop will be polluted and contaminated.

YOUR INVITATION TO COMMENT

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PLEASE NOTE - IF YOU DO NOT REGISTER AS AN I&AP, YOU WILL NOT AUTOMATICALLY RECEIVE FURTHER INFORMATION ON THE PROJECT

Ms. N Gasa
Fax: (031) 765 1935
e-mail: khanya@geomeasuregroup.co.za

Title:	Mrs First name: Kirsten	Surname: PhillipS	Initials: K.D
Organisation:	Gardenia Farm	Designation:	Home Owner/Employee
Postal Address:	112, Newcastle		
Postal Code:	2940		
Tel No:	/	Cell No:	0712437911
Fax No:	0343121401	E-mail:	kirstdawnped@hotmail.com

COMMENTS

I am living on a farm which is in close proximity to the "waste landfill" site's proposed location. I am not prepared to have the air I breathe in everyday completely polluted by the waste landfill site, certain plastics will be burnt and can produce toxic substances - which I and many others will have to be living with. Air pollution which is effected can contribute to Acid Rain which can ruin and damage certain crops being planted in the Area close to

Kindly forward us details of I&APs that you think might have interest in the proposed development. Thank you for your participation.

the landfill site. It's not fair to place such an establishment so close to farms and farmers which work so hard to produce crops which most of us eat. I'm not happy with future food I put into my mouth being dangerous.

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Ms. N Gasa
Fax: (031) 765 1935
e-mail: khanya@geomeasuregroup.co.za

Title: Mr	First name: Lloyd	Surname: Phillips	Initials: LPW
Organisation: Farmers Association	Designation: Vice chairmen		
Postal Address: 112, Newcastle			
Postal Code: 2940			
Tel No: /	Cell No: 076 722 3345		
Fax No: /	E-mail: Lloydphillips18@gmail.com		

COMMENTS

As Vice chairman of the Newcastle Farmers Association I feel that it is my duty to express my concerns about the proposed landfill site. Firstly Badly managed landfill sites may attract Vermin and cause Litter- which is a problem to our environment, especially as many Neighbours have live stock on their farms. Secondly waste eventually Rots and causes a terrible Smell in the Air and may generate Methane Gas- which is explosive - which is putting people

Kindly forward us details of I&APs that you think might have interest in the proposed development. Thank you for your participation.

close by the waste Landfill site in danger.

YOUR INVITATION TO COMMENT

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Ms. N Gasa
Fax: (031) 765 1935
e-mail: khanya@geomeasuregroup.co.za

Title:	Mr First name: Michael	Surname: Phillips	Initials: M.L
Organisation:	Sunflower estates	Designation:	Dairy Farmer.
Postal Address:	112, Newcastle		
Postal Code:	2940		
Tel No:	/	Cell No:	082 255 2285
Fax No:	/	E-mail:	sunstate@mweb.co.za

COMMENTS

I am an owner of a fully functional Dairy Stud farm- which is the closest effected farm to the waste landfill site- I object to any further establishment as certain Bacteria from the landfill site will be carried and will contaminate the milk we produce- as well as our Cattle. We will then in turn have a bad effect on the production of milk and we are most concerned about the health of our Cattle on our farm. There will be

Kindly forward us details of I&APs that you think might have interest in the proposed development. Thank you for your participation.

Stray dogs visiting the site which carry diseases, and they can also be a problem to other neighbouring Animals.

From: Ethel Von Abo <Ethel@kwanalu.co.za>
Sent: 28 October 2014 01:49 PM
To: khanya@geomeasuregroup.co.za
Subject: Application for a waste management license and environmental authorization:
Newcastle

Importance: High

Dear Khanya

The KwaZulu Natal Agricultural Union would be grateful if you could let us have a copy of this application for our perusal.

Kind regards
Ethel

Ethel von Abo
Kwanalu
P O Box 100123
3209 Scottsville

Tel. 033-3429393
Fax. 033-3457141
Website. www.kwanalu.co.za
email: ethel@kwanalu.co.za



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From: Esmeralda Visser <adminnf@normandien.co.za>
Sent: 27 October 2014 10:48 AM
To: khanya@geomeasuregroup.co.za
Subject: EIA (Environment Impact Assessment) Waste Management License
Attachments: EIA Notice.pdf

Good day

Normandien Farms (PTY) LTD would like to register as an Interested and Affected Party for the attached notification. How do I proceed with the registration?

Thank you
Kind Regards,

Esmeralda Visser
Normandien Farms (Pty) Ltd
Office: +27 (0) 87 285 0845 /
+27 (0) 34 31 49800
Extension: 312
Fax: +27 (0) 34 314 9802
Fax to Email: 086 202 0171
Email: adminnf@normandien.co.za
Physical: P39 Road, Normandien; Newcastle
Forestry | Sawmilling | Manufacturing | Logistics



khanya@geomeasuregroup.co.za

From: dtpretorius@yahoo.com
Sent: 23 October 2014 04:22 PM
To: khanya@geomeasuregroup.co.za
Subject: DC25/0007/2014. DC25/WML/0001/2014

Hi

I would like to be registered as an AFFECTED party. I want more information and a map of the farm Greenwich 8784 where you are planning to make the waste landfill.

Pls confirm that I am registered.

Dankie

DT Pretorius
0835399774

Sent from my BlackBerry® wireless device

From: [Irshaad Peer](#)
To: khanya@geomeasuregroup.co.za
Cc: [Shabir Goga](#)
Subject: Newcastle Landfill
Date: 23 October 2014 02:14:42 PM
Attachments: [104052506530696Business_CARDS_IRSHAAD_2012-1.jpg](#)
[104048865341323image002.jpg](#)
[20141023_140320_resized.jpg](#)

Good day

Please provide additional information on the site/development and register the following as interested and affected persons:

I Peer
S H Goga
HAY Seedat

Kindly conform receipt if this email.

Regards
Irshaad

Irshaad Peer CA(SA)



From: [Hofina](#)
To: khanya@geomeasuregroup.co.za
Subject: Proposed landfill site Newcastle
Date: 27 October 2014 02:35:52 PM

Please register me as an effected party.

I am a owner of two neighbouring farms, Carrick and Meadowstreams.

PO Box 2869 Newcastle 2940

Herman Schoeman
0828007818

**Boomzicht Landgoed t/a
Hofina Poultry**

Tel no.: 082 882 0107
Fax no.: 086 600 9289
Cell no.: 082 800 7818

From: [norselandfarm](#)
To: [gert@designdesk22.co.za](#); [khanya@geomeasuregroup.co.za](#); [Peet Liebenberg](#); [Chris Fourie](#)
Cc: [Sanette Viljoen](#); [Herman Schoeman](#); [New Norseland \(Pty\) Ltd](#)
Subject: Re: Registration as Interested Party: Newcastle General Waste Landfill Establishment
Date: 27 October 2014 11:31:42 AM
Attachments: [RAW.dat](#)

Dear Sir/Madame

Please also register me as an effected party.

I own one of the neighbouring farms and would appreciate you advising me why I have not been approached directly?

Regards Craig Petersen
Norseland Farm (incorporating Carrick and Hope)

----- Original message -----

From: Gert Strydom <gertstrydom22@gmail.com>
Date: 27/10/2014 09:51 (GMT+02:00)
To: khanya@geomeasuregroup.co.za, Peet Liebenberg
<investormail@telkomsa.net>, [Chris Fourie <chris@afriforum.co.za>](mailto:chris@afriforum.co.za),
norselandfarm@yahoo.com
Cc: [Sanette Viljoen <sdejager.dejager@gmail.com>](mailto:sdejager.dejager@gmail.com)
Subject: Registration as Interested Party: Newcastle General Waste Landfill
Establishment

Geomeasure Group
POBox 1194
Hillcrest
3650

Dear Nokukhanya,

EIA Reference: DC25/0007/2014
WML Reference: DC25/WML/0001/2014

Please ensure that Afriforum Newcastle are registered as an Interested & Affected Party in the Application for a Waste Management License and Environmental Authorization process. Contact person: Gert Strydom to the details below.

Also please forward me the exact location (GPS / Google Earth Coordinates) of the proposed development on the farm Greenwich 8784. and the proposed layout drawing in PDF format

Regards

Gert Strydom

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Ms. N Gasu
 Fax: (031) 765 1935
 e-mail: khanya@geomeasuregroup.co.za

Title: Mr	First name: Shabir	Surname: Goga	Initials: SH
Organisation:	Shabir Gogela		Designation:
Postal Address:	PO Box 176, Newcastle		
Postal Code:	2940		
Tel No:	0343128678	Cell No:	0836262195
Fax No:	034354889	E-mail:	shabir@sgi.24.com

COMMENTS

Register me as I&AP

Kindly forward us details of I&APs that you think might have interest in the proposed development. Thank you for your participation.

YOUR INVITATION TO COMMENT

You are invited as an Interested and Affected Party (I&AP) to register and comment on the proposed establishment of a general waste landfill site to be located in Newcastle. Please return the completed registration form to Nokukhanya Gasas before **05 November 2014**.

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Ms. N Gasas
Fax: (031) 765 1935
e-mail: khanya@geomeasuregroup.co.za

Title: Mr	First name: Irshaad	Surname: Peer	Initials: I
Organisation:	Shahar Gogelhe	Designation:	Director
Postal Address:	PO Box 176, Newcastle		
Postal Code:	2940		
Tel No:	0343128678	Cell No:	0837869425
Fax No:	0866690052	E-mail:	irshaad@sgj.za.com

COMMENTS

Please add me as an I&AP

Kindly forward us details of I&APs that you think might have interest in the proposed development. Thank you for your participation.

From: [Ansa Serfontein](#)
To: khanya@geomeasuregroup.co.za
Subject: Waste Management (I&AP)
Date: 27 October 2014 11:06:10 AM
Importance: High

Good day

Please register me on above matter as interest party.

J H Serfontein
082 808 2602

**SIGNED PETITION AGAINST THE DEVELOPMENT
OF THE NEWCASTLE GENERAL WASTE LANDFILL**

#3



Petition against the establishment of a Municipal dump site on the farm Greenwich which borders:

- Hilldrop area;
- Hofina poultry;
- Newcastle farmers association;
- Various other farms.

The Newcastle Municipality have acquired the Farm Greenwich with the intention of establishing a municipal dump/refuse site. Should the dump site be established it will have the effect of:

- Reducing the value of all properties in the greater surrounding areas;
- Make it close to impossible to sell properties in the area;
- Cause pollution in the area both through wind borne odours and refuse as well as contaminating groundwater and streams; (The proposed site is situated on the rainfall catchment area for feeder streams that lead into the Ncandu and Horn rivers)
- Animals eating the wind borne plastic will perish;
- Squatters will establish housing in the surrounding area with the obvious resultant increase in crime;
- The area is the natural habitat for various endangered local species including the Oribi which will either be hunted to extinction or perish through loss of habitat;
- Other not mentioned.

The signatures appended below represent the names of people/organisations who are opposed to the establishment of the refuse site on what is currently pristine land in the midst of productive farm land and adjoining the upmarket residential area of Hilldrop.

Name	Address	Contact number	Signature
K. J. L. ROBINSON	KRANTZKOP FARM DUNDEE	034 212 3730	
L. P. W. Phillips	Gardenia Farm Newcastle	076722 3345	

#2

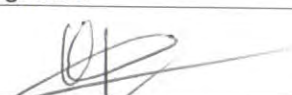
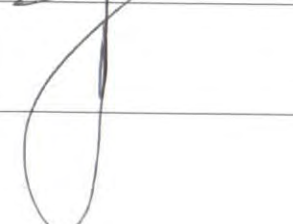
Petition against the establishment of a Municipal dump site on the farm Greenwich which borders:

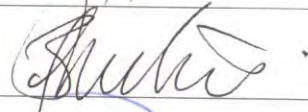


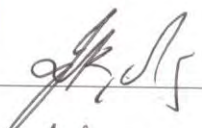

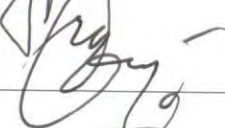



- Hilldrop area;
- Hofina poultry;
- Newcastle farmers association;
- Various other farms.

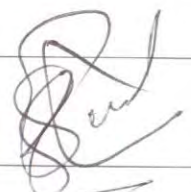

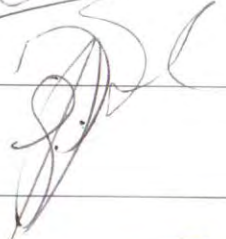


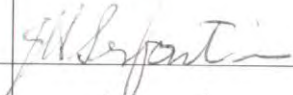
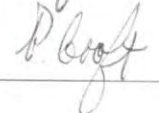
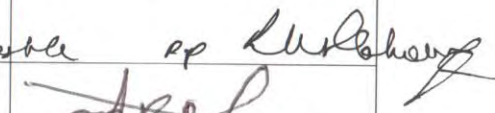
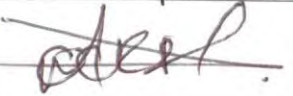
The Newcastle Municipality have acquired the Farm Greenwich with the intention of establishing a municipal dump/refuse site. Should the dump site be established it will have the effect of:

- Reducing the value of all properties in the greater surrounding areas;
- Make it close to impossible to sell properties in the area;
- Cause pollution in the area both through wind borne odours and refuse as well as contaminating groundwater and streams; (The proposed site is situated on the rainfall catchment area for feeder streams that lead into the Ncandu and Horn rivers)
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- Other not mentioned.

The signatures appended below represent the names of people/organisations who are opposed to the establishment of the refuse site on what is currently pristine land in the midst of productive farm land and adjoining the upmarket residential area of Hilldrop.

Name	Address	Contact number	Signature
H-J Vosloo	Res 326 Velliskrust	0832406237	
H van Wierburgh	Box 761 Newcastle	0825720369	

J.W. TAGGARD	P.O. Box 171	0828909218	Claguen
S. PETERSEN	P.O. Box 369	082 885 6370	
C. PETERSEN	- do -	071 241 6146	
A. BURGERS	P.O. Box 270	082 5500429	
J. G. KOTZÉ	P.O. Box 2852 Nk.	0828921081	
C. CRONJÉ	Box 1589 N/C	083 2836598	lobonja
G.J. GROBLER	Bus 21369 N/C	0823372947	
F.R. CRONJÉ	Bus 1589 N/C	0825546090	
J.S. Oosthuisen	Bus 9253 N/C	0721179404	
N. FERRIER	Box 1662 N/C	0823375686	
R. Muller	Box 113 N/C	082 8204665	

G. POTTERER	Postbus 33 LITRECHT	0829242379	
T. NIEL	Box 2 Juggo 2744	0834568772	
J. PHILLIPS	Box 2500 N/C	0825001234	
G. HAMBLBY	Box 9293 NWC.	0824135850	
DJ. BLEWIS	Postbus ^{P1814} SUIPERIS ^{X663} N/C	0823377451	
J.H. SERFOUNTIN	Box 7256 N/C	0828082602	
P. CROFT	Box 2234 N/C	0828007819	
R.M. ALEXANDER	0825777555	Box 119, unknown	
M. DOCEAT	0827556664	Box 23202	

#1


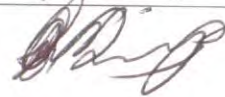
Petition against the establishment of a Municipal dump site on the farm Greenwich which borders:

- Hilldrop area;
- Hofina poultry;
- Newcastle farmers association;
- Various other farms.

The Newcastle Municipality have acquired the Farm Greenwich with the intention of establishing a municipal dump/refuse site. Should the dump site be established it will have the effect of:

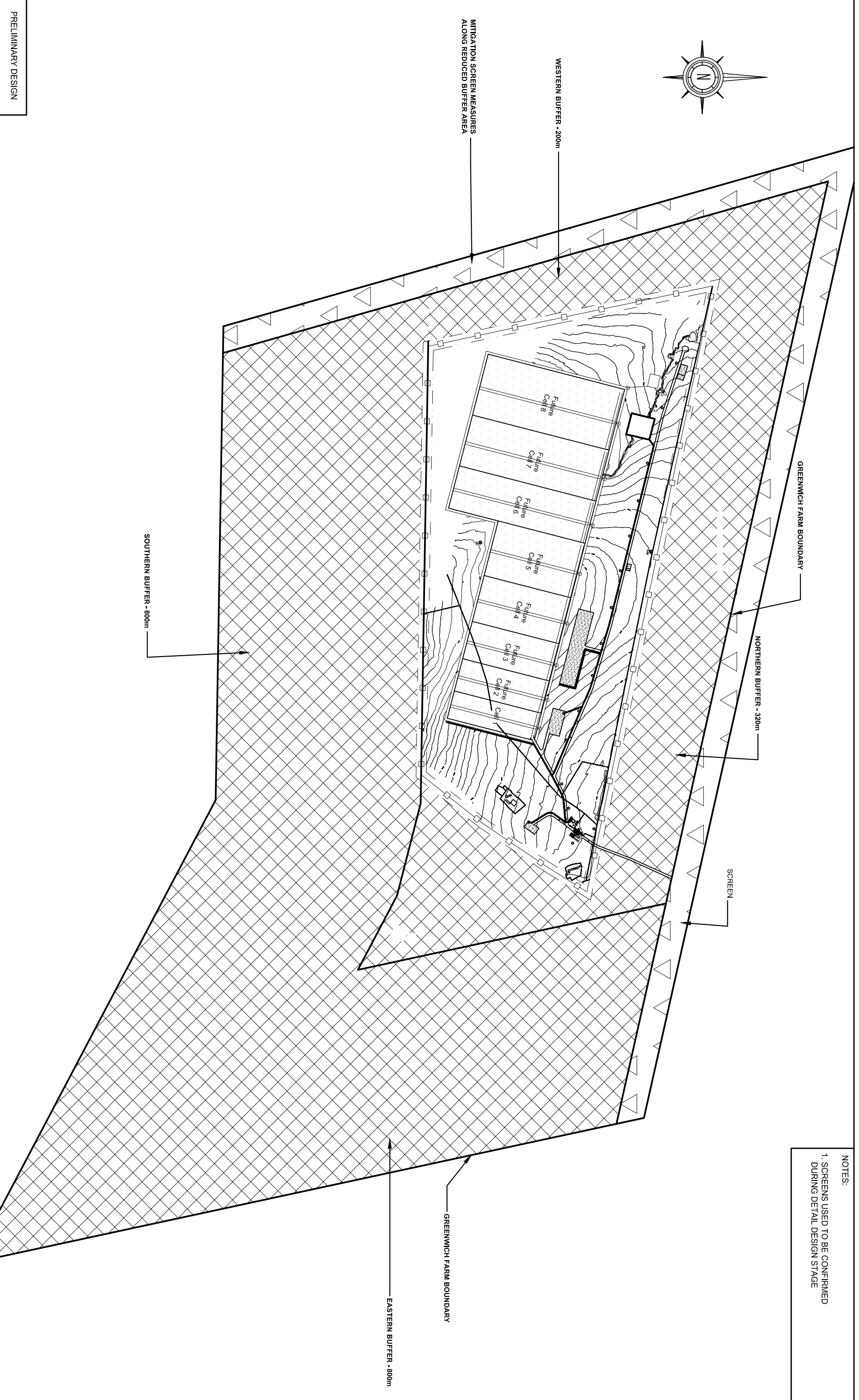
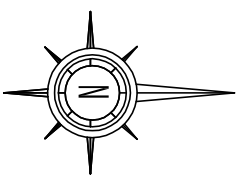
- Reducing the value of all properties in the greater surrounding areas;
- Make it close to impossible to sell properties in the area;
- Cause pollution in the area both through wind borne odours and refuse as well as contaminating groundwater and streams; (The proposed site is situated on the rainfall catchment area for feeder streams that lead into the Ncandu and Horn rivers)
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- The area is the natural habitat for various endangered local species including the Oribi which will either be hunted to extinction or perish through loss of habitat;
- Other not mentioned.

The signatures appended below represent the names of people/organisations who are opposed to the establishment of the refuse site on what is currently pristine land in the midst of productive farm land and adjoining the upmarket residential area of Hilldrop.

Name	Address	Contact number	Signature
GRANT JAMES COLYER	DEOIKRANTZ FARM	0824938528	
Lloyd Phillips	Gardenia Farm, Newcastle	0767223345	

NAME	ADDRESS	CONTACT No:	SIGNATURE
JC Journey	Bus 326 Wakekentown	0932710826	Journey
NJ DEVENISH	Bus 15 "	0928142326	NJ Devenish
M Wain Wally	Bus 259 Southden	0892646243	Wally
A. Bosman	Bus 9394 Hulla Heights	0833273570	Bosman
L Bosman	Bus 2094 Newcastle	0823543000	Bosman
MA Nesses	"Will Hope" MC	0826142005	MA Nesses
MS KHUMALO	BWIASPAS	0766211160	MS Khumalo
SS KHUMALO	TN0060	0766211200	SS Khumalo
L KOST	TN0060	0826970706	L. KOST
A Adenomon	Bus 2320, MC	0834109957	Adenomon
M Mthembu	Box 288 Edmore	0839579975	M Mthembu

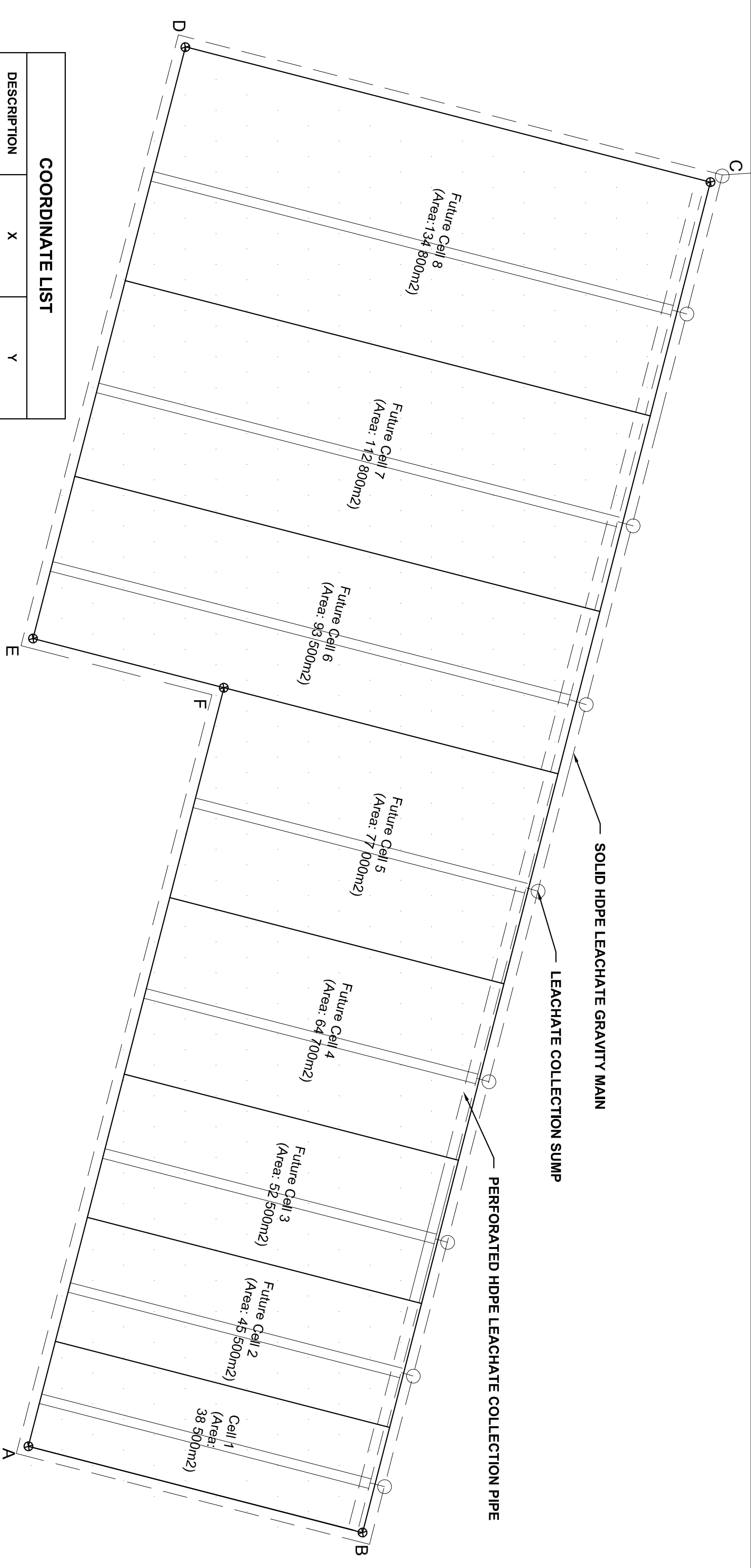
APPENDIX D
PRELIMINARY LANDFILL DESIGNS



NOTES:
1. SCREENS USED TO BE CONFIRMED DURING DETAIL DESIGN STAGE

PRELIMINARY DESIGN


NO.	DATE	APPROVED	DESCRIPTION	DESIGNED	DATE	ENGINEER	CLIENT	COMPLIANT	CLIENT	PROJECT TITLE	SCALE	JOB NUMBER	SHEET NO.	DRAWING NO.
1	06/03/2015	VS	FOR DISCUSSION	VS				 <p> SALISBURY 22 Spencer Avenue Belmont, 1501 South Africa 2810 Tel: +27-11-423 2810 Fax: +27-11-423 2811 info@envitech.co.za </p> <p> KING-STILLERMAN 101 Claremont Road Grahamstown, 6160 4th St. May's Road Kood 3810 Tel: +27-31-724 1555 Fax: +27-31-724 1556 brendon@envitech.co.za </p>	 <p> Newcastle Municipality Private Bag X 6621 Newcastle 2940 </p>	DESIGN AND CONSTRUCTION OF A NEW LANDFILL SITE FOR NEWCASTLE MUNICIPALITY BUFFER ZONE	1:6000	207-2008	2 OF 7	207-2008-2-REV1

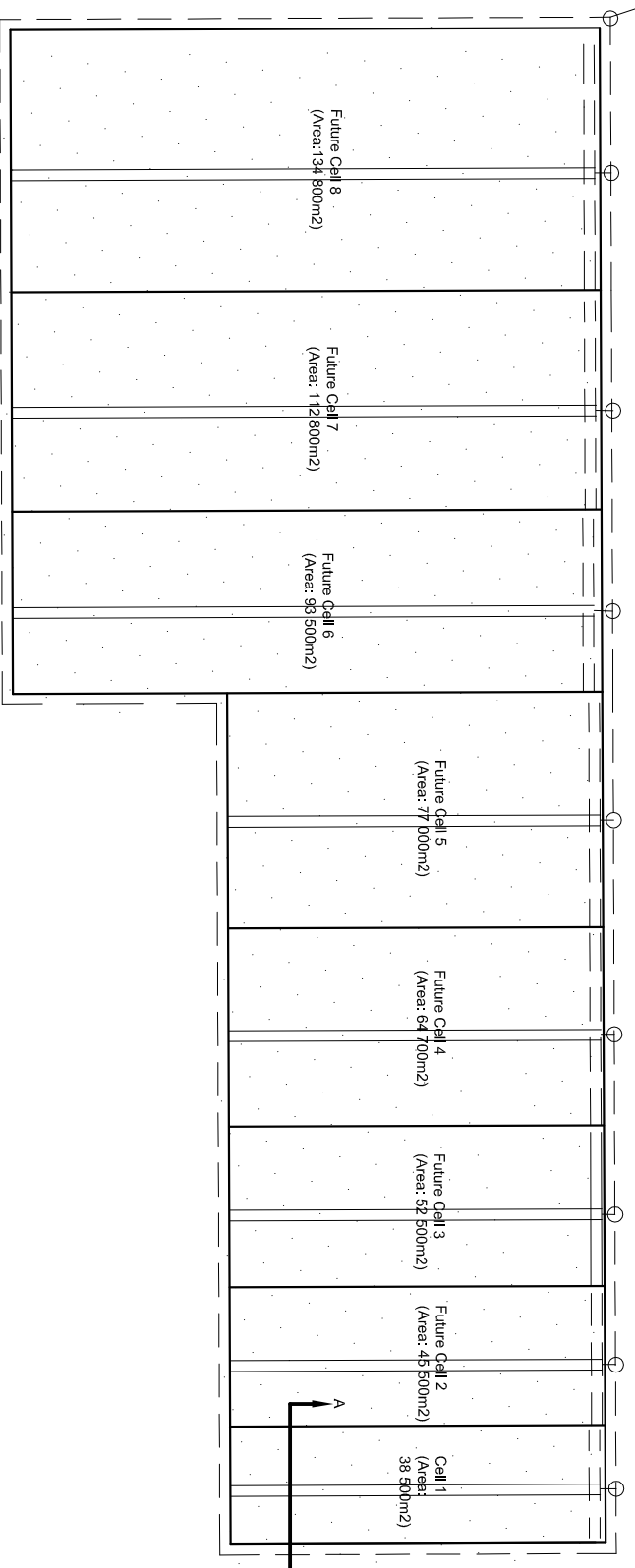


COORDINATE LIST		
DESCRIPTION	X	Y
A	-3082598.3954	91352.8268
B	-3082267.5608	91435.3369
C	-3081915.5906	90069.8924
D	-3082448.0965	89932.6801
E	-3082602.8004	90533.0689
F	-3082409.1266	90582.9734

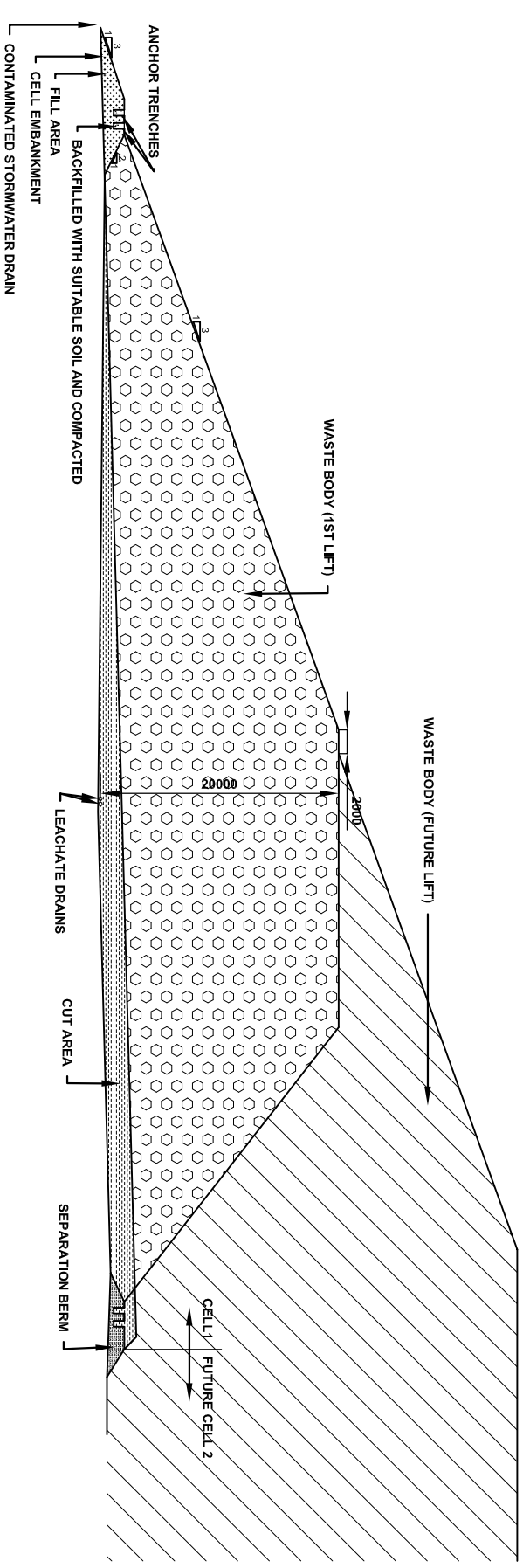
PRELIMINARY DESIGN

REVISIONS		APPROVALS		DRAWINGS		CLIENT		PROJECT TITLE		SCALE	
NO.	DATE	APPROVED	DESCRIPTION	DESIGNED	VS	ENGINEER	DATE	CLIENT	DATE	DATE	SCALE
1	06/03/2015	VS	FOR DISCUSSION	DESIGNED	VS	ENGINEER	06/03/2015	CLIENT			1:1000
				DESIGNED	ND	ENGINEER					207-2008
				DESIGNED	VS	ENGINEER					3 OF 7
				DESIGNED	ND	ENGINEER					207-2008-3-REV1

envitech solutions 22 Seberton Avenue Newmarket, 1501 South Africa 2010 Tel: +27-11-425 2810 Fax: +27-11-425 2811 info@envitech.co.za		Kings-Zulu-Natal District Municipality 418 St. Mary's Road Klood 3610 Tel: +27-31-724 1555 Fax: +27-31-724 1556 brendon@envitech.co.za	
 Newcastle Municipality Private Bag X 6621 Newcastle 2940		DESIGN AND CONSTRUCTION OF A NEW LANDFILL SITE FOR NEWCASTLE MUNICIPALITY LANDFILL CELL LAYOUT PLAN AND LEACHATE COLLECTION SYSTEM	



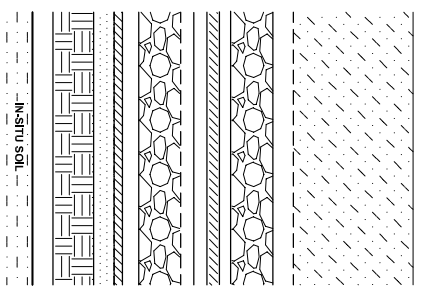
LAYOUT PLAN
SCALE 1 : 1500



TYPICAL SECTION A-A - LANDFILL CELL 1
SCALE 1 : 1200

PRELIMINARY DESIGN

NO.	DATE	APPROVED	DESCRIPTION	DESIGNED	ENGINEER	CLIENT	COMPLIANT	CLIENT
1	09/03/2015	VS	FOR DISCUSSION	VS	09/03/2015	CLIENT	<p>envitech solutions</p> <p>22 Spencer Avenue Birkenhead, 1501 South Africa 2810 Tel: +27-11-425 2810 Fax: +27-11-425 2822 info@envitech.co.za</p> <p>Kings-Zulu-Natal Dunbar House Governors Drive 4th St. Mary's Road Kloof 3610 Tel: +27-31-724 1555 Fax: +27-31-724 1556 envitech@envitech.co.za</p>	<p>Newcastle Municipality</p> <p>Private Bag X 6621 Newcastle 2940</p>



1m SELECTED WASTE TO ENSURE FREE DRAINAGE

NEEDLE PUNCHED NONWOVEN GEOTEXTILE MINIMUM NOMINAL MASS 200g/m²

NOMINAL MASS 200g/m²

150mm THICK CRUSHED ROCK AGGREGATE TO LEACHATE DRAINAGE LAYER

NEEDLE PUNCHED NONWOVEN GEOTEXTILE MINIMUM NOMINAL MASS 1000g/m²

20mm THICK DOUBLE SIDED TEXTURED HDPE LINER (COARSE TEXTURE DOWN)

100mm SAND CUSHION LAYER

NEEDLE PUNCHED NONWOVEN GEOTEXTILE MINIMUM NOMINAL MASS 200g/m²

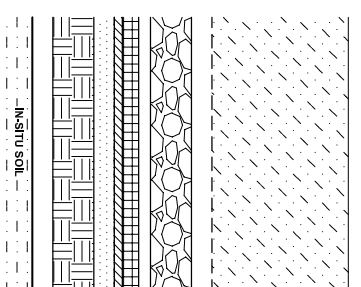
150mm THICK CRUSHED ROCK LEAK DETECTION

100mm SAND CUSHION LAYER

1.5mm THICK DOUBLE SIDED TEXTURED HDPE LINER (COARSE TEXTURE DOWN) GCL

150mm THICK BASE PREPARATION LAYER COMPACTED TO 93% OF MOD AASHTO MAXIMUM DENSITY

RIP AND COMPACT IN SITU TO 93% OF MOD AASHTO MAXIMUM DENSITY OR SHAPE WASTE MATERIAL AND COMPACT WITH A MINIMUM OF 4 PASSES WITH A 10 TON ROLLER



1m SELECTED WASTE TO ENSURE FREE DRAINAGE

NEEDLE PUNCHED NONWOVEN GEOTEXTILE MINIMUM NOMINAL MASS 200g/m²

150mm THICK CRUSHED ROCK AGGREGATE TO LEACHATE DRAINAGE LAYER

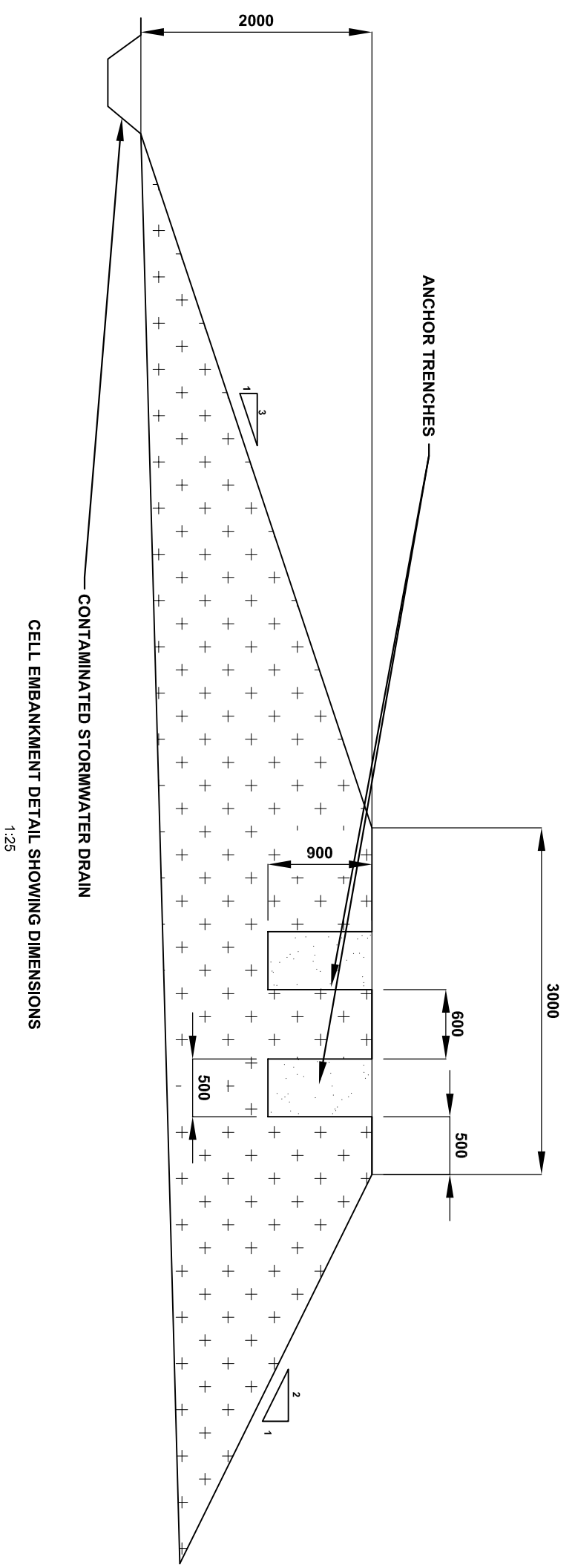
NEEDLE PUNCHED NONWOVEN GEOTEXTILE MINIMUM NOMINAL MASS 1000g/m²

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150mm THICK BASE PREPARATION LAYER COMPACTED TO 93% OF MOD AASHTO MAXIMUM DENSITY

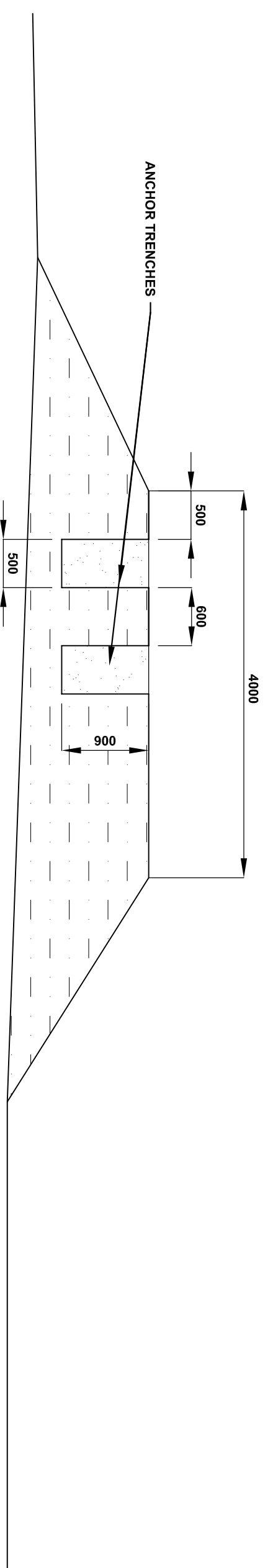
RIP AND COMPACT IN SITU TO 93% OF MOD AASHTO MAXIMUM DENSITY OR SHAPE WASTE MATERIAL AND COMPACT WITH A MINIMUM OF 4 PASSES WITH A 10 TON ROLLER

PROJECT TITLE	SCALE	AS SHOWN
DESIGN AND CONSTRUCTION OF A NEW LANDFILL SITE FOR NEWCASTLE MUNICIPALITY	JOB NUMBER	207-2008
TYPICAL SECTION OF CELL 1	SHEET NO.	4 OF 7
	DRAWING NO.	207-2008-4-REV1



CELL EMBANKMENT DETAIL SHOWING DIMENSIONS



1:25

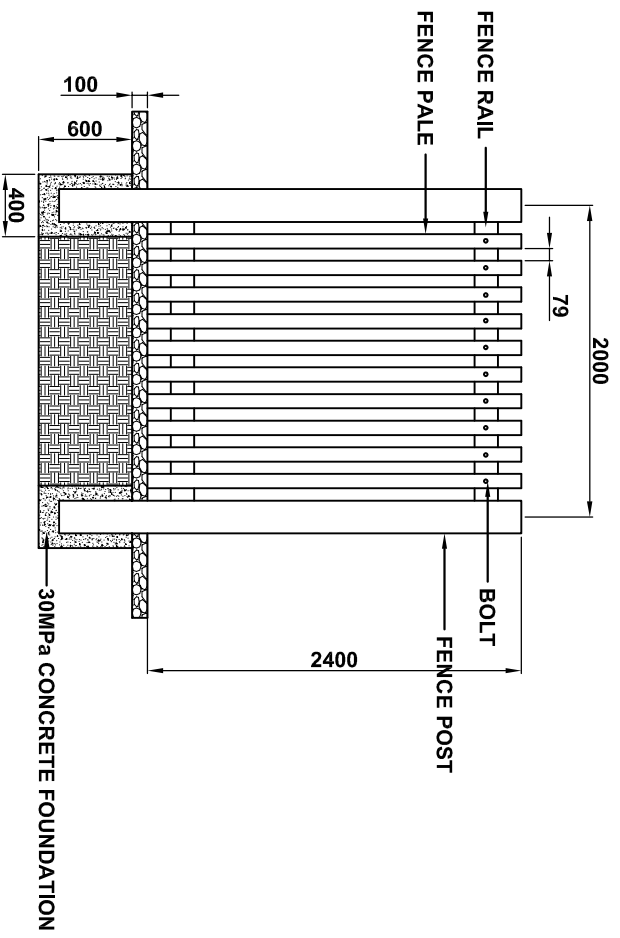


SEPERATION BERM DETAIL SHOWING DIMENSIONS

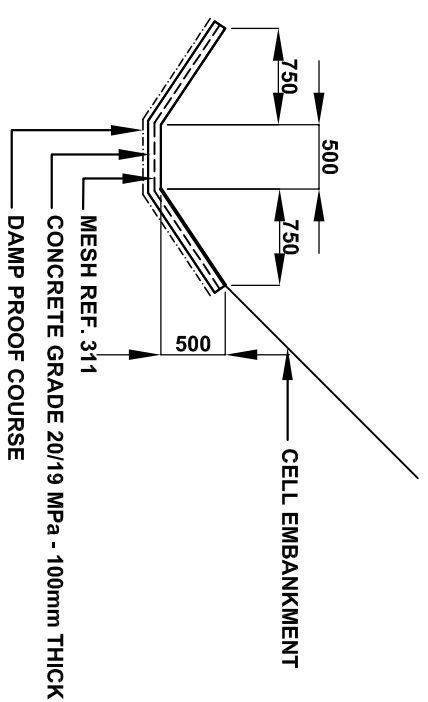
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PRELIMINARY DESIGN

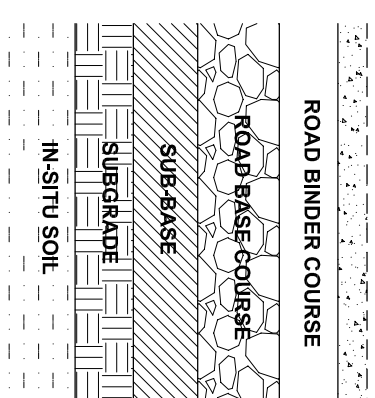
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1		09/03/2015		VS				FOR DISCUSSION		VS		ND		 22 Spencer Avenue Benoni, 1501 South Africa 2010 Tel: +27-11-425 2810 Fax: +27-11-425 2811 info@envitech.co.za		 Newcastle Municipality Private Bag X 6621 Newcastle 2940		DESIGN AND CONSTRUCTION OF A NEW LANDFILL SITE FOR NEWCASTLE MUNICIPALITY TYPICAL DETAILS OF CELL 1		1:25	
										ND		VS		King Zulu Nkomo Director of Waste 418 St. Mary's Road Kooz 3810 Tel: +27-31-7794 1555 Fax: +27-31-7794 1556 brensdon@envitech.co.za				JOB NUMBER 207-2008			
										VS		ND						SHEET NO. 5 OF 7		DRAWING NO. 207-2008-5-REV1	
										ND		VS									



CONCRETE PALISADE FENCE
SCALE 1 : 25

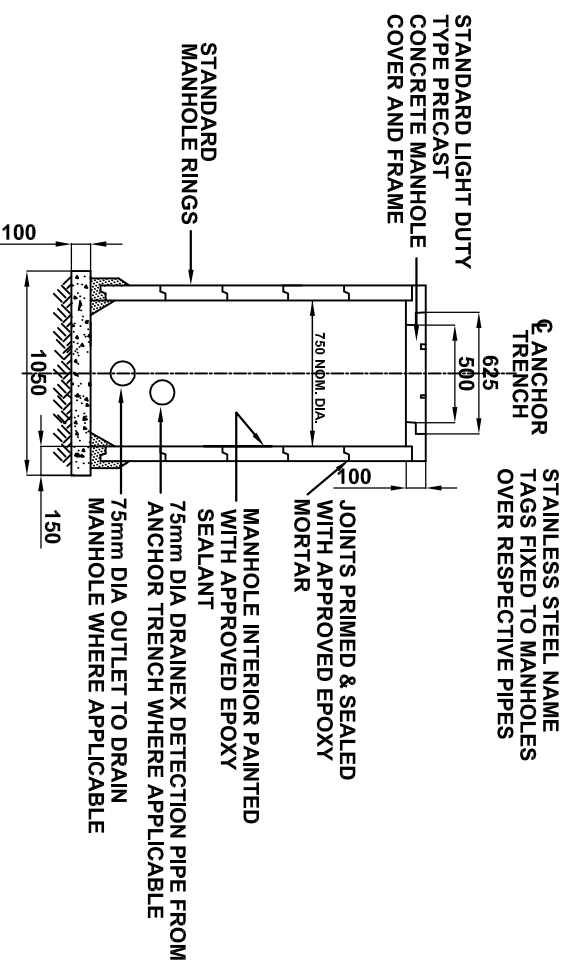


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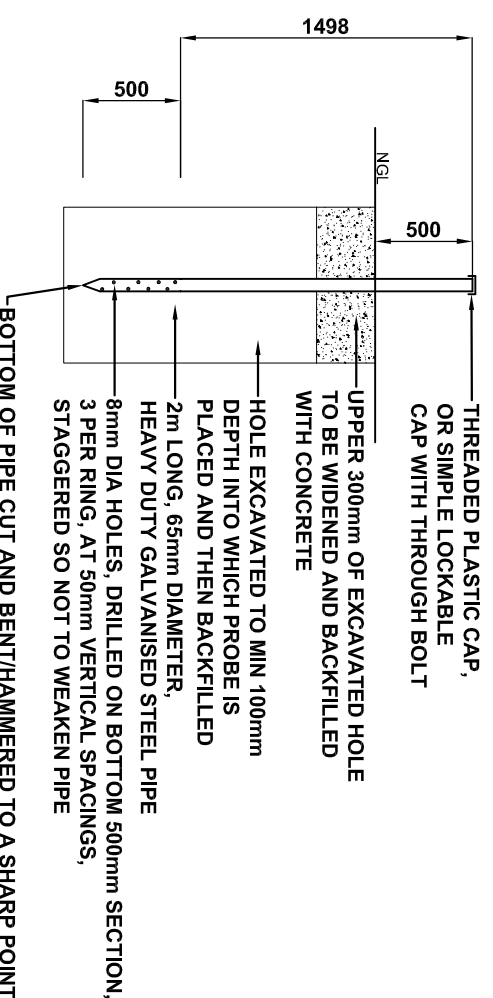


ROAD LAYERWORKS DETAIL
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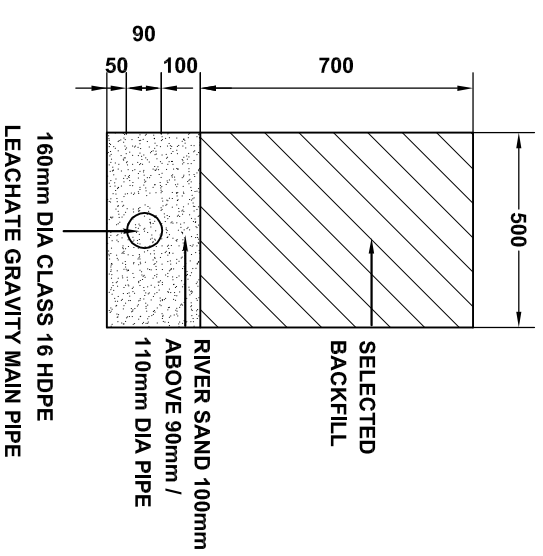
30mm ASPHALT WEARING COURSE
150mm THICK BINDER COURSE LAYER (G1 QUALITY MATERIAL) COMPACTED TO 93% OF MOD AASHTO MAXIMUM DENSITY
200mm THICK BASE COURSE LAYER (G3 QUALITY MATERIAL) COMPACTED TO 93% OF MOD AASHTO MAXIMUM DENSITY
150mm THICK BASE PREPARATION LAYER (G7 QUALITY MATERIAL) COMPACTED TO 93% OF MOD AASHTO MAXIMUM DENSITY
150mm THICK BASE PREPARATION LAYER (G9 OR SIMILAR) COMPACTED TO 93% OF MOD AASHTO MAXIMUM DENSITY
RIP AND COMPACT IN SITU TO 93% OF MOD AASHTO MAXIMUM DENSITY OR SHAPE WASTE MATERIAL, AND COMPACT WITH A MINIMUM OF 4 PASSES WITH A 10 TON ROLLER



LEACHATE DETECTION / COLLECTION
MANHOLE DETAILS
SCALE 1 : 20



GAS MONITORING PROBE DETAIL
SCALE 1 : 20



LEACHATE GRAVITY MAIN TRENCH
FOR LEACHATE DELIVERY PIPE
SCALE 1 : 10

PRELIMINARY DESIGN

NO.	DATE	APPROVED	DESCRIPTION	DESIGNED	ENGINEER	CLIENT	PROJECT TITLE	SCALE
1	09/03/2015	VS	FOR DISCUSSION	VS	09/03/2015	CLIENT	DESIGN AND CONSTRUCTION OF A NEW LANDFILL SITE FOR NEWCASTLE MUNICIPALITY	AS SHOWN
				VS			TYPICAL DETAILS	207-2008
				VS				7 OF 7
				VS				207-2008-7-REV1

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APPENDIX E
SPECIALIST STUDIES

NEWCASTLE MUNICIPALITY NEW LANDFILL
INVESTIGATION – GEOTECHNICAL
INVESTIGATION OF GREENWICH FARM
CANDIDATE SITE



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GEOMEASURE GROUP
Groundwater & Environmental Consultants

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APPENDIX A

LABORATORY CERTIFICATES OF ANALYSES

NEWCASTLE MUNICIPALITY NEW LANDFILL INVESTIGATION – GEOTECHNICAL INVESTIGATION OF GREENWICH FARM CANDIDATE SITE

1. INTRODUCTION AND TERMS OF REFERENCE

The Newcastle Municipality is under significant pressure to develop a new landfill site in the area due to the existing landfill site rapidly reaching the end of its design life. This is due to the closure of the Madadeni and Osizweni Landfill Sites by the Department of Water Affairs (DWA, previously known as DWAF) as a result of non-compliance to the governing legislation. This event resulted in an influx of solid waste to the existing landfill site, which in turn further reduced its anticipated design life.

The initial limited invasive investigation of the candidate landfill site located on the farm Greenwich was undertaken in November 2013 and comprised a geophysical survey, a limited geohydrological investigation and a limited invasive geotechnical investigation with the aim of assessing the suitability of the preferred candidate site for the development of a new landfill site. These findings were presented in the report entitled “*Newcastle Municipality New Landfill Investigation – Limited Geohydrological, Geophysical & Geotechnical Investigation of Additional Candidate Site*”, dated 15th November 2013. The findings of the limited invasive investigation indicated that the site was suitable for the development of a landfill site and therefore warranted the detailed investigation of this preferred site.

It must be noted here that during the limited invasive investigation, it was observed that the site was predominantly covered by grasses, however, portions of the site displayed somewhat diverse vegetation, which could infer diverse ecological systems on the site. It was therefore decided that it would be prudent to commission the ecological survey before the final geohydrological investigation and borehole installations commenced, in the event that the site was not suitable in terms of sensitive or endangered species being located on-site and which would therefore otherwise eliminate the site prior to landfill development.

The ecological survey was undertaken by Williams Environmental in January 2014, and the completed ecological report, “*Ecological Review of the Preferred Candidate Site for the Development of a Landfill – Greenwich Farm, Newcastle*”, dated 14th February 2014 was submitted to the client on 14th February 2014. The ecological report confirmed that the site would be suitable for landfill development provided the recommendations and mitigation measures detailed in the report were adhered to.

It must furthermore be noted that the Department of Environmental Affairs (DEA) have recently gazetted and promulgated the National Environmental Management: Waste Act (2008) National Norms and Standards for Disposal of Waste to Landfill, which now govern all land-filling and related practices within South Africa. However, within these standards, provision has not been made for the investigation of landfill sites, and as such, the Department of Water Affairs and Forestry (DWAF) Minimum Requirements for Waste Disposal by Landfill (2nd Edition – 1998) for Solid Waste Landfill Development have been used. These represent the best-practice guidelines in South Africa at this time, and are typically accepted for use.

This report includes the findings, conclusions and recommendations from the detailed geotechnical investigation of the preferred candidate landfill site, located on Greenwich Farm.

2. SCOPE OF WORK

This study is limited to the geotechnical investigation of the Greenwich Farm site, where the following was undertaken:

- Site walkover and evaluation of study area.
- Excavation of a total of sixteen (16 No.) trial pits to allow for measurement of depth to bedrock (if reached), soil profiling and identification of shallow / perched groundwater conditions.
- Collection and of submission of a total of six (6 No.) soil samples to a geotechnical laboratory for full indicator tests: two (2 No.) soil samples for natural MOD AASHTO analysis, two (2 No.) soil samples for constant head permeability test and two (2 No.) (2 x 3) soil samples for consolidated slow-drained shear tests.
- Backfilling of trial pits and re-instatement of ground surface.
- Evaluation of field data and laboratory data collected during the geotechnical investigation.
- Preparation of a geotechnical report, with input from a principle geotechnical engineer, summarising the current geotechnical conditions of the site, whilst recommendations for the safe construction of the proposed landfill site have also been given.

3. GENERAL INFORMATION

3.1 STUDY AREA

The study area is situated to the south-southwest of Newcastle at the co-ordinates 27° 51' 18.63" S / 29° 55' 35.65" E. The site is accessed via a gravel road off the N11 main road located away to the east (see Locality Plan – Dwg No. 2012/328 Figure 1).

3.2 TOPOGRAPHY AND DRAINAGE

The Greenwich Farm, on which the preferred candidate landfill site is located, varies in altitude from 1300 m to 1470 m AMSL. Drainage occurs radially away from a central high located in the southern portions of the site (toward tributaries of either the iNcandu River or the iNgagane River), whilst the topography varies from gently to moderately undulating (see attached Area Plan – Dwg No. 2012/328 Figure 3).

3.3 CLIMATE AND VEGETATION

Climatic data for the Newcastle region was obtained from Agrimet at Cedara and the South African Weather Bureau. This data shows that the average precipitation for the wettest six months for the area is approximately 600 mm / annum – 830 mm / annum (based on 10 years of data). The evaporation of the wettest six months, as measured using the A-pan averages (based on 10 years of data) and incorporating an evaporation factor of 0.7, is approximately 490 mm / annum – 930 mm / annum. On average, this area experiences a rainfall surplus, such that the climatic water balance (**B**) is positive for more than one year in five, and therefore 'leachate production' is possible.

Average temperatures for the region vary from about 10°C to 26°C, with summer temperatures occasionally rising to over 30°C and winter temperatures dropping to 2°C. During winter months, mist and frost occur frequently, particularly in low-lying areas.

According to "*Borough of Newcastle New Regional Landfill Site Candidate Site Selection Report*" written by Knight Piésold Consulting in January 2003, the principal wind direction in the months of April to December is a north-westerly (toward the south-east), while in the months of January to March, the principle wind direction is a south-easterly (toward the north-west). Based on monthly averages, an approximate wind speed of 4.5 km / hour is expected.

With respect to vegetation and bioclimatic zones, the region falls into the transition between the Sour Sandveld and Tall Grassland zones. The vegetation varies from fine Kakuei grasses to scattered shrubs and small tress, which generally resembles a savannah landscape.

3.4 GEOLOGY AND SOILS

The Newcastle area is underlain by consolidated sediments of the Ecca Group and Beaufort Group of the Karoo Supergroup. The bedrock underlying the immediate vicinity of the town comprises shale and sandstone of the Vryheid Formation. To the west of the town, shale and mudrock of the Volksrust Formation and Adelaide Subgroup respectively outcrop as elevations begin to increase. These bedrock formations are relatively flat lying and present a stratigraphic succession with increasing elevation.

Karoo Igneous Province dolerite extensively intrudes the bedrock of the region in the form of both dolerite dykes and sills. The dolerite sills, as shown by the available geological maps, are fairly extensive, intruding large areas. Much of the Greenwich Farm is underlain by dolerite intrusions, as shown on the attached Geological Plan – Dwg No. 2012/328 Figure 2. The mapping shows little in the way of displacement faults in the region, with no major faults seen to occur within a 15 km radius of Newcastle.

The soils in the study area are derived from weathering of the underlying geology, with the outcrops of Quaternary Sands along river beds the most recent addition to the soil profile. The residual soils are generally comprised of silty to occasionally sandy clays and clayey silts, however profiles are usually not extensive, with typical depths in the region of 0.45 m to 0.75 m, or perhaps slightly more, within a 15 km radius of Newcastle. Weathering profiles in the sediments are generally shallow, except in zones where seepage occurs, whilst dolerite sills are occasionally weathered to depths of over 5.00 m.

3.5 GEOHYDROLOGY

The Karoo Supergroup sedimentary units are essentially secondary or fractured rock aquifers with negligible primary storage and permeability. Groundwater storage and movement is generally confined to fractures, joints and bedding planes within the rock mass. This statement holds true too for the doleritic intrusions, whose contacts (when weathered) often exhibit greater transmissivity.

According to Mapping Unit 11 of the '*Characterization and Mapping of the Groundwater Resources – KwaZulu-Natal Province*' prepared by VSA Earth Science Consultants (1995), the shale and sandstone of the Karoo Supergroup, in this area, are generally classified as poor to moderate potential fractured rock aquifers, with borehole yields typically ranging from > 0.1 l/sec – 3.0 l/sec. However, boreholes drilled into the dolerite intrusions typically only yield marginal (> 0.0 l/sec – 0.1 l/sec) amounts of groundwater, although greater yields are

expected when boreholes are drilled along their margins with the surrounding sedimentary formations.

According to the DWA publication produced for Unit 11 of the KwaZulu-Natal Groundwater Mapping Project, the Quaternary Sands exhibit a moderate ground water development potential as they are classified as an inter-granular aquifer. This can be ascribed to the unconsolidated nature of the unit, where pore spaces between the sand grains allow for the retention of water.

Groundwater storage within the consolidated units is limited to the fractures and bedding planes within the rock mass and therefore storativity is typically low, at approximately 0.17%. However, owing to the fact that the saturated thickness of the underlying aquifer is thought to be 20 m, and with the rock mass porosity set to be approximately 10%, actual volumes of water stored in the geological units are typically quite high. Groundwater rainfall recharge is of the order of 4 % - 5% of MAP.

Water quality in the region is generally good to moderate, with the electrical conductivity (EC) values of the groundwater generally falling below 70.00 mS/m. However within the general study area, bicarbonate-type waters, sulphate-type waters and chloride-type waters are all seen to be in evidence.

3.6 EXISTING BOREHOLE DATA

A desk top study of the region was conducted using the KZN Groundwater Resource Information Project (GRIP) database, and our internal (Geom) database, which represent the most up to date and complete data sets for the study area. The results of this exercise indicated that only one (1) borehole or spring record occurs within a 4 km radius of the centre of Greenwich Farm (see attached Area Plan – Dwg No. 2012/328 Figure 3).

3.7 AGRICULTURAL POTENTIAL

The agricultural soil potential map, which was produced by the Institute of Soil, Climate and Water, shows this region as a low potential area with approximately 20% soils of intermediate suitability. This is, however, a very general classification and some high yielding agricultural ventures occur in the general area, especially along the iNcane and iNgagane Rivers to the north-east and north-west of Newcastle. Most of the farms adjoining the municipal land are, however, used for livestock grazing only, as was seen on Greenwich Farm during this investigation.

4. WASTE STREAM AND LANDFILL CLASSIFICATION

During the initial investigation, the waste stream generated within the Newcastle Local Council administered area amounted to some 106 000 m³ / annum, or approximately 290 tonnes / day. This waste comprises domestic, garden, commercial and building waste as well as non-hazardous industrial waste. The current waste loads information was obtained from the “*Proposed New Regional Landfill Site Selection Report to Council – Revision 3*” as compiled by Knight Piésold Consulting in 2003. A growth rate of 2.5% was applied to determine the amount of waste generated from the envisaged landfill project commencement date. Consequently, the estimated waste load for the new proposed landfill would be approximately 375 tonnes / day.

The proposed site should have sufficient capacity for approximately 40 years, and if an annual growth rate of 2.5% is applied to the estimated daily waste stream of approximately 375 tonnes / day, the air space required for the disposal site, based upon land-filling

operations of 260 days / year, will be in the order of 17.772 million m³. At an average height of 35.00 m, the required footprint area would be approximately 80 ha.

The water balance for the region, based on the seasonal rainfall and evaporation as transcribed by the Minimum Requirements of DWA, indicates a rainfall surplus for the region, such that leachate will be produced. In terms of the above information, the site should be designed and permitted as a General (G), Large (L) site with a positive water balance (B⁺), or **G:L:B⁺** facility. Furthermore, according to the DEA National Environmental Management: Waste Act (2008) National Norms and Standards for Disposal of Waste to Landfill, this equates to a **Class B** landfill.

5. SIZE AND LOCATION OF THE PREFERRED CANDIDATE SITE

Greenwich Farm is approximately 844 ha in extent, however the eastern portions have already been sold and hence were not available for investigation. Consequently, a 94 ha polygon was drawn and was shifted around the available portion of the farm in an attempt to determine an area suitable for landfill development.

It was decided to investigate the northern portions of the farm, away from the eastern areas, given that an 800 m buffer around a landfill footprint is typically required.

6. GEOTECHNICAL INVESTIGATION

A detailed geotechnical investigation was carried out on 19th February 2014 within the northern portions of the farm within the 94 ha polygon, where a number of soil profiles were exposed in excavated trial pits, and a number of soil samples were collected for analysis.

6.1 SOIL PROFILING

A tractor-loaded backhoe (TLB) was used to excavate sixteen (16) trial pits to a maximum depth of 2.53 m below ground level (bgl) across the investigated area. The soil profiles exposed in these pits were logged in accordance with the Jennings, Brink and Williams protocol for Geotechnical Profiling, whilst the distribution of the trial pits is shown on the attached Trial Pit Site Plan – Dwg No. 2012/328 Figure 4. Note that the additional trial pits excavated as part of this detailed geotechnical investigation have been delineated separately to those excavated during the initial investigation.

The various trial pit logs, and accompanying photographs, are included in Appendix A. The overall profile can be characterized as a thin horizon of dry to slightly moist, brown, loose to medium dense, intact silty sand (~ 250 mm) over a layer of slightly moist to moist, tan-red brown, soft to firm, intact sandy to silty clay with occasional dolerite boulders (~ 750 mm). This horizon is typically underlain by a moist, tan-red brown, firm, intact silty clay layer with sporadic ferricrete and highly weathered dolerite near the base. The soil profiles typically represent the Bainsvlei Form, which often results from the weathering of dolerite in lowveld areas.

From the soil profile information, as well as additional socio-economic information made available to this office, and finally the recently-drilled borehole locations, an 80 ha 'Ultimate Inferred Landfill Footprint' was delineated mainly within the 94 ha investigated area. However, part of this footprint sits outside of the investigated area to the immediate west, and will require further investigations when the final cells of the landfill are constructed many years from now (as it is recommended that the eastern areas of the site be developed first).

Each cell should, in any event, have its own soils investigation undertaken to provide more detailed and specific information for the construction.

The soil profiles were used to construct the attached Soil Types Plan – Dwg No. 2013/328 Figure 5, which delineates the dominant soils across the investigated area within the inferred landfill footprint. As can be seen, there are two (2) principle soil types in existence, with the dolerite boulder soils (as they have been named due to maximum grain size, even though cobbles are more common) prevailing. Furthermore, the attached Depth to TP Bottom Contour Map – Dwg No. 2013/228 Figure 6 was constructed using the depth to trial pit bottom measurements recorded. It is evident that thicker soil profiles are in existence in the south-central to north-western areas of the inferred landfill footprint, with limited soil thickness observed in the northern and south-western parts (with the latter located near a rocky ridge).

6.2 SOIL SAMPLING

Six (6) soil samples were collected from the trial pits excavated within the investigated area and were submitted for various analyses, as shown below in Table 1, to determine the selected physical properties of this material.

Table 1: Newcastle Landfill Geotechnical Investigation Samples Analyses

Test Pit No.	Depth	Analyses Requirements
TP 4 (Sample 1)	0.35 m – 0.61 m	Full Indicator Test
TP 5 (Sample 2)	0.81 m – 2.18 m	Full Indicator Test
TP 12 (Sample 3)	0.15 m – 0.70 m	Full Indicator Test + Natural MOD. AASHTO + Falling Head Permeability Test + Consolidated Slow Drained Shear Test
TP 13 (Sample 4)	0.00 m – 0.20 m	Full Indicator Test
TP 15 (Sample 5)	1.32 m – 2.53 m	Full Indicator Test + Natural MOD. AASHTO + Falling Head Permeability Test + Consolidated Slow Drained Shear Test
TP 14 (Sample 6)	1.20 m – 2.40 m	Full Indicator Test

The summarised soil parameters are shown in Table 2 below, whilst the Laboratory Certificates of analysis are contained in Appendix B.

Table 2: Newcastle Landfill Geotechnical Investigation Summarized Soil Parameters

Physical Properties	TP 4 Silty Clay	TP 5 Silty Clay	TP 12 Silty Gravel	TP 13 Clayey Silt	TP 15 Silty Clay	TP 14 Silty Clay
AASHTO Soil Classification	A – 8	A – 7 – 5	A – 7 – 6	A – 8	A – 7 – 5	A – 7 – 5
Liquid Limit	46.7	50.3	41.7	42.7	46.6	51.9
Plasticity Index	10.5	14.6	12.2	10.7	13.3	20.8
Linear Shrinkage	6.7	9.3	6.0	9.3	7.3	11.3
Potential Expansiveness	Low	Low	Low	Low	Low	Low
Unified Classification	ML or OL	MH or OH	SM	ML or OL	ML or OL	MH or OH
% Gravel	2.6	1.3	38.2	1.1	7.9	0.6
% Sand	13.2	11.1	14.4	18.6	10.4	7.6
% Silt	35.9	36.2	26.0	44.0	31.6	35.8
% Clay	48.3	51.4	20.6	36.3	50.0	56.1
Grading Modulus	0.21	0.16	1.37	0.24	0.34	0.09
D ₁₀ *	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Mod AASHTO Density (Kg/m ³)	N/A	N/A	1740	N/A	1549	N/A
Derived k-value (D ₁₀ ²)* (cm/s)	<4 x 10 ⁻⁶	<4 x 10 ⁻⁶	<4 x 10 ⁻⁶	<4 x 10 ⁻⁶	<4 x 10 ⁻⁶	<4 x 10 ⁻⁶
Measured Permeability (cm/s)	N/A	N/A	1.461 x 10 ⁻⁶	N/A	3.659 x 10 ⁻⁸	N/A

- Diameter (mm) at which 10% of the material passes through the sieve

* - Empirical value

N/A – Not Analysed

The results of the consolidated slow-drained shear box tests that were undertaken on samples collected from TP 12 and TP 15 are included overleaf in Table 3, whilst the

Laboratory Certificates are contained in Appendix B. The sample material was re-compacted to 95% MOD. AASHTO for use in these tests.

Table 3: Newcastle Landfill Geotechnical Investigation Summarized Consolidated Slow-Drained Shear Test Results

Test Parameters & Results	TP 12 – Silty Gravel			TP 15 – Silty Clay		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 2
Normal Stress (kN/m ²)	100	200	300	100	200	300
Dry Density (kg/m ³)	1653	1653	1653	1472	1472	1472
Moisture Content (%)	18.4	18.4	18.4			
Shear Strain (%)	4.6	7.7	11.8	3.9	7.1	9.9
Shear Stress (kN/m ²)	98.0	162.1	242.4	103.8	155.8	204.5
Shear Strength Parameters						
Angle of Internal Friction (φ)	36			27		
Cohesion (kPa)	23			54		

7. GEOTECHNICAL SITE ASSESSMENT

7.1 SOIL PERMEABILITY AND DRAINAGE

The permeability results of the soil samples collected from TP 12 and TP 15 can basically be regarded as the two ‘end-member’ values of the site, owing to the Unified Classification of the samples. Consequently, the rate of movement of shallow groundwater (and possibly leachate) is likely to fall within the values included below in Table 4.

Table 4: Newcastle Landfill Geotechnical Investigation Time-Calculated Permeability Results

Physical Properties	TP 12 Silty Gravel	TP 15 Silty Clay
Measured Permeability (cm/s)	1.461 x 10 ⁻⁶	3.659 x 10 ⁻⁸
Measured Permeability (cm/day)	1.262 x 10 ⁻¹	3.161 x 10 ⁻³
Measured Permeability (cm/month)	3.787	9.484 x 10 ⁻²
Measured Permeability (cm/year)	45.443	1.138
Empirical Leakage rates (cm/year) (0.6 m thick liner / 0.3 m head above the liner)	23	1

It can be seen that should any leachate breach the (presumed synthetic) landfill liner, it would migrate at a rate of approximately 0.45 m per year in the silty gravels, yet only approximately 1 cm per year in the silty clays for each metre of soil thickness. As the silty clays are more prevalent across the site, there is little perceived risk of groundwater contamination migrating off-site. However, from the DWAF Minimum Requirements for Waste Disposal by Landfill (2nd Edition – 1998) for Solid Waste Landfill Development, rates of migration must be less than 0.30 m per year for a clay liner system for **B⁺** landfill sites (if it is also incorporated), hence the silty gravels cannot be used in the development of a clay liner (as is detailed further hereafter). Note that these permeability values are valid so long as similar densities (95% Mod AASHTO) can be achieved in the construction of the landfill lining system. The recommended density for the compaction of the clay soil is 95% Proctor and permeability values should be obtained for samples compacted to this density if the material is to be considered for use in the lining system.

The soil types underlying the majority of the site are assessed as being poorly draining, which may result in surface water ponding in the flatter areas of the site. It is therefore recommended that site drainage be facilitated by installation of the appropriate drainage systems. Note that although perched groundwater conditions are considered unlikely, even during the wetter, summer months, this should be assessed as the site is developed and an appropriate allowance for drainage and subsoil drainage measures should be allowed for in

the design of the landfill development.

7.2 SLOPE STABILITY AND SETTLEMENT

The consolidated slow-drained shear tests returned an angle of internal friction (ϕ) of 27°, and a cohesion value of 54 kPa, for the sampled silty clays underlying the majority of the inferred landfill footprint. These results, coupled with the relatively gentle slopes across the site (approximately 15° at maximum), suggest that the site is inherently stable and should not be subjected to slope stability problems within the homogenous soil. A separate stability analysis of the landfill development and liner system should be undertaken and the natural state of the materials, as well as any possible discontinuities in the underlying soils, taken into account.

Settlement of the soil underlying a landfill bottom liner system can occur due to the consolidation and compression of the foundation soils from the weight of the landfill above. However, although the proposed landfill site will contain an appreciable mass of waste, the relative density of the Karoo Igneous Province dolerite on which the site will be located, suggests that only limited settlement will take place. Settlement is however, unlikely to be uniform as landfilling may not be uniform and the soils may not be homogeneous. Detailed settlement analysis and the appropriate design of the liner system may need to be considered.

7.3 POSSIBLE INHERENT SOIL PROBLEMS

7.3.1 Dispersivity

Although neither the pinhole test nor the double hydrometer test formed part of the laboratory analysis scope of work of this investigation, the standard 'Field Investigation' methods, as proposed by Elges (1985), were performed on site.

No gully erosion, field tunnelling (piping) or excessive turbidity in storage water was observed within the investigated area. Furthermore, the subsurface silty clays that were encountered in many of the trial pits did not soften rapidly nor did they have a greasy feel upon contact with water. Consequently, it is implied that the soils that were encountered on site are unlikely to be dispersive.

However, detailed dispersivity tests should be undertaken on any soils that are identified for use in the landfill liner system.

7.3.2 Collapsibility

Problems with collapse are generally associated with silty or sandy soils with a low clay content. However, all of the samples collected from the trial pits have a silt + clay content of > 45% (indeed the silt + clay content exceeds 75% in most of the samples). Furthermore, the soils are not residual of basement granites, or any other lithologic units detailed by Schwartz (1985) as being potentially collapsible, and so it is assessed that collapsibility is unlikely.

7.3.3 Soft Clays

Although neither in-situ field tests, nor any applicable laboratory tests were undertaken on the soils underlying the site, the standard definitions of soft clays detailed by Jones and Davies (1985) are considered hereafter.

The location of soft clays are generally confined to the coastal areas along the eastern seaboard, and are a result of a number of depositional environments which have occurred during periodic changes in sea level. Furthermore, it is typically understood that soft clays are fully saturated and are normally consolidated, however as Newcastle normally experiences a rainfall deficit, it is unlikely that any soils in the region will be fully saturated. Consequently, based on its location,

and their typically soft to firm field assessment, the silty clays underlying much of the inferred landfill footprint are unlikely to exhibit the properties of “soft clays” as defined above.

7.3.4 Expansive Soils

Potentially expansive (active) soils are responsible for heave (and possibly shrinkage), which is typically defined as an increase in the volume of the soil with an increase in water content or a decrease in volume when drying from a moist or saturated condition. Assessments of potential activity are generally undertaken with the assistance of certain indicator results, and then quantified through oedometer testing.

Liquid limit and plasticity index results of the soil samples collected from the various trial pits and submitted for analysis generally fall into the medium to high plasticity class, thereby inferring that the soils may be active. Furthermore, plasticity index results for the soil samples collected from the various trial pits fall into the (medium to high) moderately plastic class, thereby inferring that heave is possible.

The use of the plasticity index, % soil passing through the 0.425 mm sieve and clay content allows for the classification of potential expansiveness according to the method proposed by Van der Merwe (1964). This method is generally the most widely used, and returns a potential expansiveness of ‘low’ for all of the soils underlying the inferred landfill footprint. The clay soil underlying at least part of the landfill is likely to be re-worked as part of the liner construction, which should reduce the potential for heave. The possibility of heave does need to be considered in the design of the liner system however.

8. GEOTECHNICAL LANDFILL ASSESSMENT

8.1 AVAILABILITY OF COVER MATERIAL

According to Poe and Lawrence (2004), the use of daily / operational landfill cover material is typically only restricted by the size of the particles, which should not exceed 101.6 mm in diameter. Such a size classification is consistent with cobbles, of which many were seen in the subsurface soil profiles excavated on site. Consequently, only the soil excavated on site from which cobbles (and boulders) have been removed, may be used for daily / operational landfill cover material.

Although the proposed depth below ground level at which the landfill is to be constructed is unknown, it is suggested that an approximate, average depth of 1.50 m bgl be used (in areas where soil profiling has confirmed such depths are possible). This is due to the fact that at depths below 1.50 m bgl, increasingly less-weathered rock is likely to be encountered. Consequently, if it is possible to excavate to such depths across approximately 63 ha (which excludes the rocky southern ridge), a significant volume of landfill cover material (approximately 945 000 m³ excluding bulking factor yet including cobbles and boulders) will be available on-site (excluding possible use of clay material for a liner). Plans should be developed to excavate and safely stockpile the cover material as the site is developed.

8.2 AVAILABILITY OF CLAY FOR LINER

In accordance with the Department of Water Affairs (DWA) Minimum Requirements for Waste Disposal by Landfill (2nd Edition – 1998) for solid waste landfill development, and those internationally-accepted guidelines detailed by O’Sullivan and Quigley (2009) when the former is not available, the following requirements / guidelines are used for landfill clay liner design:

- Hydraulic conductivity of $< 1 \times 10^{-6}$ cm/s
- Minimum clay content of 10%
- Minimum fines (clay + silt) content $> 30\%$
- Plasticity index $> 10\%$ and $< 65\%$
- Liquid limit $< 90\%$
- Maximum particle size < 25 mm

It is evident from the results of the laboratory analysis that the majority of the silty clays sampled from the investigated area, may be suitable for use as a clay liner, when re-compacted to 95% Proctor Density. Permeability and dispersivity tests on re-worked material are needed to verify the suitability of the clay.

Note that, as detailed previously, that the silty gravels display a hydraulic conductivity (permeability) of $> 1 \times 10^{-6}$ cm/s, and contain particles whose size exceeds 25 mm. Hence this material cannot be used in the development of a clay liner.

From the investigation undertaken there is, on average, around 0.85 m of silty clay underlying the majority of the site, the excavation of at least 63 ha (which excludes the rocky southern ridge) should result in an adequate volume of clay material to construct a 0.60 m thick clay liner (should it be incorporated into the design). This needs to be evaluated in detail on a cell by cell basis however.

9. GEOTECHNICAL INFRASTRUCTURE DEVELOPMENT

9.1 FOUNDING

From the overall investigation of this site, it is recommended that any single storey structures that are to be built on the site should be able to be founded on normal strip footings. These should be taken on to the in situ silty clay soils at a depth of some 1.00 m below original ground level. Founding material should be inspected and approved by a competent person before footings are cast.

Building design and construction should follow normal good building practices, typically as required by NHBC requirements for single storey masonry buildings with a residential site class designation of "H".

At this time, design maximum bearing pressures of 60 kPa should be used for the strip footings and a minimum width of 850 mm for external foundations and 750 mm for internal footings is suggested. The design of Individual spot bases should be based on a maximum foundation loading of 75 kPa.

Specific soils investigations in the areas where buildings are proposed should be undertaken to provide detail for final design.

9.2 SITE DRAINAGE

As detailed previously, the majority of the soils across the site were assessed as being poorly draining. Consequently, it is recommended that proper drainage systems (including rooftop gutters discharging rainwater through downpipes and away from the structures, as well as those recommendations previously detailed) be implemented as part of the construction of any buildings.

9.3 PAVEMENT LAYER WORKS AND CONSTRUCTION MATERIALS

Although appropriate laboratory information is not available at this stage of the investigation, it is considered likely that the silty clays available on site are unsuitable for use in layerworks. This is due to the fact that the soils' classification will likely be G10, or less than G10. However, it is possible that the silty gravel in the vicinity of TP 12 may be suitable for use as pavement construction materials in selected and sub-grade layers only, however CBR testing will have to be undertaken to confirm this.

10. PREFERRED LANDFILL AREA DELINEATION

The results of the geotechnical assessment of the soils within the Greenwich Farm candidate site suggest that 63 ha of the investigated area is currently suitable for the development of the proposed landfill, excluding the southern ridge where depth to bedrock is limited. Note that, as detailed, further detailed investigation is suggested for the development of each cell and will particularly be required for the remaining 17 ha within the 'Ultimate Inferred Landfill Footprint', when the final cells of the landfill are constructed many years from now.

11. CONCLUSIONS

Based upon the findings of this investigation, the following conclusions were reached:

- The new waste disposal site must meet the DWAF Minimum Requirements for Waste Disposal by Landfill (2nd Edition – 1998) for Solid Waste Landfill Development for a **G:M:B⁺** landfill site. According to the DEA National Environmental Management: Waste Act (2008) National Norms and Standards for Disposal of Waste to Landfill, this equates to a **Class B** landfill.
- The available airspace required is approximately 17.772 million m³, based on available waste load quantities for a landfill with a minimum lifespan of 40 years, which equates to an area of approximately 80 ha, as a conservative estimate.
- Soil profiling confirms that only 63 ha of land within the originally-investigated 94 ha candidate landfill site is underlain by soils of adequate thickness conducive to the development of a landfill site.
- Soil sample analysis shows that the silty clays underlying the majority of the site have a low permeability, and so groundwater (and possibly leachate) is expected to migrate very slowly through this horizon.
- However, these soils are also deemed poorly-draining, and so shallow subsurface drainage systems may be required (as appropriate).
- The silty clay soils underlying this site are unlikely to fall into any of the 'problematic soil' categories.
- Soils on-site (are typically deemed suitable for use as landfill cover (when cobbles and boulders have been removed), with adequate quantities potentially available.
- The silty clay soils underlying the site are typically assessed as probably being suitable for use in a clay liner, with adequate quantities of material potentially available to construct a ~0.60 m thick liner over 63 ha. Additional testing to confirm the overall suitability of the clay soils selected for use in the liner system is needed

and specific identification of the areas from where liner material is to be excavated is required.

- In summary, whilst 63 ha of land is deemed geotechnically suitable for the development of a landfill site, excluding the rocky southern ridge, an additional 17 ha of land to the west of the candidate landfill site will have to be investigated when the final cells are constructed many years in the future.
- The site is suitable for the construction of the single storey masonry buildings typical of a landfill site, but adequate foundation and proper drainage details need to be incorporated into the design.
- Only some of the soils underlying the site are likely suitable for use in pavement layer works, specifically the silty gravels, however CBR testing will have to be undertaken to confirm this.

12. **RECOMMENDATIONS**

- The findings of this study must be presented to I&AP's and authorities as part of the EIA process to gauge public acceptance of the findings and obtain comment on the Greenwich Farm candidate landfill site.

13. **ADDITIONAL SOURCES OF INFORMATION UTILISED**

- Elges, H.F.W. K. (1985). Problem Soils in South Africa – State of the Art: Dispersive Soils. *The Civil Engineer in South Africa*, **27**, 6 pp.
- Jones, G.A. and Davies, P. (1985). Problem Soils in South Africa – State of the Art: Soft Clays *The Civil Engineer in South Africa*, **27**, 8 pp.
- O' Sullivan, D. and Quigley, P. (2009). Geotechnical Engineering & Environmental Aspects of Clay Liners for Landfill Projects. *Fehiley Timoney Co. & Irish Geotechnical Services Ltd.* South Dublin County, Ireland. 11 pp.
- Poe, D.E. and Lawrence, L. (2004). Approved Site Development Plan – Jones County Solid Waste Landfill, Abilene, Texas – Part III: Site Development Plan, Attachment 4, Geology and Geotechnical Report. *SCS Engineers*, Texas, U.S.A. 65 pp.
- Schwartz. K. (1985). Problem Soils in South Africa – State of the Art: Collapsible Soils. *The Civil Engineer in South Africa*, **27**, 10 pp.
- Van der Merwe, D.H. (1964). The Prediction of Heave from the Plasticity Index and Percentage Clay Fraction of Soils. *The Civil Engineer in South Africa*.

We trust that this meets with your requirements in this matter.

Yours Faithfully,



R Sebire
Project Geologist



K Gravelét-Blondin
Engineering Geologist

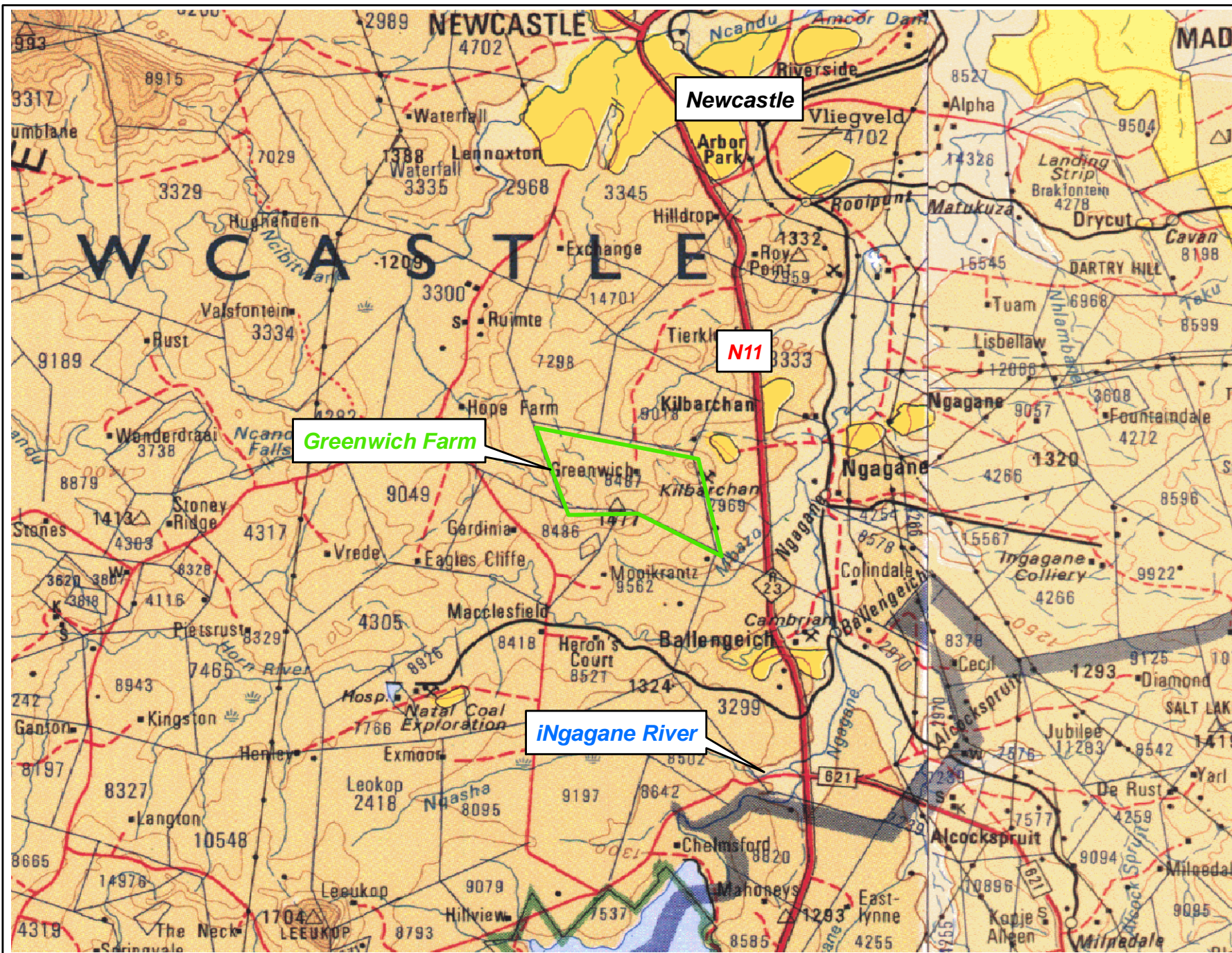


Jon Pass
Geotechnical Engineer

GEOMEASURE GROUP (Pty) Ltd

WILSON PASS

FIGURES



Legend:



**NEWCASTLE
CANDIDATE
LANDFILL
SITE SELECTION**

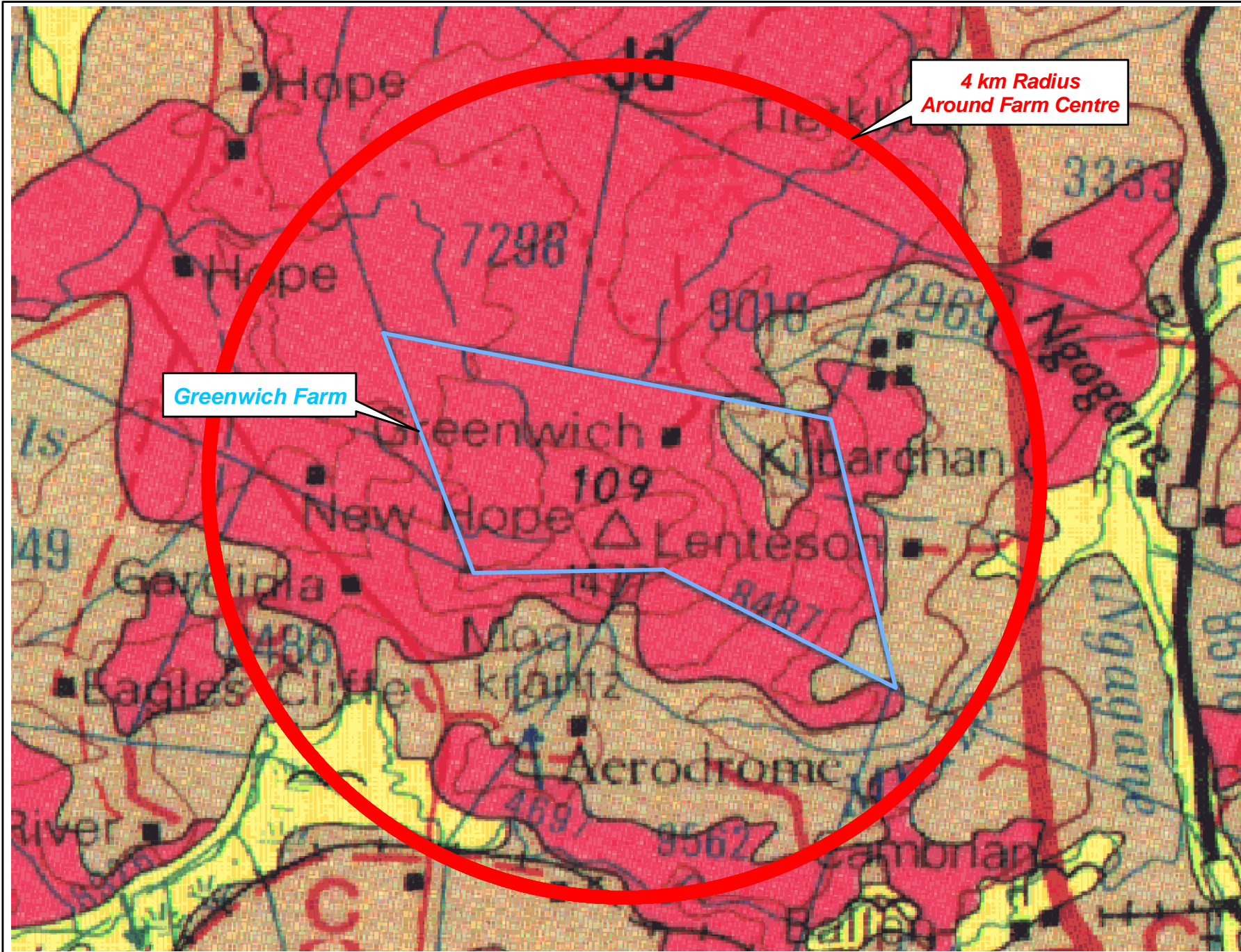
**LOCALITY
PLAN**

4 2 0 4 8 12 16 20 24 Kilometers



1 : 250 000 Digital Coverage from Chief Director: Surveys and Mapping

**DWG NO. 2012/328
FIGURE 1**



Legend:

- Quarternary Alluvium
- Jd Jurassic Dolerite
- Pv Vryheid Sandstone



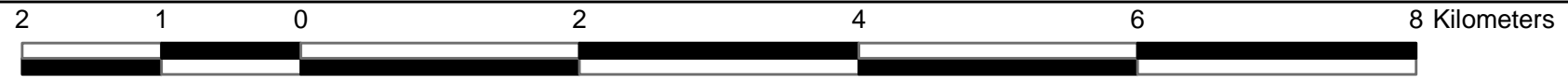
**4 km Radius
Around Farm Centre**

Greenwich Farm



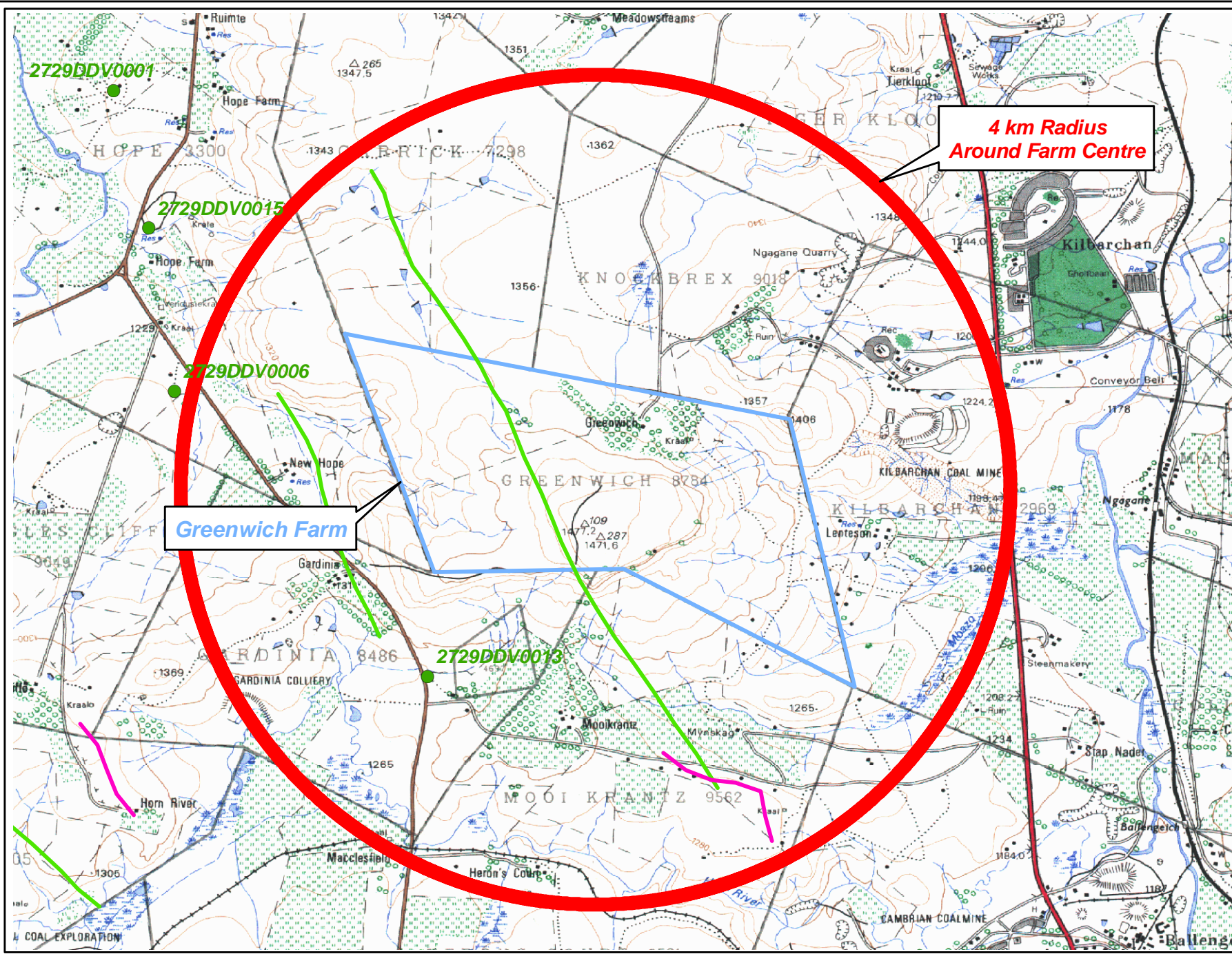
**NEWCASTLE
CANDIDATE
LANDFILL
SITE SELECTION**

**GEOLOGICAL
PLAN**



1 : 250 000 Digital Coverage from Chief Director: Surveys and Mapping

**DWG NO. 2012/328
FIGURE 2**



**4 km Radius
Around Farm Centre**

Greenwich Farm

- Legend:**
- Geom BH Data
 - GRIP BH Data
 - Dolerite Dykes
 - Geological Faults
 - Lineaments



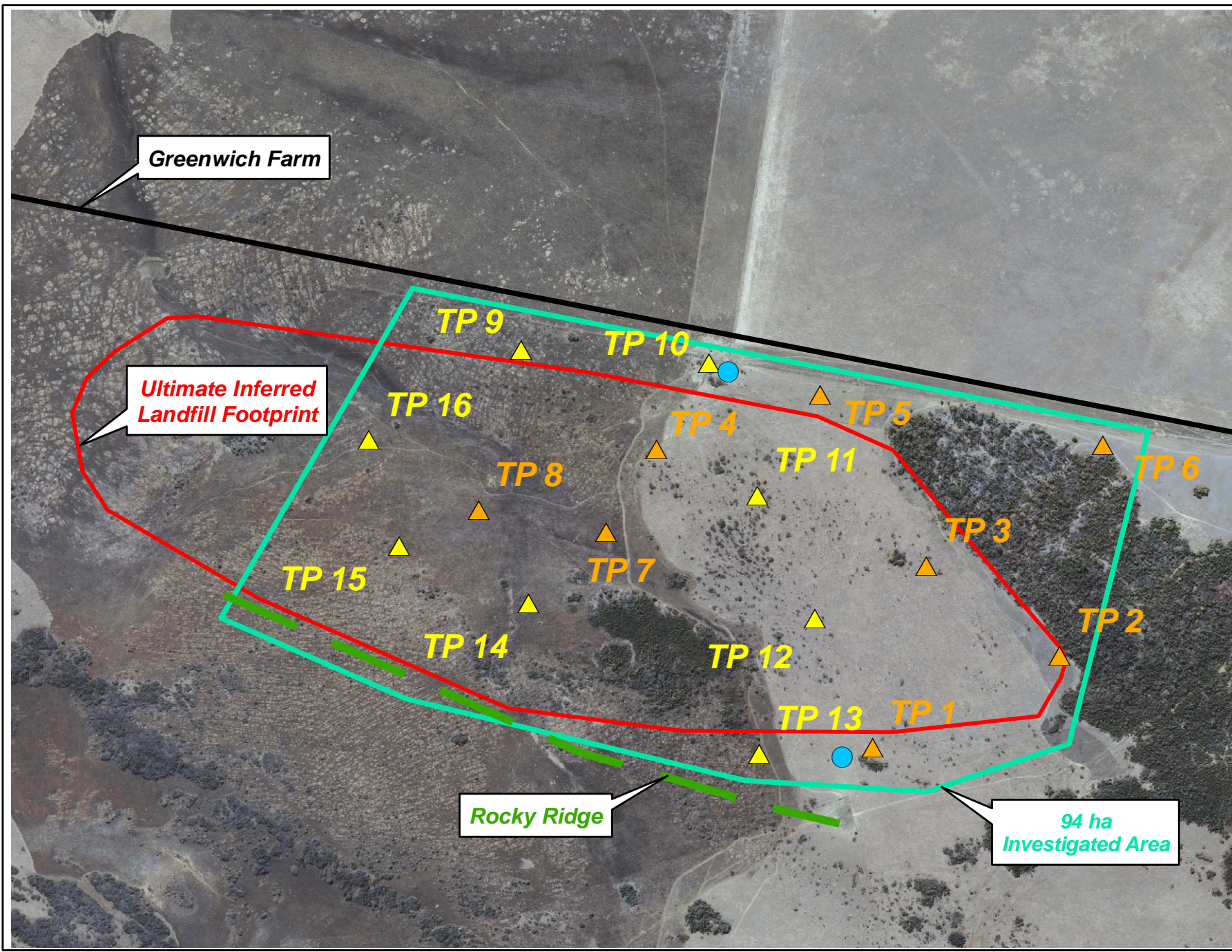
**NEWCASTLE
CANDIDATE
LANDFILL
SITE SELECTION**

**AREA PLAN
SHOWING
STRUCTURES &
AVAILABLE
HYDROCENSUS DATA**



1 : 50 000 Digital Coverage from Chief Director: Surveys and Mapping

**DWG NO. 2012/328
FIGURE 3**



Legend:



- ▲ Initial Invest TPs
- ▲ Detailed Invest TPs
- Recently-Installed Monitoring BHs



**NEWCASTLE
CANDIDATE
LANDFILL
SITE SELECTION**

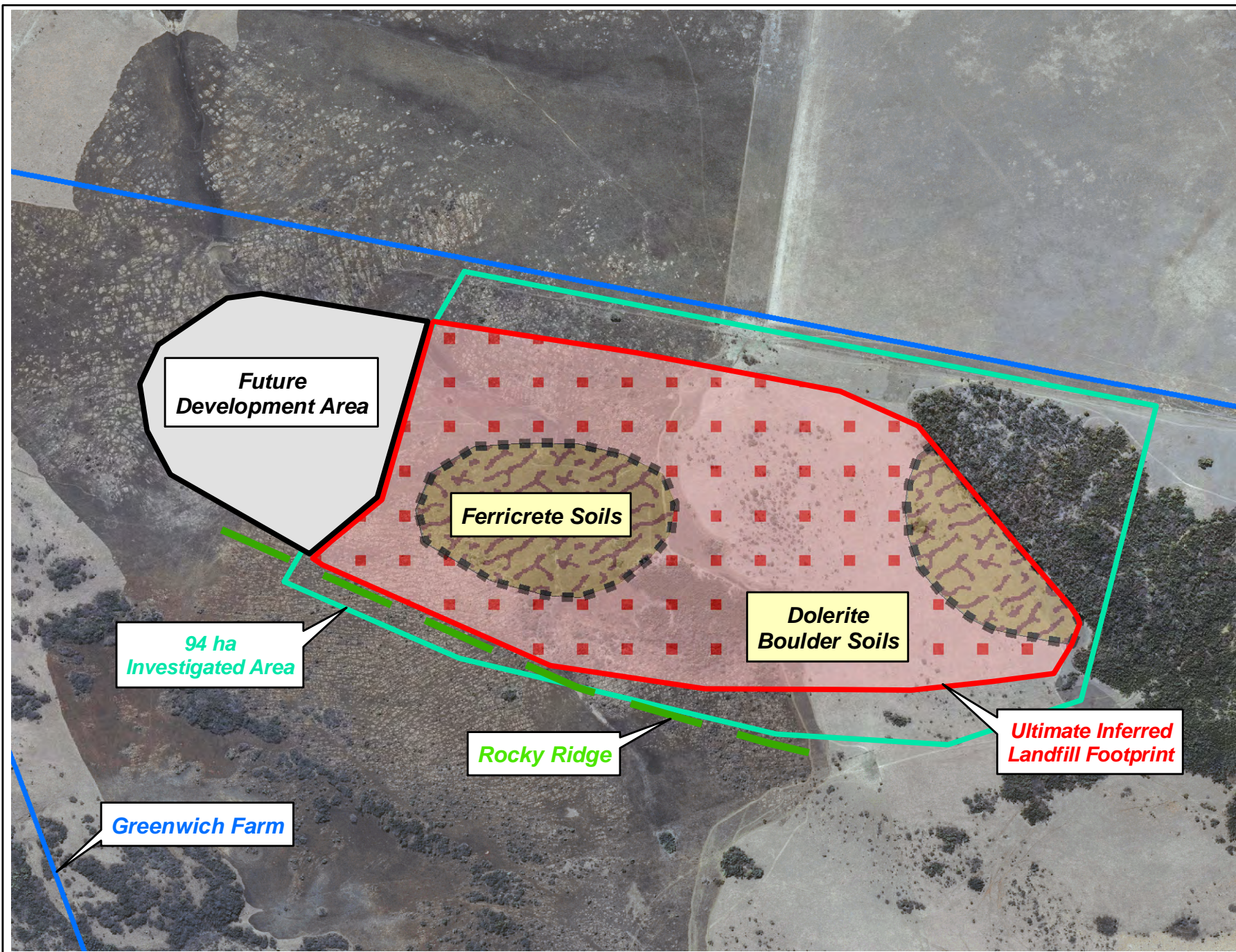
**TRIAL PIT
SITE PLAN**

**DWG NO. 2012/328
FIGURE 4**

250 125 0 250 500 750 1 000 1 250 1 500 Meters



1 : 10 000 Digital Coverage from Chief Director: Surveys and Mapping



Legend:



**NEWCASTLE
CANDIDATE
LANDFILL
SITE SELECTION**

**SOIL TYPES
SITE PLAN**

**DWG NO. 2012/328
FIGURE 5**

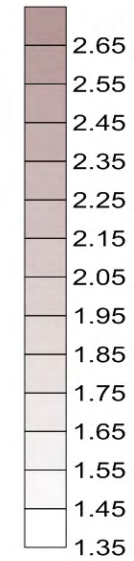
250 125 0 250 500 750 1 000 1 250 1 500 Meters



1 : 10 000 Digital Coverage from Chief Director: Surveys and Mapping



Legend



Depth to TP
Bottom (m)



GEOMEASURE GROUP
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Unit 3 Burnside Office Park, 1 Builders Way, Hillcrest (3610)
Tel: (031) 765 1900 Fax: (031) 765 1935


**NEWCASTLE
CANDIDATE
LANDFILL
SITE SELECTION**

**DEPTH TO
TP BOTTOM
CONTOUR MAP**

**DWG NO. 2012/328
FIGURE 6**

APPENDIX A
TRIAL PIT LOGS

TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Sand	Dry, light brown, medium dense, intact silty SAND with dolerite boulders					
0.3							
0.6			Soil - Clay	Slightly moist, red-brown, firm, intact CLAY			
0.9	Soil - Clay	Dry to slightly moist, tan-beige brown, firm, intact sandy CLAY with numerous dolerite boulders					
1.2							
1.5							

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 10/02/2013

TP NO: TP 1

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown


TP CO-ORDINATES: 27 51' 10.02" S / 29 55' 24.20" E

NOTE: Trial Pit Reached Refusal



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TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Sand	Dry, light brown, medium dense, intact silty SAND					
0.3							
0.6							
0.9	Soil - Clay	Slightly moist, red-brown, firm, intact silty CLAY with sporadic red-black ferricrete					
1.2	Soil - Clay	Slightly moist, red-brown, firm, intact silty CLAY with red-black ferricrete					
1.5							
1.8							

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 10/02/2013

TP NO: TP 2

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown

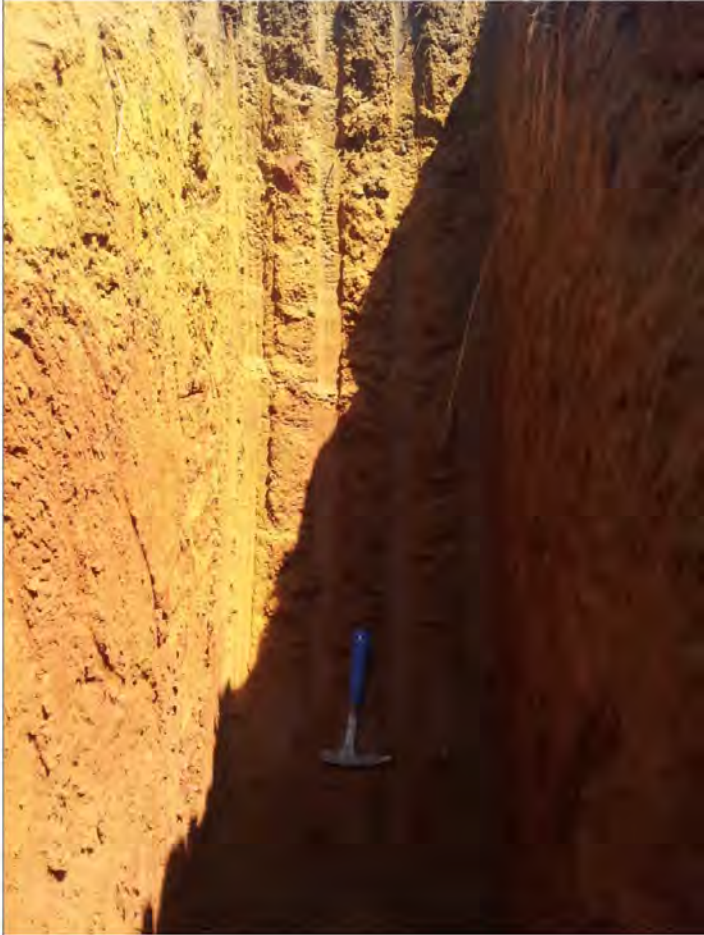
TP CO-ORDINATES: 27 51' 05.10" S / 29 55' 34.66" E

NOTE: Trial Pit Did Not Reach Refusal



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TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Sand	Dry, light brown, medium dense, intact silty SAND					
0.3	Soil - Sand	Slightly moist, tan-brown, loose to medium dense, intact silty SAND with sporadic red-black ferricrete					
0.6	Soil - Sand	Slightly moist to moist, red-brown, soft to firm, intact silty CLAY					
0.9	Soil - Clay	Slightly moist to moist, red-brown, soft to firm, intact silty CLAY					
1.2	Soil - Clay						
1.5	Soil - Clay						
1.8	Soil - Clay						

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 10/02/2013

TP NO: TP 3

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown


TP CO-ORDINATES: 27 51' 00.10" S / 29 55' 27.20" E

NOTE: Trial Pit Did Not Reach Refusal



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TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Sand	Slightly moist, brown, medium dense, intact silty SAND					
0.3	Soil - Clay	Slightly moist, tan-brown, soft to firm, intact sandy CLAY				Sample 1	
0.6	Soil - Clay	Moist, red-brown, firm, intact sandy CLAY with dolerite boulders					
0.9							
1.2							
1.5							
1.8							
2.1							

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 10/02/2013

TP NO: TP 4

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown


TP CO-ORDINATES: 27 50' 53.60" S / 29 55' 12.20" E

NOTE: Trial Pit Did Not Reach Refusal



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TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Sand	Dry, brown, medium dense, intact clayey SAND					
0.3	Soil - Clay	Dry, tan-brown, soft to firm, intact sandy CLAY with dolerite boulders					
0.6	Soil - Clay						
0.9	Soil - Clay						
1.2	Soil - Clay						
1.5	Soil - Clay	Slightly moist, red-brown, firm, intact silty CLAY				Sample 2	
1.8	Soil - Clay						
2.1	Soil - Clay						

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 10/02/2013

TP NO: TP 5

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown


TP CO-ORDINATES: 27 50' 50.50" S / 29 55' 21.30" E

NOTE: Trial Pit Did Not Reach Refusal



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TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Sand	Slightly moist, brown, medium dense, intact silty SAND					
0.3	Soil - Sand	Slightly moist, tan-brown, medium dense, intact silty CLAY with ferricrete					
0.6	Soil - Clay	Moist, red-brown, firm, intact sandy CLAY					
0.9	Soil - Clay						
1.2	Soil - Clay						
1.5	Soil - Clay						
1.8	Soil - Clay						

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 10/02/2013

TP NO: TP 6

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown


TP CO-ORDINATES: 27 50' 53.40" S / 29 55' 37.00" E

NOTE: Trial Pit Did Not Reach Refusal



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TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Clay	Slightly moist, brown, soft to firm, intact sandy CLAY					
0.3	Soil - Sand	Moist, tan-yellow brown, loose to medium dense, intact clayey SAND					
0.6							
0.9	Soil - Clay	Moist, red-brown, soft to firm, intact silty CLAY					
1.2							
1.5							
1.8							

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 10/02/2013

TP NO: TP 7

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown


TP CO-ORDINATES: 27 50' 58.20" S / 29 55' 09.40" E

NOTE: Trial Pit Did Not Reach Refusal



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TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Sand	Dry, brown, loose, intact silty SAND					
0.3	Soil - Silt	Moist, brown to orange-brown, soft to firm, intact SILT with ferricrete					
0.6							
0.9							
1.2	Soil - Clay	Moist, red-brown, soft to firm, intact silty CLAY with ferricrete					
1.5							
1.8							

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 10/02/2013

TP NO: TP 8

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown

TP CO-ORDINATES: 27 50' 57.00" S / 29 55' 02.30" E

NOTE: Trial Pit Did Not Reach Refusal



GEOMEASURE GROUP
Groundwater & Environmental Consultants

TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0		Dry, grey-brown blotched orange-white, loose to medium dense, intact silty SAND with weathered dolerite boulders					
0.3		Slightly moist, orange-brown, soft to firm, intact clayey SILT with weathered dolerite boulders					
0.6		Moist, red-brown, firm, intact CLAY with weathered dolerite at base					
0.9							
1.2							

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 02/19/2014

TP NO: TP 9

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown


TP CO-ORDINATES: 27 50' 48.11" S / 29 55' 04.70" E

NOTE: Trial Pit Reached Refusal



GEOMEASURE GROUP
Groundwater & Environmental Consultants

TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Sand	Dry, grey-brown, loose to medium dense, intact silty SAND					
0.25			★				
0.3	Soil - Silt	Slightly moist, tan-orange brown, soft to firm, intact SILT with weathered dolerite boulders					
0.42			★				
0.6	Soil - Clay	Moist, red-brown, firm, intact CLAY with weathered dolerite at base					
0.9							
1.2							

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 02/19/2014

TP NO: TP 10

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown


TP CO-ORDINATES: 27 50' 48.80" S / 29 55' 15.10" E

NOTE: Trial Pit Reached Refusal



GEOMEASURE GROUP
Groundwater & Environmental Consultants

TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Sand	Dry, grey-brown, loose to medium dense, intact silty SAND					
0.3	Soil - Silt	Moist, dark red-brown, soft to firm, intact clayey SILT with weathered dolerite boulders		0.45 ★			
0.6							
0.9	Soil - Clay	Slightly moist, red-brown, soft to firm, intact CLAY with weathered dolerite at base					
1.2							
1.5							
1.8							
2.1							
2.4							

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 02/19/2014

TP NO: TP 11

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown


TP CO-ORDINATES: 27 50' 56.20" S / 29 55' 17.80" E

NOTE: Trial Pit Reached Refusal



GEOMEASURE GROUP
Groundwater & Environmental Consultants

TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Sand	Dry, grey-brown, loose to medium dense, intact silty SAND					
0.3	Soil - Sand	Slightly moist, tan-beige, loose to medium dense, intact silty SAND with grey-black grit and weathered dolerite boulders				Sample 3	
0.6	Soil - Clay	Slightly moist, red-brown mottled beige-white, soft to firm, intact silty CLAY with weathered dolerite at base					
0.9	Soil - Clay						
1.2	Soil - Clay						
1.5	Soil - Clay						
1.8	Soil - Clay						
2.1	Soil - Clay						
2.4	Soil - Clay						

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 02/19/2014

TP NO: TP 12

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown


TP CO-ORDINATES: 27 50' 51.30" S / 29 55' 21.00" E

NOTE: Trial Pit Reached Refusal



GEOMEASURE GROUP
Groundwater & Environmental Consultants

TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Sand	Dry, grey-brown, loose to medium dense, intact silty SAND				Sample 4	
0.3	Soil - Clay	Moist, red-tan brown, firm, intact silty CLAY					
0.6	Soil - Clay						
0.9	Soil - Clay						
1.2	Soil - Clay	Slightly moist, red-brown, firm, intact sandy CLAY with weathered dolerite boulders					
1.5	Soil - Clay						
1.8	Soil - Clay						
2.1	Soil - Clay						

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 02/19/2014

TP NO: TP 13

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown


TP CO-ORDINATES: 27 50' 10.50" S / 29 55' 17.90" E

NOTE: Trial Pit Reached Refusal



GEOMEASURE GROUP
Groundwater & Environmental Consultants

TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Sand	Dry, grey-brown, loose to medium dense, intact silty SAND				Sample 4	
0.3	Soil - Clay	Moist, red-tan brown, firm, intact silty CLAY					
0.6	Soil - Clay						
0.9	Soil - Clay						
1.2	Soil - Clay						
1.5	Soil - Clay	Slightly moist, red-brown, firm, intact sandy CLAY with weathered dolerite boulders					
1.8	Soil - Clay						
2.1	Soil - Clay						

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 02/19/2014

TP NO: TP 13

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown



TP CO-ORDINATES: 27 50' 10.50" S / 29 55' 17.90" E

NOTE: Trial Pit Did Not Reach Refusal



GEOMEASURE GROUP
Groundwater & Environmental Consultants

TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Silt	Slightly moist, dark brown, medium dense, intact sandy SILT					
0.3							
0.6	Soil - Clay	Slightly moist, tan brown, soft to firm, intact silty CLAY					
0.9							
1.2	Soil - Clay	Moist, tan-brown, firm, intact CLAY				Sample 6	
1.5							
1.8							
2.1							
2.4							

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 02/19/2014

TP NO: TP 14

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown


TP CO-ORDINATES: 27 51' 02.20" S / 29 55' 05.10" E

NOTE: Trial Pit Did Not Reach Refusal



GEOMEASURE GROUP
Groundwater & Environmental Consultants

TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Silt	Slightly moist, dark brown, medium dense, intact sandy SILT					
0.3	Soil - Clay	Moist, red-tan brown, firm, intact silty CLAY					
0.6	Soil - Clay						
0.9	Soil - Clay						
1.2	Soil - Clay						
1.5	Soil - Clay						
1.8	Soil - Clay	Slightly moist, red-brown, firm, intact sandy CLAY with weathered dolerite boulders				Sample 5	
2.1	Soil - Clay						
2.4	Soil - Clay						

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 02/19/2014

TP NO: TP 15

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown

TP CO-ORDINATES: 27 50' 59.00" S / 29 54' 57.90" E

NOTE: Trial Pit Did Not Reach Refusal



GEOMEASURE GROUP
Groundwater & Environmental Consultants

TRIAL PIT LITHOLOGICAL LOG

Depth (m bgl)	Lithology Profile	Lithology Log	Seepage (m bgl)	Roots (m bgl)	Termites (m bgl)	Samples	Frontwall Photograph
0	Soil - Silt	Slightly moist, dark brown, medium dense, intact sandy SILT					
0.3	Soil - Sand	Slightly moist, tan-beige, loose to medium dense, intact silty SAND with grey-black grit and weathered dolerite boulders					
0.6							
0.9	Soil - Clay	Moist, red-brown, soft to firm, intact CLAY with weathered dolerite boulders					
1.2							
1.5							
1.8							
2.1							
2.4							

PROJECT: Newcastle Candidate Landfill Site Selection

JOB NO: 2012/328

DATE EXCAVATED: 02/19/2014

TP NO: TP 16

LOGGED BY: Kent Gravelet-Blondin

CONTRACTOR: Charlies

MACHINE: NH B90B

OPERATOR: Unknown

TP CO-ORDINATES: 27 50' 53.10" S / 29 54' 56.20" E

NOTE: Trial Pit Did Not Reach Refusal



GEOMEASURE GROUP
Groundwater & Environmental Consultants

APPENDIX B

LABORATORY CERTIFICATES OF ANALYSES

Laboratory Test Summary



Job Description: Newcastle Landfill - Ref. No. 2012/328
Job no.: 7096
Date: 14/11/2013

Lab no.		10015	10016							
Location		TP 4	TP 5							
Depth		0.35 - 0.61	0.81 - 2.18							
Description		-	-							
Binder Material		-	-							
Particle Size (mm)	75									
	53									
	37.5									
	26.5									
	19									
	13.2	100								
	9.5	99								
	4.75	98	100							
	2	97	99							
	0.425	95	97							
Hydrometer	0.25	94	96							
	0.15	92	94							
	0.075	87	89							
	0.05	83	87							
	0.02	69	76							
Soil Mortar	0.005	59	64							
	0.002	48	51							
	Coarse Sand <2.0 >0.425mm	2.0	1.7							
	Fine Sand <0.425>0.05mm	17.0	12.9							
Atterberg Limits	Silt <0.05 >0.005	23.3	22.5							
	Clay <0.005	57.7	62.9							
	Liquid Limit % (m/m)	46.7	50.3							
	Plasticity Index	10.5	14.6							
Mod AASHTO Density	Linear Shrinkage %	6.7	9.3							
	Natural MC %	-	-							
	Dry Density kg/m ³									
CBR	OMC %									
	100% MDD									
	98%									
	95%									
	93% (Inferred) *									
AASHTO Soil Classification *										
Grading Modulus										
TRH 14 (1985) *										

Signature:
 Title:

TEST REPORT

MATERIALS ANALYSIS

THEKWINI SOILS LAB. CC

Project: Newcastle Landfill - Ref. No. 2012/328

Ref no.: 7096 **Lab no.:** 10015 **Borehole/Pit no.:** TP 4 **Fig no.:** S1
Description: -

Depth: 0.35 - 0.61

Test Methods: TMH1 METHOD A1(a), A2, A3 & A4, D+M1000

Grading Analysis	
Grain Size (mm)	% Passing
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	99.3
4.75	98.4
2	97.4
0.425	95.4
0.25	94.2
0.15	91.9
0.075	86.6
0.05	82.6
0.02	68.7
0.005	58.8
0.002	48.3

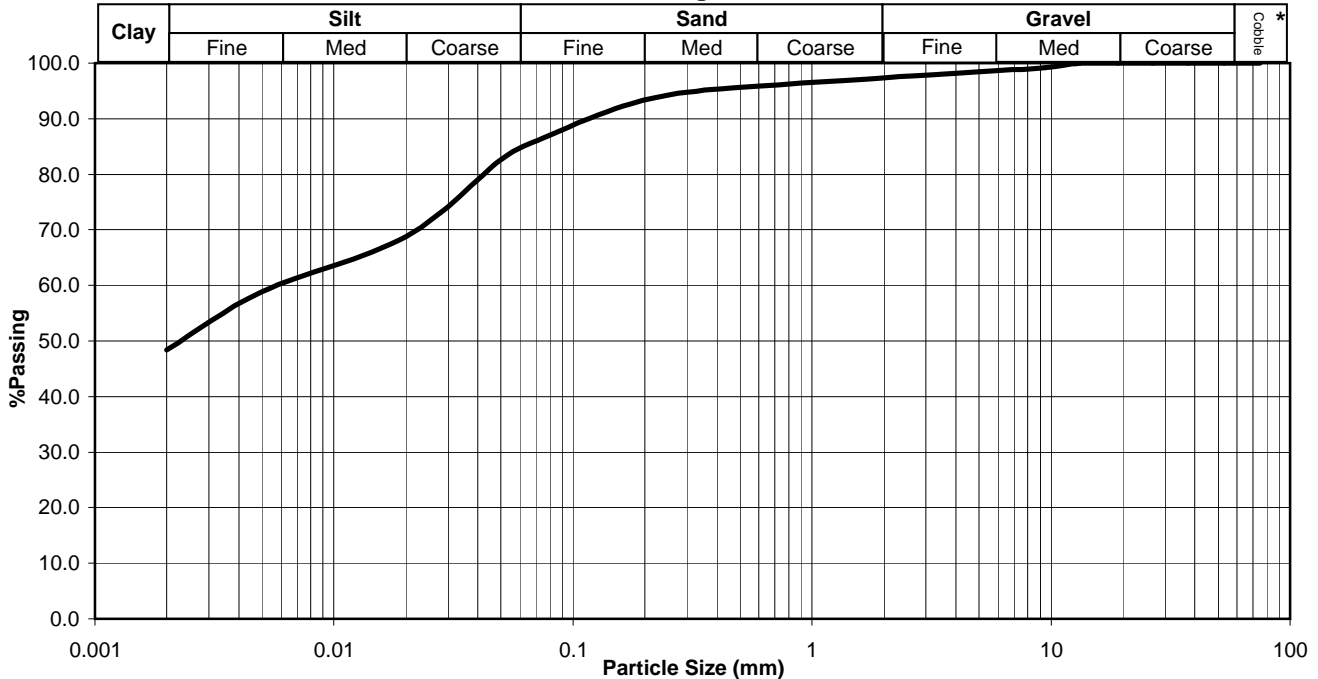
M.I.T SIZE *	
CLASSIFICATION	
Cobble%	0.0
Gravel%	2.6
Coarse	0.0
Medium	1.3
Fine	1.2
Sand%	13.2
Coarse	1.7
Medium	2.6
Fine	8.9
Silt%	35.9
Coarse	15.5
Medium	9.2
Fine	11.2
Clay%	48.3

PLASTICITY	
Liquid Limit, %	46.7
Plasticity Index	10.5
Linear Shrinkage, % (L/L)	6.7

GRADING	
D10 Size (mm)	<0.002
Uniformity Coefficient	*
Grading Modulus	0.21

CLASSIFICATION *	
Potential Expansiveness	Low
Group Index	12
AASHTO Soil Classification	A - 8
Unified Classification	ML or OL

Grading Curve



Ref no.: 7096

Fig no.: S1

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TEST REPORT

MATERIALS ANALYSIS

THEKWINI SOILS LAB. CC

Project: Newcastle Landfill - Ref. No. 2012/328

Ref no.: 7096 **Lab no.:** 10016 **Borehole/Pit no.:** TP 5 **Fig no.:** S2
Description: -

Depth: 0.81 - 2.18

Test Methods: TMH1 METHOD A1(a), A2, A3 & A4, D+M1000

Grading Analysis	
Grain Size (mm)	% Passing
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	100.0
2	98.7
0.425	97.0
0.25	95.7
0.15	93.6
0.075	88.6
0.05	86.9
0.02	75.5
0.005	64.0
0.002	51.4

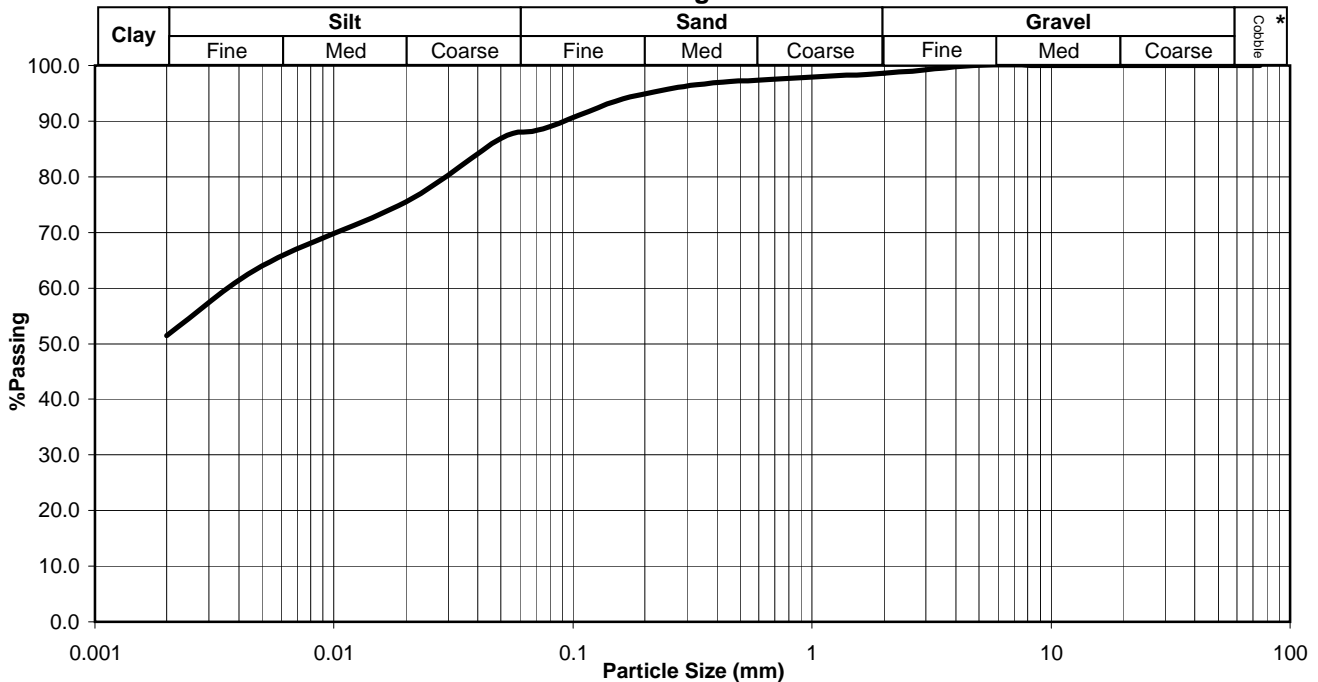
M.I.T SIZE *	
CLASSIFICATION	
Cobble%	0.0
Gravel%	1.3
Coarse	0.0
Medium	0.0
Fine	1.3
Sand%	11.1
Coarse	1.5
Medium	2.5
Fine	7.1
Silt%	36.2
Coarse	12.1
Medium	10.8
Fine	13.4
Clay%	51.4

PLASTICITY	
Liquid Limit	50.3
Plasticity Index	14.6
Linear Shrinkage	9.3

GRADING	
D10 Size (mm)	<0.002
Uniformity Coefficient	NA
Grading Modulus	0.16

CLASSIFICATION *	
Potential Expansiveness	Low
Group Index	17
AASHTO Soil Classification	A - 7 - 5
Unified Classification	MH or OH

Grading Curve



Ref no.: 7096

Fig no.: S2

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Laboratory Test Summary

THEKWINI SOILS LAB. CC

Job Description: Newcastle landfill Investigation - 2012/328
 Job no.: 7226
 Date: 07-04-2014

Lab no.		02112	02113	02114	02115					
Location		TP 12 S3	TP 13 S4	TP 14 S6	TP 15 S5					
Depth		0.15 - 0.70	0.0 - 0.20	1.20 - 2.40	1.32 - 2.53					
Description		-	-	-	-					
Binder Material		-	-	-	-					
Particle Size (mm)	75	100								
	53	99								
	37.5	98								
	26.5	96								
	19	96				100				
	13.2	88				95				
	9.5	85	100			94				
	4.75	79	100	100		93				
	2	61	99	99		92				
	0.425	54	93	98		90				
	0.25	53	91	98		89				
Hydrometer	0.15	52	89	96		87				
	0.075	48	84	93		83				
	0.05	46	78	91		80				
	0.02	35	58	78		69				
	0.005	27	47	66		60				
0.002	21	36	56		50					
Soil Mortar	Coarse Sand <2.0 >0.425mm	11.5	5.8	1.1		1.9				
	Fine Sand <0.425>0.05mm	48.2	20.6	8.9		19.2				
	Silt <0.05 >0.005	16.7	29.4	24.8		20.2				
	Clay <0.005	23.6	44.1	65.2		58.7				
Atterberg Limits	Liquid Limit % (m/m)	41.7	42.7	51.9		46.6				
	Plasticity Index	12.2	10.7	20.8		13.3				
	Linear Shrinkage %	6	9.3	11.3		7.3				
	Natural MC %	-	-	-		-				
Mod AASHTO Density	Dry Density kg/m ³	1740				1549				
	OMC %	18.4				24				
CBR	100% MDD									
	98%									
	95%									
	93% (Inferred) *									
	90%									
CBR Swell (%)										
AASHTO Soil Classification *		A - 7 - 6 (3)	A - 8 (11)	A - 7 - 5 (24)	A - 7 - 5 (14)					
Grading Modulus TRH 14 (1985) *		1.37	0.24	0.09	0.34					

Signature:
 Title:

TEST REPORT

MATERIALS ANALYSIS

THEKWINI SOILS LAB. CC

Project: Newcastle landfill Investigation - 2012/328

Ref no.: 7226 **Lab no.:** 02112 **Borehole/Pit no.:** TP 12 S3 **Fig no.:** -
Description: -

Depth: 0.15 - 0.70

Test Methods: TMH1 METHOD A1(a), A2, A3 & A4, ASTM D422

Grading Analysis	
Grain Size (mm)	% Passing
75	100.0
53	98.8
37.5	97.6
26.5	96.4
19	95.9
13.2	88.0
9.5	84.7
4.75	78.8
2	61.0
0.425	54.0
0.25	53.1
0.15	51.5
0.075	48.2
0.05	45.5
0.02	34.8
0.005	26.7
0.002	20.6

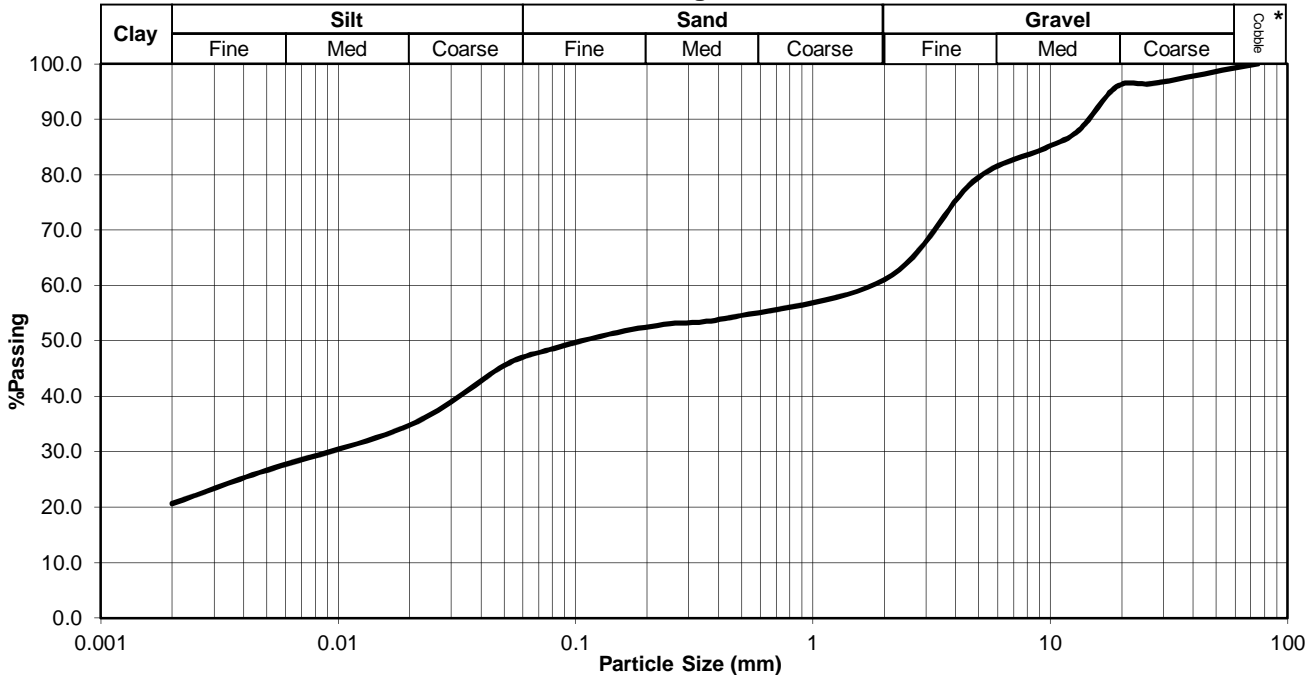
M.I.T SIZE *	
CLASSIFICATION	
Cobble%	0.8
Gravel%	38.2
Coarse	3.3
Medium	15.6
Fine	19.3
Sand%	14.4
Coarse	6.2
Medium	2.5
Fine	5.7
Silt%	26.0
Coarse	11.9
Medium	7.5
Fine	6.6
Clay%	20.6

PLASTICITY	
Liquid Limit, %	41.7
Plasticity Index	12.2
Linear Shrinkage, % (L/L)	6

GRADING	
D10 Size (mm)	<0.002
Uniformity Coefficient	*
Grading Modulus	1.37

CLASSIFICATION *	
Potential Expansiveness	Low
Group Index	3
AASHTO Soil Classification	A - 7 - 6
Unified Classification	SM

Grading Curve



Ref no.: 7226

Fig no.: -

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TEST REPORT

MATERIALS ANALYSIS

THEKWINI SOILS LAB. CC

Project: Newcastle landfill Investigation - 2012/328

Ref no.: 7226 **Lab no.:** 02113 **Borehole/Pit no.:** TP 13 S4 **Fig no.:** -
Description: -

Depth: 0.0 - 0.20

Test Methods: TMH1 METHOD A1(a), A2, A3 & A4, ASTM D422

Grading Analysis	
Grain Size (mm)	% Passing
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	99.9
2	98.9
0.425	93.2
0.25	91.4
0.15	88.9
0.075	83.8
0.05	78.1
0.02	58.2
0.005	46.8
0.002	36.3

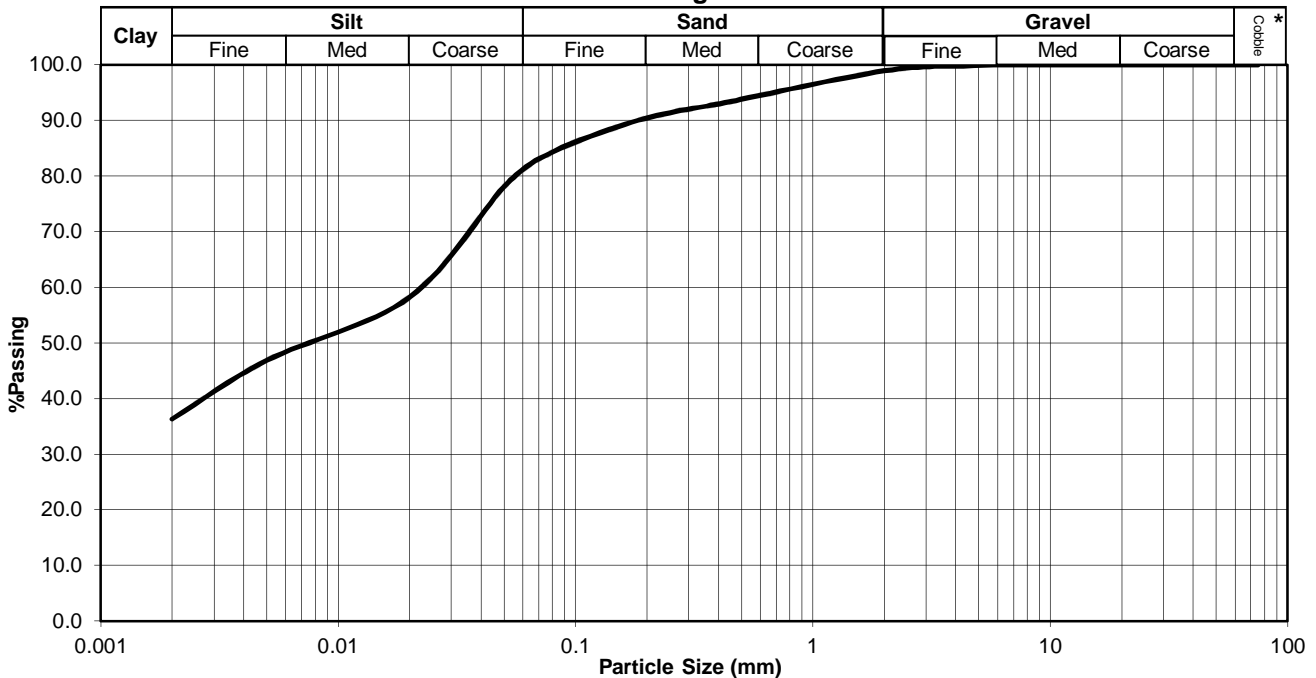
M.I.T SIZE *	
CLASSIFICATION	
Cobble%	0.0
Gravel%	1.1
Coarse	0.0
Medium	0.1
Fine	1.0
Sand%	18.6
Coarse	5.1
Medium	3.7
Fine	9.8
Silt%	44.0
Coarse	22.1
Medium	10.6
Fine	11.3
Clay%	36.3

PLASTICITY	
Liquid Limit	42.7
Plasticity Index	10.7
Linear Shrinkage	9.3

GRADING	
D10 Size (mm)	<0.002
Uniformity Coefficient	NA
Grading Modulus	0.24

CLASSIFICATION *	
Potential Expansiveness	Low
Group Index	11
AASHTO Soil Classification	A - 8
Unified Classification	ML or OL

Grading Curve



Ref no.: 7226

Fig no.: -

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TEST REPORT

MATERIALS ANALYSIS

THEKWINI SOILS LAB. CC

Project: Newcastle landfill Investigation - 2012/328

Ref no.: 7226 **Lab no.:** 02114 **Borehole/Pit no.:** TP 14 S6 **Fig no.:** -
Description: -

Depth: 1.20 - 2.40

Test Methods: TMH1 METHOD A1(a), A2, A3 & A4, ASTM D422

Grading Analysis	
Grain Size (mm)	% Passing
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	100.0
2	99.4
0.425	98.3
0.25	97.6
0.15	96.5
0.075	93.1
0.05	91.0
0.02	78.5
0.005	65.9
0.002	56.1

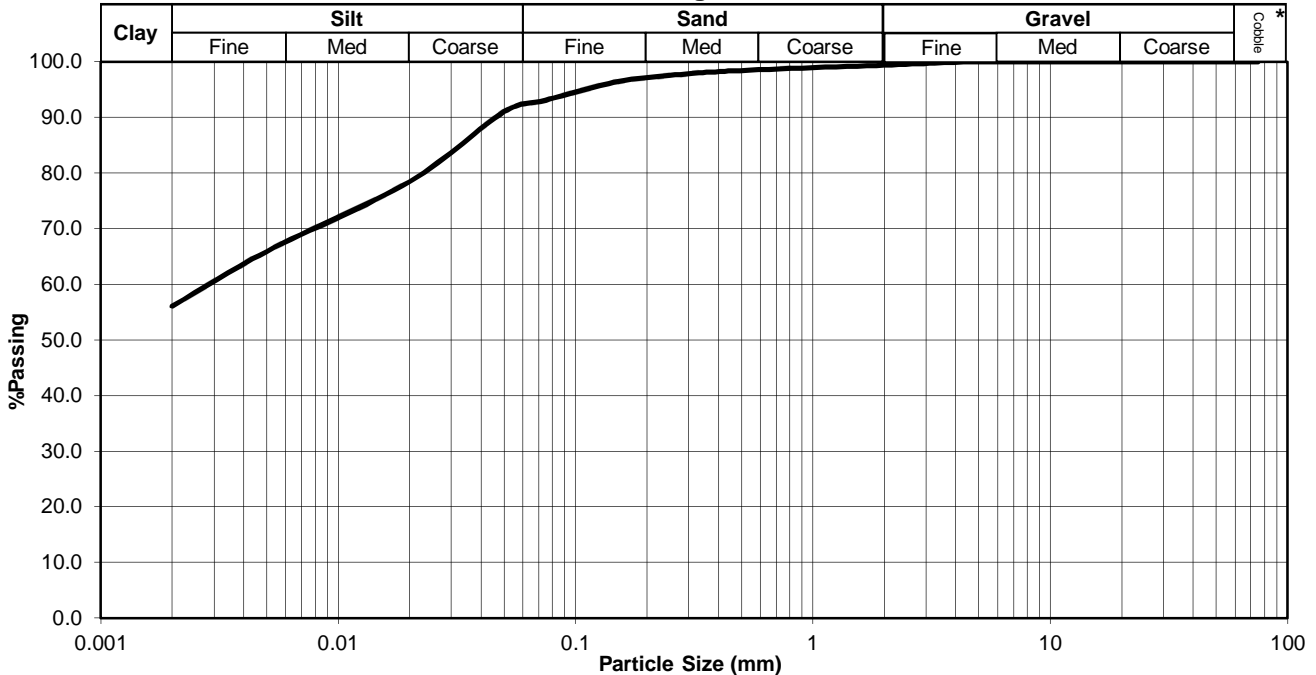
M.I.T SIZE *	
CLASSIFICATION	
Cobble%	0.0
Gravel%	0.6
Coarse	0.0
Medium	0.0
Fine	0.6
Sand%	7.6
Coarse	1.0
Medium	1.4
Fine	5.1
Silt%	35.8
Coarse	13.4
Medium	11.7
Fine	10.7
Clay%	56.1

PLASTICITY	
Liquid Limit	51.9
Plasticity Index	20.8
Linear Shrinkage	11.3

GRADING	
D10 Size (mm)	<0.002
Uniformity Coefficient	NA
Grading Modulus	0.09

CLASSIFICATION *	
Potential Expansiveness	Low
Group Index	24
AASHTO Soil Classification	A - 7 - 5
Unified Classification	MH or OH

Grading Curve



Ref no.: 7226

Fig no.: -

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TEST REPORT

MATERIALS ANALYSIS

THEKWINI SOILS LAB. CC

Project: Newcastle landfill Investigation - 2012/328

Ref no.: 7226 **Lab no.:** 02115 **Borehole/Pit no.:** TP 15 S5 **Fig no.:** -
Description: -

Depth: 1.32 - 2.53

Test Methods: TMH1 METHOD A1(a), A2, A3 & A4, ASTM D422

Grading Analysis	
Grain Size (mm)	% Passing
75	100.0
53	100.0
37.5	100.0
26.5	100.0
19	100.0
13.2	95.3
9.5	94.0
4.75	93.1
2	92.1
0.425	90.3
0.25	89.2
0.15	87.5
0.075	83.4
0.05	80.5
0.02	68.7
0.005	59.8
0.002	50.0

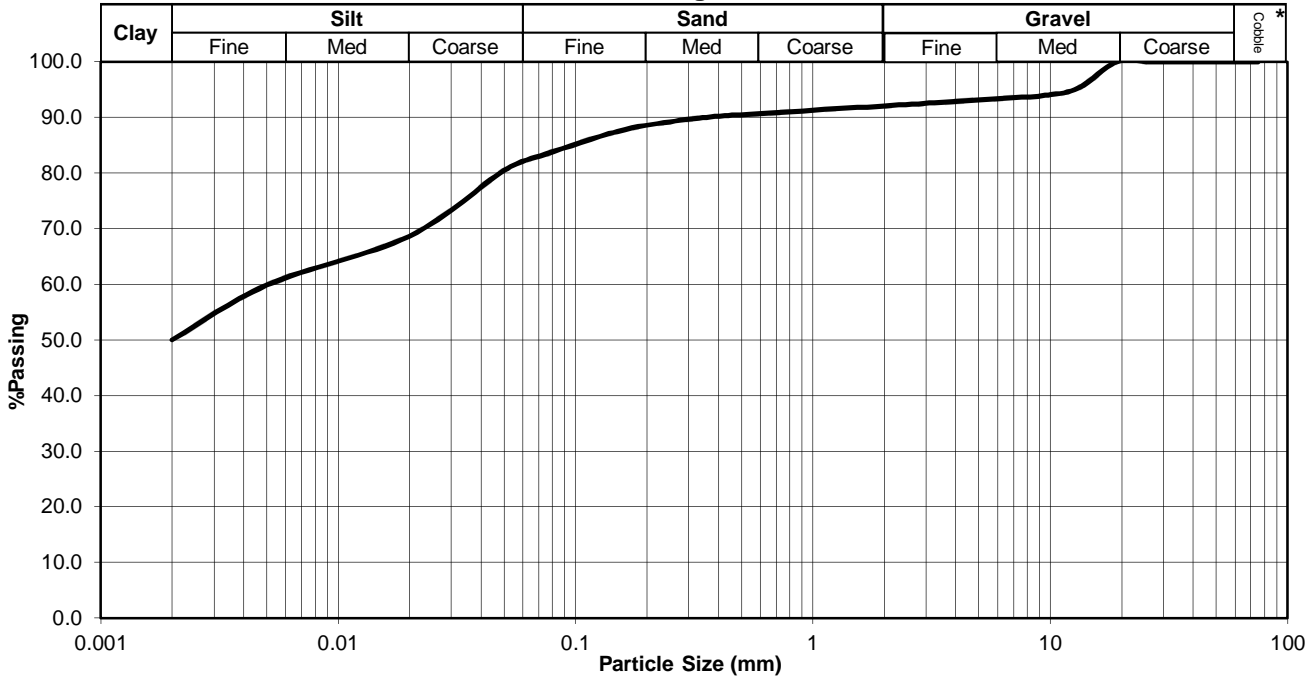
M.I.T SIZE *	
CLASSIFICATION	
Cobble%	0.0
Gravel%	7.9
Coarse	0.0
Medium	6.7
Fine	1.3
Sand%	10.4
Coarse	1.6
Medium	2.1
Fine	6.7
Silt%	31.6
Coarse	13.0
Medium	8.2
Fine	10.4
Clay%	50.0

PLASTICITY	
Liquid Limit	46.6
Plasticity Index	13.3
Linear Shrinkage	7.3

GRADING	
D10 Size (mm)	<0.002
Uniformity Coefficient	NA
Grading Modulus	0.34

CLASSIFICATION *	
Potential Expansiveness	Low
Group Index	14
AASHTO Soil Classification	A - 7 - 5
Unified Classification	ML or OL

Grading Curve



Ref no.: 7226

Fig no.: -

* Information marked with an asterisk is outside the scope of Accreditation.
 The results only relate to the samples tested.
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CONSOLIDATED DRAINED SHEAR BOX TEST TEST RESULTS

Project Newcastle landfill Investigation - 2012/328
Ref no. 7226 **Description:**
Lab no. 02112 -
Depth (m): 0.15 - 0.70 **Sample Type:**
Position: TP 12 S3 Recompacted to 95% of MOD.



THEKWINI SOILS LAB. CC

V.A.T. REGISTRATION NO. 4590210981

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 Tollgate, DURBAN MAYVILLE, 4058
 Tel : (031) 201-8992 Fax : (031) 201-7920

Test 1								Test 2								Test 3							
Inputs								Inputs								Inputs							
Normal Stress (kPa)		100		MC at Test (%)		18.4		Normal Stress (kPa)		200		MC at Test (%)		18.4		Normal Stress (kPa)		300		MC at Test (%)		18.4	
Prooving Ring Factor		82.02		Dry Density (kg/m ³)		1653		Prooving Ring Factor		80.7		Dry Density (kg/m ³)		1653		Prooving Ring Factor		85.64		Dry Density (kg/m ³)		1653	
Area (cm ²)		36		Volume at Test (cm ³)		77.652		Area (cm ²)		36		Volume at Test (cm ³)		77.328		Area (cm ²)		36		Volume at Test (cm ³)		76.68	
Volume (cm ³)		79.2						Volume (cm ³)		79.2						Volume (cm ³)		79.2					
Strain Gauge	Prooving Ring	Vertical Gauge	Total Strain (mm)	Total Strain %	Δ	V/Vo	Shear Stress kN/m ²	Strain Gauge	Prooving Ring	Vertical Gauge	Total Strain (mm)	Total Strain %	Δ	V/Vo	Shear Stress kN/m ²	Strain Gauge	Prooving Ring	Vertical Gauge	Total Strain (mm)	Total Strain %	Δ	V/Vo	Shear Stress kN/m ²
3	0	1218						3	0	924						5	0	1201					
17	10	1217	0.1	0.28	0.00	22.8	16	10	923	0.1	0.27	0.00	22.4	15	6	1200	0.1	0.25	0.00	14.3			
46	19	1217	0.1	0.77	0.00	43.3	45	26	923	0.1	0.75	0.00	58.3	35	19	1200	0.1	0.58	0.00	45.2			
88	28	1217	0.1	1.47	0.00	63.8	86	39	922	0.2	1.43	-0.01	87.4	74	33	1200	0.1	1.23	0.00	78.5			
178	38	1216	0.2	2.97	-0.01	86.6	175	63	917	0.7	2.92	-0.03	141.2	165	62	1202	-0.1	2.75	0.00	147.5			
209	41	1216	0.2	3.48	-0.01	93.4	206	67	916	0.8	3.43	-0.04	150.2	196	69	1201	0.0	3.27	0.00	164.1			
273	43	1219	-0.1	4.55	0.00	98.0	271	71	908	1.6	4.52	-0.07	159.2	265	82	1190	1.1	4.42	-0.05	195.1			
352	41.8	1227	-0.9	5.87	0.04	95.2	349	72	902	2.2	5.82	-0.10	161.4	340	90	1178	2.3	5.67	-0.11	214.1			
470	38.3	1236	-1.8	7.83	0.08	87.3	413	72	899	2.5	6.88	-0.12	161.4	403	94	1173	2.8	6.72	-0.13	223.6			
556	37	1238	-2.0	9.27	0.09	84.3	464	72.3	898	2.6	7.73	-0.12	162.1	457	96	1158	4.3	7.62	-0.20	228.4			
621	36	1239	-2.1	10.35	0.10	82.0	544	72	895	2.9	9.07	-0.13	161.4	533	100	1149	5.2	8.88	-0.24	237.9			
722	35.1	1239	-2.1	12.03	0.10	80.0	612	71.4	892	3.2	10.20	-0.15	160.1	602	101	1144	5.7	10.03	-0.26	240.3			
787	35	1240	-2.2	13.12	0.10	79.7	716	70.5	890	3.4	11.93	-0.16	158.0	706	101.9	1140	6.1	11.77	-0.28	242.4			
899	34.3	1240	-2.2	14.98	0.10	78.1	782	70	888	3.6	13.03	-0.17	156.9	775	101.5	1138	6.3	12.92	-0.29	241.5			
967	34.1	1240	-2.2	16.12	0.10	77.7	891	69.2	886	3.8	14.85	-0.18	155.1	882	100.1	1135	6.6	14.70	-0.31	238.1			
1082	34	1240	-2.2	18.03	0.10	77.5	956	69	884	4.0	15.93	-0.19	154.7	950	98.5	1133	6.8	15.83	-0.32	234.3			
1151	34	1240	-2.2	19.18	0.10	77.5	1072	67.8	882	4.2	17.87	-0.19	152.0	1064	97	1132	6.9	17.73	-0.32	230.8			
							1142	66.8	880	4.4	19.03	-0.20	149.7	1134	96.3	1131	7.0	18.90	-0.32	229.1			

CONSOLIDATED DRAINED SHEAR BOX TEST

Project Newcastle landfill Investigation - 2012/328
Ref no. 7226
Lab no. 02112 **Sample Type**
Depth (m): 0.15 - 0.70 Recompacted to 95% of MOD.
Position: TP 12 S3 **Description:**



THEKWINI SOILS LAB. CC

V.A.T. REGISTRATION NO. 4590210961.

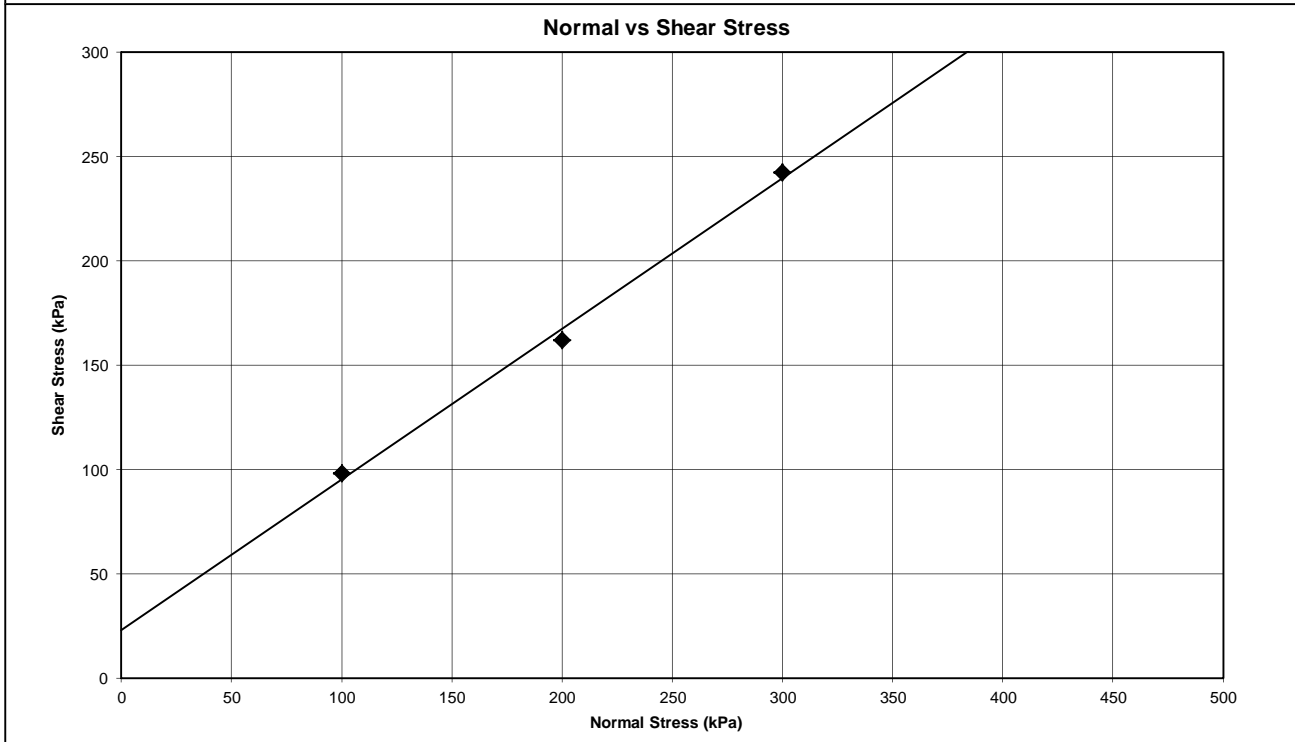
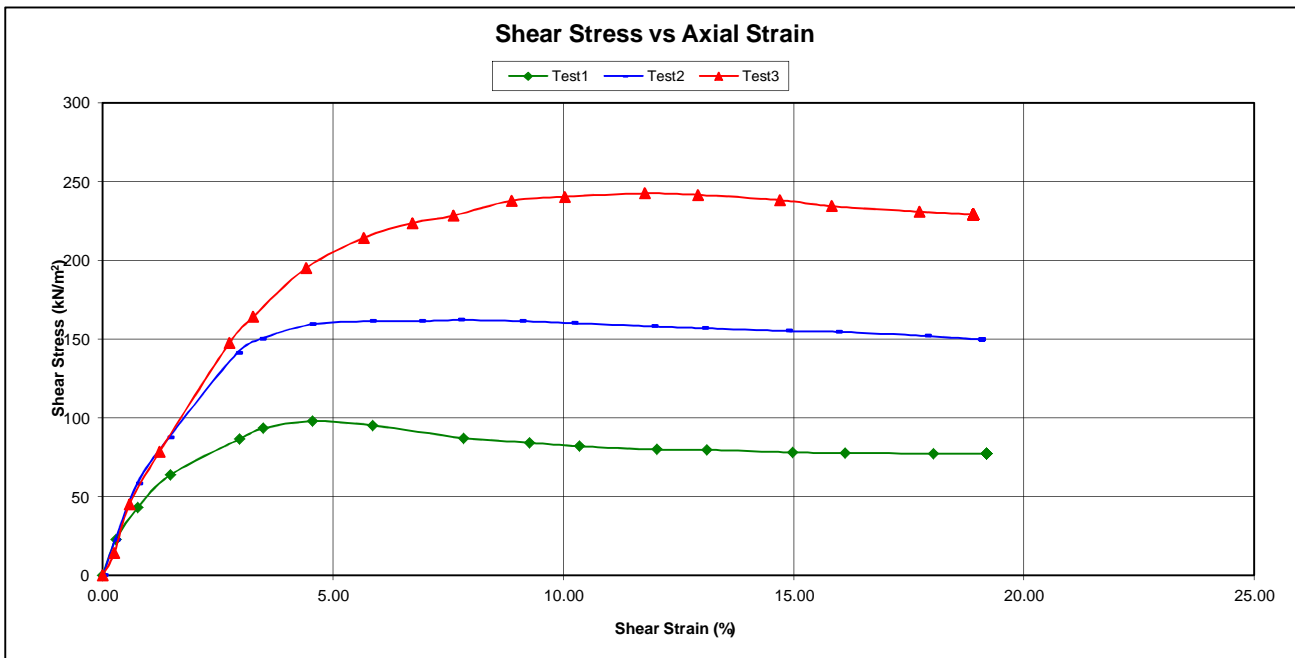
68 Ridge Road,
Tollgate, DURBAN
Tel : (031) 201-8992

P.O. Box 30464,
MAYVILLE, 4058
Fax : (031) 201-7920

	Test 1	Test 2	Test 3
Normal Stress (kN/m ²)	100	200	300
Dry Density (kg/m ³)	1653	1653	1653
Moisture Content (%)	18.4	18.4	18.4
Shear Strain (%)	4.6	7.7	11.8
Shear Stress (kN/m ²)	98.0	162.1	242.4

Shear Strength Parameters

Angle of Internal Friction (O°) 36
Cohesion (kPa) 23



CONSOLIDATED DRAINED SHEAR BOX TEST TEST RESULTS

Project Newcastle Landfill Investigation - 2012/328
Ref no. 7226 **Description:**
Lab no. 02115 -
Depth (m): 1.32 - 2.53 **Sample Type:**
Position: TP 15 S5 Recompacted to 95% of MOD.



THEKWINI SOILS LAB. CC

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68 Ridge Road, P.O. Box 30464,
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Test 1								Test 2								Test 3													
Inputs								Inputs								Inputs													
Normal Stress (kPa)		100		MC at Test (%)				Normal Stress (kPa)		200		MC at Test (%)				Normal Stress (kPa)		300		MC at Test (%)									
Prooving Ring Factor		74.7		Dry Density (kg/m ³)		1471.55		Prooving Ring Factor		80.1		Dry Density (kg/m ³)		1471.55		Prooving Ring Factor		83.55		Dry Density (kg/m ³)		1471.55							
Area (cm ²)		36		Volume at Test (cm ³)				78.228		Area (cm ²)		36		Volume at Test (cm ³)				74.376		Area (cm ²)		36		Volume at Test (cm ³)				74.376	
Volume (cm ³)		79.2										Volume (cm ³)		79.2										Volume (cm ³)		79.2			
Strain Gauge	Prooving Ring	Vertical Gauge	Total Strain (mm)	Total Strain %	Δ	V/Vo	Shear Stress kN/m ²	Strain Gauge	Prooving Ring	Vertical Gauge	Total Strain (mm)	Total Strain %	Δ	V/Vo	Shear Stress kN/m ²	Strain Gauge	Prooving Ring	Vertical Gauge	Total Strain (mm)	Total Strain %	Δ	V/Vo	Shear Stress kN/m ²						
16	0	1098						0	0	1031						46	0	961											
29	9	1098	0.0	0.48	0.00	18.7	14	10	1031	0.0	0.23	0.00	22.3	63	9	961	0.0	1.05	0.00	20.9									
52	16	1098	0.0	0.87	0.00	33.2	37	18	1027	0.4	0.62	-0.02	40.1	85	21	960	0.1	1.42	0.00	48.7									
85	30	1097	0.1	1.42	0.00	62.3	68	27	1021	1.0	1.13	-0.05	60.1	113	32	950	1.1	1.88	-0.05	74.3									
157	45	1098	0.0	2.62	0.00	93.4	139	41	992	3.9	2.32	-0.18	91.2	179	50	910	5.1	2.98	-0.23	116.0									
186	48	1098	0.0	3.10	0.00	99.6	168	47	982	4.9	2.80	-0.23	104.6	209	56	897	6.4	3.48	-0.29	130.0									
234	50	1099	-0.1	3.90	0.00	103.8	216	54	965	6.6	3.60	-0.30	120.2	255	65	880	8.1	4.25	-0.37	150.9									
298	50	1103	-0.5	4.97	0.02	103.8	279	60	943	8.8	4.65	-0.40	133.5	315	74	864	9.7	5.25	-0.45	171.7									
350	50	1104	-0.6	5.83	0.03	103.8	332	67	937	9.4	5.53	-0.43	149.1	368	82	859	10.2	6.13	-0.47	190.3									
392	50	1106	-0.8	6.53	0.04	103.8	372	69	936	9.5	6.20	-0.44	153.5	408	85	856	10.5	6.80	-0.48	197.3									
450	44.5	1106	-0.8	7.50	0.04	92.3	428	70	935	9.6	7.13	-0.44	155.8	449	87	853	10.8	7.48	-0.50	201.9									
510	44.1	1106	-0.8	8.50	0.04	91.5	488	69.4	934	9.7	8.13	-0.45	154.4	511	88	851	11.0	8.52	-0.51	204.2									
590	42.4	1106	-0.8	9.83	0.04	88.0	567	68.3	933	9.8	9.45	-0.45	152.0	591	88.1	849	11.2	9.85	-0.52	204.5									
644	42.2	1106	-0.8	10.73	0.04	87.6	621	67.9	933	9.8	10.35	-0.45	151.1	644	87.7	848	11.3	10.73	-0.52	203.5									
767	41.7	1106	-0.8	12.78	0.04	86.5	743	66.7	933	9.8	12.38	-0.45	148.4	764	87.4	847	11.4	12.73	-0.52	202.8									
847	41.7	1106	-0.8	14.12	0.04	86.5	824	65.4	932	9.9	13.73	-0.46	145.5	844	87.3	846	11.5	14.07	-0.53	202.6									
984	41	1104	-0.6	16.40	0.03	85.1	961	65.3	932	9.9	16.02	-0.46	145.3	982	87.3	844	11.7	16.37	-0.54	202.6									
1067	40.7	1102	-0.4	17.78	0.02	84.5	1044	65.3	931	10.0	17.40	-0.46	145.3	1062	87.8	842	11.9	17.70	-0.55	203.8									
1119	39.5	1101	-0.3	18.65	0.01	82.0	1100	64.8	931	10.0	18.33	-0.46	144.2	1100	87.2	842	11.9	18.33	-0.55	202.4									

CONSOLIDATED DRAINED SHEAR BOX TEST

Project Newcastle Landfill Investigation - 2012/328
Ref no. 7226
Lab no. 02115 **Sample Type**
Depth (m): 1.32 - 2.53 Recompacted to 95% of MOD.
Position: TP 15 S5 **Description:**



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V.A.T. REGISTRATION NO. 4590210961.

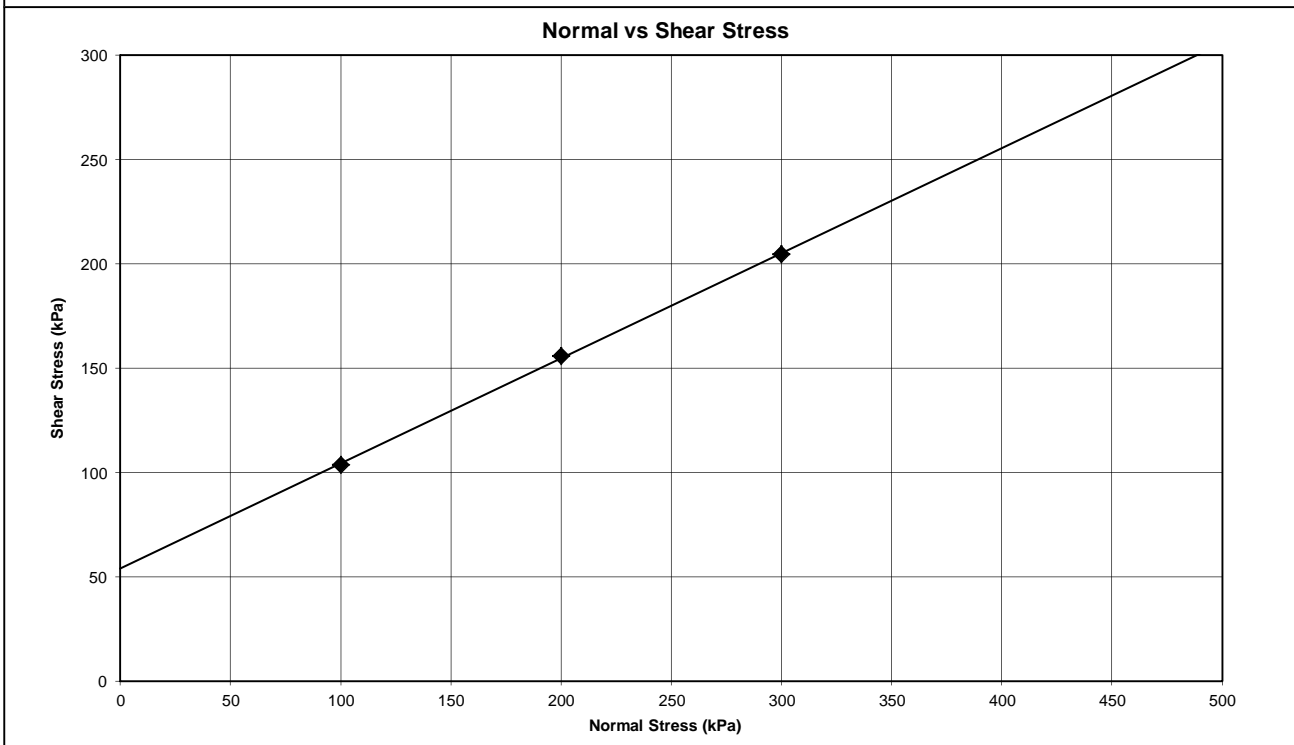
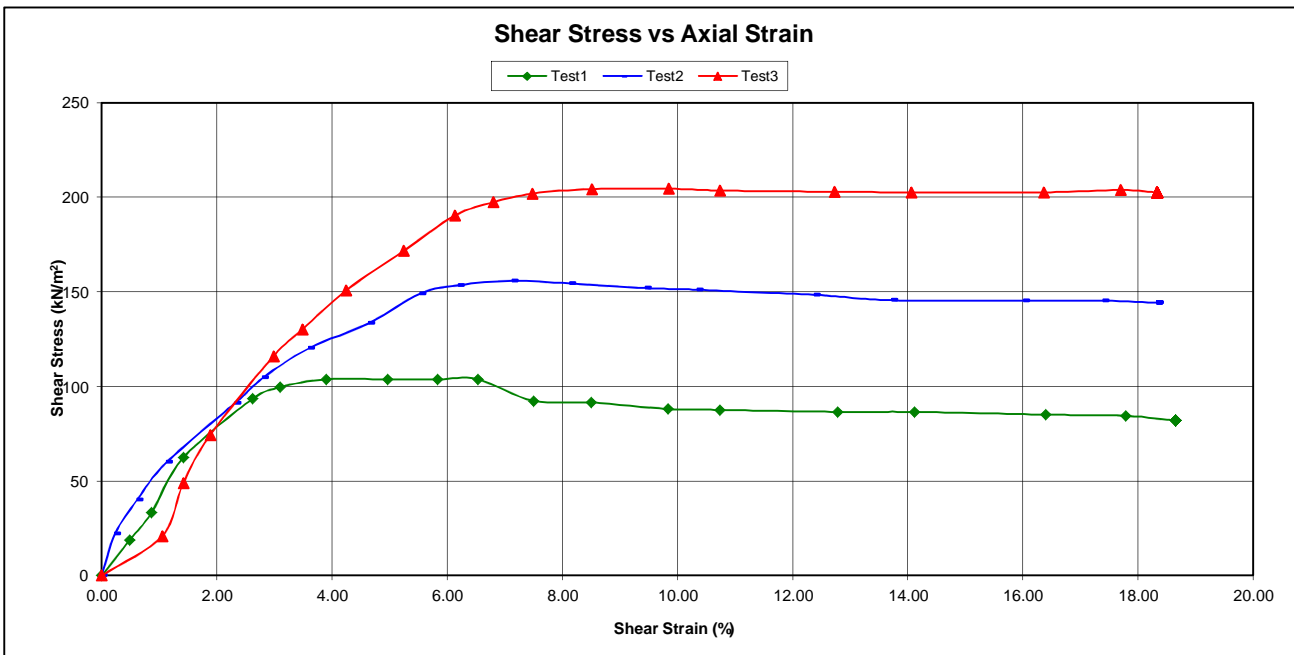
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Tel : (031) 201-8992

P.O. Box 30464,
MAYVILLE, 4058
Fax : (031) 201-7920

	Test 1	Test 2	Test 3
Normal Stress (kN/m ²)	100	200	300
Dry Density (kg/m ³)	1472	1472	1472
Moisture Content (%)			
Shear Strain (%)	3.9	7.1	9.9
Shear Stress (kN/m ²)	103.8	155.8	204.5

Shear Strength Parameters

Angle of Internal Friction (O°) 27
Cohesion (kPa) 54



**NEWCASTLE MUNICIPALITY NEW LANDFILL
INVESTIGATION – FINAL GEOHYDROLOGICAL
INVESTIGATION REPORT OF GREENWICH
FARM CANDIDATE SITE**



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Groundwater & Environmental Consultants

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Figure 1 : Locality Plan

Figure 2 : Geological Plan

Figure 3 : Area Plan Showing Geological Structures & Available Hydrocensus Data

Figure 4 : Geohydrological Site Plan

Figure 5 : Hydrocensus & Receptor Site Plan

APPENDIX A : GEOLOGICAL & CONSTRUCTION BOREHOLE LOGS

APPENDIX B : MANAGEMENT RECOMMENDATION SHEET & PUMPTEST DATA ANALYSIS

APPENDIX C : TABULATED WATER QUALITY RESULTS & LABORATORY CERTIFICATE

NEWCASTLE MUNICIPALITY NEW LANDFILL INVESTIGATION – PHASE 3 FINAL GEOHYDROLOGICAL INVESTIGATION OF PREFERRED LANDFILL SITE

1. INTRODUCTION AND TERMS OF REFERENCE

The Newcastle Municipality is under significant pressure to develop a new landfill site due to the existing landfill site rapidly reaching the end of its design life. This is due to the closure of the Madadeni and Osizweni Landfill Sites by the Department of Water Affairs (DWA), previously known as the Department of Water Affairs and Forestry (DWAF) as a result of non-compliance to the governing legislation. This event resulted in an influx of solid waste to the existing landfill site, which in turn further reduced its anticipated design life.

The initial limited invasive investigation of the site located on the farm Greenwich, undertaken in November 2013 comprised a geophysical survey, a limited geohydrological investigation and a limited invasive geotechnical investigation with the aim of assessing the suitability of the preferred candidate site for the development of a new landfill site. These findings were presented in the report “*Newcastle Municipality New Landfill Investigation – Limited Geohydrological, Geophysical & Geotechnical Investigation of Additional Candidate Site*”, dated 15th November 2013. This limited invasive investigation relates to Phase 2 – Limited Investigation of Preferred Candidate Site and Hydrocensus, laid out in our budget proposal for the identification of a new landfill site.

The findings of the limited invasive investigation indicated that the site was suitable for the development of a landfill site and therefore warranted the next phase of the investigation, the detailed investigation of the preferred site. This detailed investigation of the preferred candidate site relates to Phase 3 – Detailed Investigation of Preferred Site, laid out in our budget proposal for the identification of a new landfill site.

2. ACTIVITIES UNDERTAKEN SINCE LIMITED INVESTIGATION (PHASE 2)

The following activities have been undertaken since the limited invasive investigation (Phase 2) was undertaken in November 2013, with the purpose of concluding the final stage of our appointment in terms of the identification and investigation of a new landfill site to serve the Newcastle Municipality:

- Ecological investigation in January 2014 by Williams Environmental based on the identification of diverse ecological systems/vegetation on the site during the limited invasive investigation in November 2013.
- Submission of the Williams Environmental Ecological Report entitled “*Ecological Review of the Preferred Candidate Site for the Development of a Landfill – Greenwich Farm, Newcastle*”, dated 14th February 2014, to Envitech Solutions and the Newcastle Municipality in February 2014. The ecological report indicated that the site was suitable from an ecological point of view.

- Detailed geotechnical investigation of the preferred site which was undertaken on 19th February 2014 by Geomeasure Group, which included detailed trial pit logging and associated soil sampling, the results of which were to be used in conjunction with the soil profiling and sampling results undertaken during the previous limited invasive investigation, with the aim of delineating the dominant soils across the site and determining the soils suitability for the development of a landfill site.
- Compilation of a detailed Geotechnical Report by Geomeasure Group entitled, *“Newcastle Municipality New Landfill Investigation – Geotechnical Investigation of Greenwich Farm Candidate Site”*. The geotechnical report indicated that the majority of the site is suitable from a geotechnical point of view, with the suitable area having been clearly indicated on a site plan.
- Commencement of the detailed geohydrological investigation was initiated by the installation of 2 groundwater monitoring boreholes by Duckworth Drilling, under the supervision of Geomeasure Group, from the 3rd – 7th May 2014. The boreholes were installed in the areas regarded as up-gradient and down-gradient of the area considered to be the first phase of landfill site/footprint. The results of the drilling indicated that sufficient groundwater to undertake a pump test was intercepted in the up-gradient borehole. However, insufficient groundwater to undertake a pump test was intercepted during the drilling of the down-gradient borehole. It must be noted here that the down-gradient borehole is however still viable as a groundwater monitoring borehole required by legislation, due to the seepage encountered. The installation details of these boreholes are described in further detail in this report.
- Pump testing of the up-gradient borehole was undertaken by Midlands Pumps from the 7th – 8th May 2014. The location of this borehole on-site was indicated to Midlands Pumps by Mr. Janco du Plessis from the Newcastle Municipality. The pump test activities comprised a 12 hour calibration and monitored recovery test.
- Groundwater sampling of the up-gradient borehole was undertaken by Midlands Pumps at the end of the pump test cycle and was submitted to Talbot Laboratories for the suite of determinants included in the abbreviated SANS 241:2011 standards for drinking water. At the time of the sampling, there was insufficient groundwater in the down-gradient borehole to attain a sample. It must be noted that this is likely to be attributed to the relatively short time frame between the drilling and the pump testing of the boreholes and should not present a problem during future sampling events.
- Surface water sampling however could not be undertaken as there was insufficient water in the drainage feature located down-gradient of the landfill footprint. No surface water sampling points occur up-gradient of the landfill footprint.

This report includes the findings of the detailed geohydrological investigation which was initiated with the installation of the groundwater monitoring boreholes and which is concluded by the compilation of this final report. Please note that excerpts of the limited invasive investigation have also been included in this report for reference, explanation and continuity purposes.

3. GENERAL INFORMATION

3.1 STUDY AREA

The study area is comprised of the areas included within the proclaimed Newcastle Municipal boundaries as well as adjacent agricultural lands, which are located within a 15 km radius of the City of Newcastle (see attached Locality Plan – Dwg No. 2012/328 Figure 1). The proximity of this candidate landfill site to the N11 main road will result in economical haulage distances.

3.2 TOPOGRAPHY AND DRAINAGE

The City of Newcastle is partially located within the flood plain of the iNcandu River which enters the Amcor Dam just to the northwest of the existing landfill site. The terrain is generally moderately undulating with isolated ridges, such as Roy Point and Signal Hill, illustrating the deeply eroded nature of the study area. The terrain generally slopes towards the iNcandu and iNgagane Rivers as these form the major drainage features of the area. The elevation of Newcastle and the existing landfill site is ~ 1200 m above mean sea level (AMSL), while the ridges rise to an elevation of between 1300 m and 1400 m AMSL.

The iNcandu and Ngagane Rivers meander through the flood plain area south and south east of the town in a general south-easterly direction toward the Buffelsrivier located some 10 km due east of the existing landfill site. Numerous minor tributaries drain from both the north-east and south-west towards these three rivers. The drainage pattern of these tributaries is often deeply dendritic, with moderately deep erosion dongas being formed. The Chelmsford Dam is located along the Ngagane River upstream of the confluence with the iNcandu River about 20 km south-west of the existing landfill site.

The farm Greenwich on which the proposed candidate landfill site is located varies in altitude from 1300 m to 1470 m AMSL. Drainage occurs radially away from a central high located in the southern portions of the site, whilst the topography varies from gently to moderately undulating (see attached Area Plan – Dwg No. 2012/328 Figure 3).

3.3 CLIMATE AND VEGETATION

Climatic data for the Newcastle region was obtained from Agrimet at Cedara and the South African Weather Bureau. This data shows that the average precipitation for the wettest six months for the area is approximately 600 mm / annum – 830 mm / annum (based on 10 years of data). The evaporation of the wettest six months, as measured using the A-pan averages (based on 10 years of data) and incorporating an evaporation factor of 0.7, is approximately 490 mm / annum – 930 mm / annum. On average, this area experiences a rainfall surplus, such that the climatic water balance (**B**) is positive for more than one year in five, and therefore ‘leachate production’ is possible.

Average temperatures for the region vary from about 10°C to 26°C, with summer temperatures occasionally rising to over 30°C and winter temperatures dropping to 2°C. During winter months, mist and frost occur frequently, particularly in low-lying areas.

According to “*Borough of Newcastle New Regional Landfill Site Candidate Site Selection Report*” written by Knight Piésold Consulting in January 2003, the principal wind direction in the months of April to December is a north-westerly (toward the south-east), while in the months of January to March, the principle wind direction is a south-easterly (toward the north-west). Based on monthly averages, an approximate wind speed of 4.5 km / hour is expected.

With respect to vegetation and bioclimatic zones, the region falls into the transition between the Sour Sandveld and Tall Grassland zones. The vegetation varies from fine Kakuei grasses to scattered shrubs and small tress, which generally resembles a savannah landscape.

3.4 GEOLOGY AND SOILS

The Newcastle area is underlain by consolidated sediments of the Eccca Group and Beaufort Group of the Karoo Supergroup. The bedrock underlying the immediate vicinity of the town comprises sandstone and shale of the Vryheid Formation. To the west of the town, shale and mudrock of the Volksrust Formation and Adelaide Subgroup respectively outcrop as elevations begin to increase. These bedrock formations are relatively flat lying and present a stratigraphic succession with increasing elevation.

Karoo Igneous Province dolerite extensively intrudes the bedrock of the region in the form of both dolerite dykes and sills. The dolerite sills, as shown by the available geological maps, are fairly extensive, intruding large areas. Much of the Greenwich Farm is underlain by dolerite intrusions, as shown on the attached Geological Plan – Dwg No. 2012/328 Figure 2. The mapping shows little in the way of displacement faults in the region, with no major faults seen to occur within the 15 km radius around the existing landfill site.

The soils in the study area are derived from weathering of the underlying geology, with the outcrops of Quaternary Sands along river beds the most recent addition to the soil profile. The residual soils are generally comprised of silty to occasionally sandy clays and clayey silts, however profiles are usually not extensive, with typical depths in the region of 0.45 m to 0.75 m within the 15 km radius around the site. Weathering profiles in the sediments are generally shallow, except in zones where seepage occurs, whilst dolerite sills are occasionally weathered to depths of over 5.00 m.

3.5 GEOHYDROLOGY

The Karoo Supergroup sedimentary units are essentially secondary or fractured rock aquifers with negligible primary storage and permeability. Groundwater storage and movement is generally confined to fractures, joints and bedding planes within the rock mass. This statement holds true too for the doleritic intrusions, whose contacts (when weathered) often exhibit greater transmissivity.

According to Mapping Unit 11 of the '*Characterization and Mapping of the Groundwater Resources – KwaZulu-Natal Province*' prepared by VSA Earth Science Consultants (1995), the sandstone and shale of the Karoo Supergroup, in this area, are generally classified as poor to moderate potential fractured rock aquifers, with borehole yields typically ranging from > 0.1 l/sec – 3.0 l/sec. However, boreholes drilled into the dolerite intrusions typically only yield marginal (> 0.0 l/sec – 0.1 l/sec) amounts of groundwater, although greater yields are expected when boreholes are drilled along their margins with the surrounding sedimentary formations.

According to the DWA publication produced for Unit 11 of the KwaZulu-Natal Groundwater Mapping Project, the Quaternary Sands exhibit a moderate ground water development potential as they are classified as an inter-granular aquifer. This can be ascribed to the unconsolidated nature of the unit, where pore spaces between the sand grains allow for the retention of water.

Groundwater storage within the consolidated units is limited to the fractures and bedding planes within the rock mass and therefore storativity is typically low, at approximately 0.17%. However, owing to the fact that the saturated thickness of the underlying aquifer is thought to

be 20 m, and with the rock mass porosity set to be approximately 10%, actual volumes of water stored in the geological units are typically quite high. Groundwater rainfall recharge is of the order of 4 % - 5% of MAP.

Water quality in the region is generally good to moderate, with the electrical conductivity (EC) values of the groundwater generally falling below 70.00 mS/m. However within the general study area, bicarbonate-type waters, sulphate-type waters and chloride-type waters are all seen to be in evidence.

3.6 EXISTING BOREHOLE DATA

A desk top study of the region was conducted using the KZN Groundwater Resource Information Project (GRIP) database, and our internal (Geom) database, which represent the most up to date and complete data sets for the study area. The results of this desktop hydrocensus exercise indicated that only one (1) borehole or spring record occurs within a 4 km radius of the Greenwich Farm (see attached Area Plan Showing Geological Structures & Available Hydrocensus Data – Dwg No. 2012/328 Figure 3).

The results of the field hydrocensus indicated that no groundwater boreholes are located geohydrologically down-gradient of the site. The field hydrocensus also indicated 3 surface water points, comprising 2 stream points and 1 dam point. The locations of these possible sampling points have been presented on the Hydrocensus and Receptors Site Plan – Dwg No. 2012/328 Figure 5.

3.7 AGRICULTURAL POTENTIAL

The agricultural soil potential map, which was produced by the Institute of Soil, Climate and Water, shows this region as a low potential area with approximately 20% soils of intermediate suitability. This is, however, a very general classification and some high yielding agricultural ventures occur in the area, especially along the iNcandu and Ngagane Rivers to the north-east and north-west of the existing landfill site. Most of the farms adjoining the municipal land are, however, used for livestock grazing only.

4. WASTE STREAM AND LANDFILL CLASSIFICATION

During the initial investigation, the waste stream generated within the Newcastle Local Council administered area amounted to some 106 000 m³ / annum, or approximately 290 tonnes / day. This waste comprises domestic, garden, commercial and building waste as well as non-hazardous industrial waste. The current waste loads information was obtained from the “*Proposed New Regional Landfill Site Selection Report to Council – Revision 3*” as compiled by Knight Piésold Consulting in 2003. A growth rate of 2.5% was applied to determine the amount of waste generated from the envisaged landfill project commencement date. Consequently, the estimated waste load for the new proposed landfill would be approximately 375 tonnes / day.

The proposed site should have sufficient capacity for approximately 40 years, and if an annual growth rate of 2.5% is applied to the estimated daily waste stream of approximately 375 tonnes / day, the air space required for the disposal site, based upon land-filling operations of 260 days / year, will be in the order of 17.772 million m³. At an average height of 35.00 m, the required footprint area would be about 80 ha.

The water balance for the region, based on the seasonal rainfall and evaporation as transcribed by the Minimum Requirements of DWA, indicates a rainfall surplus for the region, such that leachate will be produced. In terms of the above information, the site should be designed and permitted as a General (G), Large (L) site with a positive water balance (B⁺), or **G:L:B⁺** facility. While according to the DEA National Environmental Management: Waste Act (2008) National Norms and Standards for Disposal of Waste to Landfill, this equates to a **Class B** landfill.

5. SIZE AND LOCATION OF THE PROPOSED PREFERRED SITE

Greenwich Farm is approximately 844 ha in size, however the eastern portions have already been sold and hence were not available for investigation. Since a landfill footprint of 80 ha was required for development, a 94 ha area incorporating the 80 ha footprint was delineated on our maps. It is the area between the 94 ha polygon and the proposed 80 ha landfill footprint which was considered for the installation of the groundwater monitoring boreholes to ensure they were not included in the area designated for excavation for the landfill footprint. These extents have been presented on the Geohydrological Site Plan – Dwg No. 2012/328 Figure 4.

As was indicated in the Geotechnical Report entitled “*Newcastle Municipality New Landfill Investigation – Geotechnical Investigation of Greenwich Farm Candidate Site*”, dated 22nd April, it was decided to investigate the northern portions of the farm, away from the eastern areas, given that an 800 m buffer around the landfill footprint is generally required and the fact that the eastern portion of the farm Greenwich has been excluded from this investigation (as instructed by the landowner) and will remain in its natural condition. It can also be noted here that the eastern portion of the site will form part of the prescribed buffer zone and therefore any vegetation identified during the on-site plant search and rescue which must be undertaken as part of the Environmental Impact Assessment Phase, as recommended by Messrs. Williams Environmental in their Ecological Survey Report entitled, “*Ecological Review of the Preferred Candidate Site for the Development of a Landfill – Greenwich Farm, Newcastle*”, dated February 2014, can be relocated to the buffer zone to ensure its protection.

6. BOREHOLE INSTALLATION

From the results of the geophysical investigation undertaken as part of the limited invasive investigation of the preferred site and reported in our report entitled “*Newcastle Municipality New Landfill Investigation – Limited Geohydrological, Geophysical & Geotechnical Investigation of Additional Candidate Site*”, dated 15th November 2013, drilling targets were identified for the installation of the up-gradient and down-gradient monitoring boreholes.

Messrs. Duckworth Drilling was appointed to drill new monitoring boreholes at the geophysically sited targets. Drilling commenced on the 3rd April 2014 and was completed on the 7th April 2014.

The details of the exploration drilling programme are summarised in Table 1 below, whilst the detailed borehole geological and construction logs are contained in Appendix A. The locations of the drilled boreholes are shown on the attached Geohydrological Site Plan – Dwg No. 2012/328 Figure 4.

Table 1: Summarised borehole location and construction details – Proposed Newcastle Landfill Site

BH No.	Latitude	Longitude	Depth (m bgl)*	Steel Casing (m)	Plain uPVC Casing (m)	Slotted uPVC Casing (m)	Water Strikes (m bgl)	Blow Yield (l/hr)
NL 1 (Up-gradient) KZN 140114	27° 51' 20.01" S	29° 55' 12.85" E	60.00	10.00	35	25	48	1 000
NL 2 (Down-gradient) KZN 140115	27° 50' 49.48" S	29° 55' 15.75" E	60.00	3.00	37	23	Seepage	Seepage

* m bgl = meters below ground level

The drilling exercise included the installation of two (2) boreholes, with the up-gradient borehole (BH NL 1) yielding sufficient groundwater for it to be pumptested so as to assist in determining the characteristics of the underlying aquifer. The pumptest data and the interpretation thereof are presented in the following section.

It must be noted that only seepage was intercepted in the down-gradient borehole BH NL 2, and therefore did not have sufficient volume to undertake a pumptest. Note though that this borehole will still be viable for groundwater monitoring purposes.

It must also be noted that the installation of a total of three (3) groundwater monitoring boreholes were allowed during the Phase 3 investigation, however, only two (2) boreholes have been installed up- and down-gradient of the area considered to be the Phase 1 portion of the proposed landfill site. The 3rd groundwater monitoring borehole will only be installed once the next phase of the landfill (the western extent of the landfill footprint) has been investigated and the preliminary designs have been considered, so to ensure the borehole is not installed in an area which may be excavated during the development of the next phase of the landfill site.

7. PUMPTESTING INVESTIGATION

7.1 CALIBRATION TEST

The pumptesting investigation was undertaken by Messrs Midlands Pumps who established on-site on 7th May 2014 and commenced with the pumptesting of BH NL1.

The pumptesting comprised a 12 hour calibration and monitored recovery pumptest which comprises pumping the borehole at varying pump rates until the water level drawdown in the borehole starts to stabilise over a 12 hour period, following which the pump is turned off and the recovering water level is monitored over 12 hours. Since the borehole was relatively low yielding, a 12 hour calibration and monitored recovery pumptest was undertaken, as opposed to undertaking a step drawdown and constant discharge and monitored recovery test.

The pumptest data and management recommendation sheet has been attached to the report as Appendix B, whilst the summarised data have been presented in Table 2 overleaf:

Table 2: Summarised Yield Test Data – Proposed Newcastle Landfill Site

BH No.	SWL* (m bgl)	Pump Installation Depth (m bgl)	ADD# (m)	Length of Pumptest (min)	% of ADD	% Recovery
BH NL 1 KZN 140114	16.00	59.00	43.00	720	56	96

As can be seen from the pump test data, the borehole only reached 56% of its available drawdown after 720 min and then recovered to 95% of its original static water level after 720 min.

7.2 THEORETICAL SUSTAINABLE YIELD

The results of the pump tests carried out on borehole BH NL 1 were analysed to determine the theoretical sustainable yield of the borehole. These theoretical recommendations are summarised in Table 3 below, whilst the borehole management sheets are attached in Appendix B.

Table 3: Theoretical Borehole Development Recommendations

BH No.	Rec. Pump Installation Depth (m bgl)	Dynamic Water Level (m bgl)	Rec. Daily Pump Cycle (hrs)	Rec. Pumping Rate (m ³ /hr)	Rec. Pumping Rate (l/s)	Rec. Pumping Rate (m ³ /day)
BH NL 1 KZN 140114	50	40	10	1.008	0.28	10.08
					Total	10.08

8. WATER QUALITY SAMPLING

Following the installation of the boreholes and the pump testing of BH NL 1, a groundwater sample was collected from BH NL 1 for submission for analysis. However, BH NL 2 was found to be dry at the time of sampling and therefore a “down-gradient” sample could not be attained. Furthermore, the surface water sampling points Stream 1 and Stream 2, located to the immediate north-west and to the north north-east of the site respectively, were also found to be dry and therefore initial surface water samples could not be attained and submitted for analysis.

It must be noted here that the lack of water in borehole BH NL 2 is not a concern at this stage, since the limited groundwater in the borehole is likely attributed to the short time period between the drilling and the pump testing / sampling investigations, as well as the decreased rainfall events and reduced groundwater recharge indicative of the drier winter months.

In addition, it must also be noted that, since the site is located at the top of a ridge, no surface water bodies were identified up-gradient of the site. In the event of the landfill site being approved for development and permitted by the Department of Agriculture and Environmental Affairs (DAEA), a surface water point in an adjacent sub-catchment which is not affected by any other activities in the area should be identified and its location should be approved by DWA for use as a long term water sampling point.

Since the results of the up- and down-gradient groundwater and surface water samples are used for comparison purposes, the sample attained from BH NL 1 was submitted for analysis according to the abbreviated SANS 241:2011 suite of determinants, as opposed to the full suite of determinants specified in the DWAF Minimum Requirements for Waste Disposal by Landfill (2nd Edition – 1998), as a preliminary step in order to reduce costs at this stage of the investigation.

In order to achieve a complete set of baseline water quality results prior to any development on the site, it is recommended that an additional sampling event be undertaken during the summer/wetter months in December 2014 or January 2015 when increased rainfall events and groundwater recharge are prevalent. The samples from this additional sampling event must be submitted for analysis according to the full suite of determinants stated in the DWAF Minimum Requirements for Waste Disposal by Landfill (2nd Edition – 1998), so that relevant comparisons of the determinants in all of the groundwater and surface water samples can be completed.

The water quality results attained from borehole BH NL 1 however indicates that the water quality is generally of good quality with only the turbidity and total coliform levels being elevated above the prescribed SANS 241: 2011 standards for drinking water. These elevated determinants have been summarised in Table 4 below:

The water quality results have been captured into a database which is attached to this report as Appendix C, as have the laboratory certificates of analysis.

Table 4: Summarised Elevated Water Quality Results – BH NL 1 Proposed Newcastle Landfill Site

Determinant	Risk	Units	Standard Limit	Sample BH NL 1 KZN 140114 7 May 2014
Physical - Water Quality				
Turbidity	Aesthetic	NTU	≤5	7.1
Micro Biological – Determinants				
Total Coliforms	Acute Health - 1	Count / 100 ml	≤ 10	38.00

From the summarised results stated in Table 5 above, only elevated turbidity and total coliform levels were identified in the borehole BH NL 1 sample. The elevated turbidity and total coliform levels are both likely attributed to the drilling and / or pumptesting activities.

Due to the dry sample points encountered during these winter/drier months, it is recommended as mentioned previously in this report, that an additional sampling event during the summer months (December or January) is undertaken to confirm the baseline groundwater and surface water quality prior to the establishment or development of a landfill site.

9. VALUATION OF RESULTS AND RISK/IMPACT ASSESSMENT

In order to quantify risk or impact of a landfill site on surface or groundwater resources, it is necessary to consider the following aspects that jointly constitute risk.

9.1 POLLUTANTS

Landfill sites situated in a rainfall surplus region such as Newcastle will generate leachate, and the constituents of the leachate are determined by the nature of the waste deposited in the landfill. For general waste landfill sites, where waste is essentially domestic, commercial and garden waste, the leachate generated by decomposition of the waste usually contains elevated concentrations of total dissolved solids (TDS) and ammonia (NH₃), as well as potentially-harmful bacteria. Unless managed properly, this will impact negatively on the surface and groundwater resources below and hydraulically down-gradient of such a site.

9.2 PATHWAYS

The migration pathways along which leachate generated in the waste body includes the following:

- Natural and / or artificial surface water drainage paths.
- Discrete pathways in the subsoil environment such as intergranular voids, fissures and fractures in the soil and bedrock profiles of vadose zone, where contaminants are mobilized by gravitational force and where present, a perched phreatic surface.
- Fractures and bedding planes in the bedrock within the saturated zone below the regional water table where contaminants are mobilized by groundwater gradient induced flow (potentially extensive).
- Weathered dolerite chill margins within the saturated zone below the regional water table where contaminants are mobilized by groundwater gradient induced flow (limited).

9.3 RECEPTORS

Receptors in this instance, which have been indicated on the attached Hydrocensus and Receptors Site Plan – Dwg No. 2012/328 Figure 5, would typically include:

- Groundwater sources: however, no boreholes within a 2 km radius of the site were identified during our hydrocensus undertaken during Phase 2 of this landfill investigation. Therefore, no possible groundwater receptors are identified at this stage.
- Surface water sources and users: such as the 2 streams and 1 dam identified during the hydrocensus undertaken under Phase 2 of this investigation. However, the 2 streams, located to the north north-east and to the north-west of the site have been found to be dry during the site visits and therefore at this stage, only the dam named Dam 1 located some 1000 m to the north-east of the site is considered a surface water receptor, in the event of possible contamination originating from landfill activities migrating off-site.

9.4 AQUIFER CHARACTERISATION

In terms of the Aquifer Classification Guidelines published in Appendix 4.2 – Section 4 of the DWAF Minimum Requirements for Waste Disposal by Landfill (2nd Edition – 1998), the aquifer underlying this site can be classified as follows in Table 5 below:

Table 5: Newcastle Landfill Site Aquifer Classification.

Parameter	BH NL 1
Inferred Natural Transmissivity (m ² /day)	0.665
Recommended Pumping Rate (l/sec)	0.28
Yield Classification	Low yielding aquifer
Potential Usage	Stock, garden, domestic

An assessment of the significance of these aquifers is given below in Table 6:

Table 6: Newcastle Landfill Site Aquifer Significance.

Parameter	BH NL 1
Yield Classification	Low yielding aquifer
Initial Water Quality	Generally good
Aquifer Significance	Minor aquifer

Based upon that which has been included in the tables above, it is observable that the fractured and bedded sandstone and shale underlying the site is classified as a minor aquifer. However, through the interpretation and analysis of the pump test data, the inferred natural transmissivity of $0.665 \text{ m}^2/\text{day}$ in the sandstone is relatively low and suggests that should contamination of this aquifer occur, possible pollution will migrate down-gradient and away from the landfill very slowly.

9.5 CONTAMINANT MIGRATION ASSESSMENT

In order to further quantify potential risk to receptors, using the intrinsic subsurface data obtained from the detailed invasive investigation, an assessment of contaminant migration and potential travel times to the potential receptors was undertaken.

To assist in the assessment a basic conceptual site model was created and is presented in Diagram 1 below:

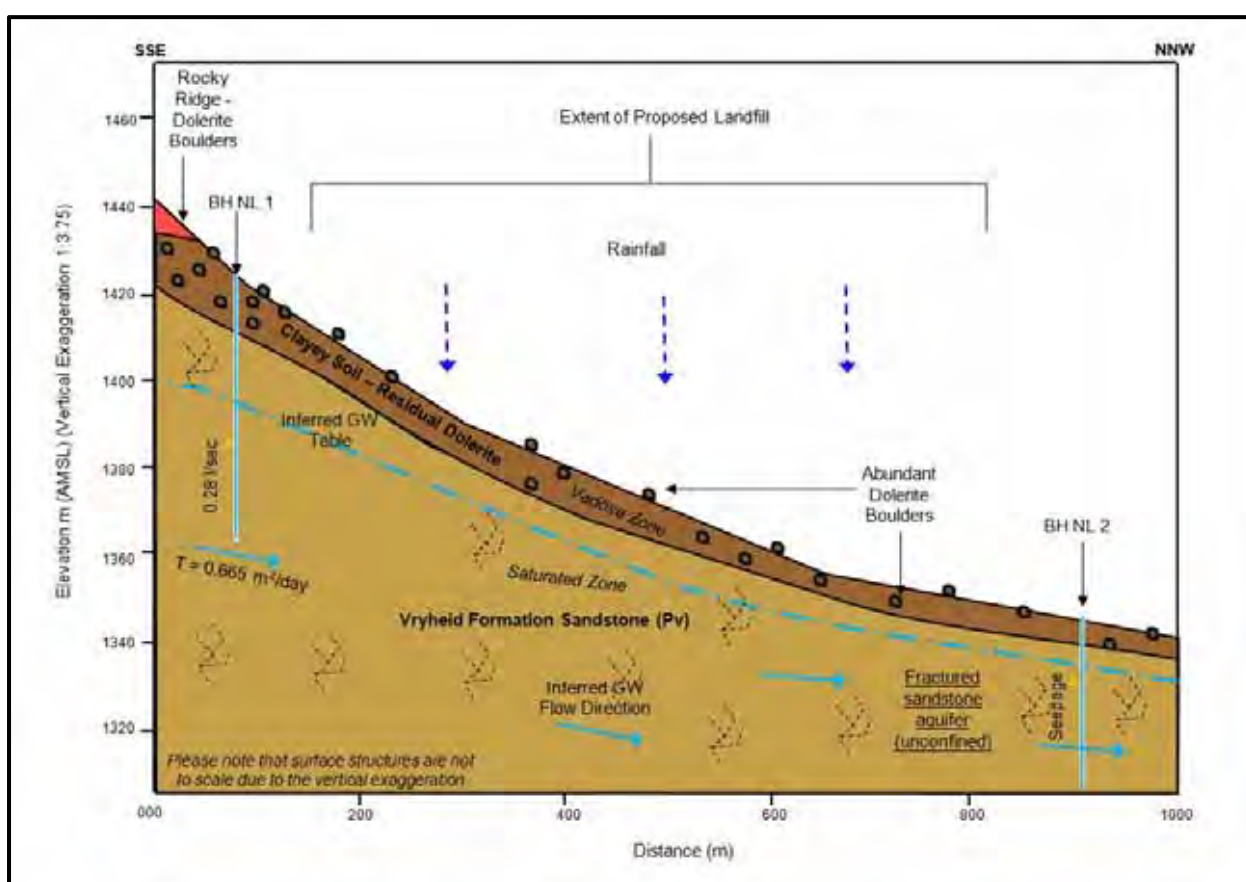


Diagram 1: Newcastle Landfill Conceptual Site Model

The following assumptions have been made in the calculation of product travel time to the receptor, which was determined from the site walkover and basic conceptual site model, to be the down-gradient Dam 1 located approximately 1000 m from the northern boundary of the ultimate inferred landfill footprint:

- The groundwater was assumed to be under steady state/natural conditions
- The groundwater gradient for the site was empirically assumed as equal to the topographical gradient and calculated to be 0.15.
- The effective porosity of the rock mass (fractured sandstone) was assumed to be 10% (as estimated from literature)
- The thickness of the saturated aquifer was assumed to be 44 m.
- The width of the aquifer perpendicular to the flow direction was assumed to be 700 m.
- A retardation factor of 15 for dissolved phase nitrates (NO_3) in a sandy clay (indicative of the likely material present within the fractures in a sandstone formation) was attained from literature as a conservative scenario. It must be noted that since ammonia (NH_3) is generally generated by the decomposition of general waste in a landfill, ammonia (NH_3) concentrations can also be used to determine contaminant travel times. However, nitrate moves at a far quicker rate through the subsurface environment, as opposed to ammonia (NH_3), they were utilised for the purposes of this assessment.
- The distance the contaminant has to travel to reach the closest receptor, which in this case is technically Dam 1, was assumed to be 1000 m, which is the distance from the northern boundary of the ultimate inferred landfill footprint to the closest point of Dam 1. It must be noted however, that the topography between the landfill and dam is almost planar and it is highly unlikely that the Dam 1 is in danger of being contaminated by landfill activities, even if the landfill liner was compromised for some reason.

From this additional data the transmissivity value of $0.665 \text{ m}^2/\text{day}$ was considered reasonable for the underlying sandstone bedrock under recovery conditions. The hydraulic conductivity of the sandstone was calculated using the transmissivity of the aquifer under recovery conditions divided by the aquifer thickness, which is defined as the area between the static water level and the known depth of the borehole.

From this data and the information, the following can be deduced:

- Using the transmissivity value of $0.665 \text{ m}^2/\text{day}$ and the thickness of the aquifer of 44 m, the hydraulic conductivity was calculated to be in the order of $0.015 \text{ m}^{-1}/\text{day}$.
- Using the calculated hydraulic conductivity value of $0.015 \text{ m}^{-1}/\text{day}$ and the travel distance of 1000 m from the northern ultimate inferred landfill footprint of the site to the closest receptor, which is theoretically Dam 1, potentially contaminated groundwater as a result of a landfill liner failure will take in the region of 1830 years to travel the 1000 m from the site to the Dam 1, once the potentially contaminated water reaches the bedrock. Again it must be stressed that this situation is however highly unlikely.

- It should be noted that these travel times could however be reduced if contaminated water flows along fractures or structures, using them as preferential flow paths.
- However, regardless of the sensitivity of the receiving environment to contamination, it is imperative that the proposed landfill is designed by a suitably qualified engineer to the appropriate standards and current best practices for a **G:L:B⁺** site so as to avoid contamination of the underlying aquifer.

10. CANDIDATE LANDFILL SITE ASSESSMENT

10.1 SCORING SYSTEM

The candidate landfill site has been assessed in terms of suitability for development in accordance with the recommended ranking criteria outlined in Table 7 below and Table 8 overleaf and the information made available by the **desk study, limited invasive investigation and the detailed investigation of the Candidate Landfill Site.**

Table 7: Landfill Scoring System

Negative		Neutral		Positive	
Fatal Flaw	Can be Mitigated	Insufficient Information / Moderate		Good	Ideal
-2	-1	0		+1	+2

10.2 PRELIMINARY CANDIDATE SITE ASSESSMENT

Table 8: Final Site Ranking Matrix

Candidate Site	Greenwich
Economic Criteria	
Regional disposal site potential	0
Economics of scale	+1
Haulage distance	+1
Size of operation	+1
Access	0
Cover availability on-site	+1
Soil quality on-site	+1
Site visibility	-1
Acquisition costs	0
Environmental Criteria	
Distance to groundwater	+1
Importance of water resources	+1
Surface water catchment	+1
Groundwater catchment	+1
Preferential flow paths	-1
Proximity to water supply boreholes	+2
Depth of soil on-site	+1
Quality of soil on-site	+1
Potential for temperature inversion	0
Potential for odour impacts to residential areas	+1
Sensitivity of receiving environment	-1
Public Acceptance Criteria	
Displacement of local inhabitants	+1
Land availability	+1
Visibility	+1
Sensitivity of environment along access road	+1
Prevailing wind directions	+1
Distance to nearest residential area	+2
Buffer zone	+1
Engineering Criteria	
Storm water management	+1
Leachate management	+1
Stability	0
Access road	-1
Available airspace	+1
SCORE	21

11. CONCLUSIONS

On the basis of the findings of the Phase 2 and Phase 3 investigations, the following conclusions were reached:

- The new waste disposal site must meet the DWAF Minimum Requirements for Waste Disposal by Landfill (2nd Edition – 1998) for Solid Waste Landfill Development for a **G:L:B⁺** landfill site. According to the DEA National Environmental Management: Waste Act (2008) National Norms and Standards for Disposal of Waste to Landfill, this equates to a **Class B** landfill.
- The available airspace required is approximately 17.772 million m³, based on available waste load quantities for a landfill with a minimum lifespan of 40 years, which equates to an area of approximately 80 ha, as a conservative estimate.
- The proposed site is underlain by sandstones and shales of the Vryheid Formation which have been fractured and faulted by the intrusion Jurassic-age dolerite in the form of sills and dykes.
- The sandstones and shales of the Vryheid Formation, and the dolerites of the Karoo Supergroup, are generally classified potential fractured rock aquifers, with borehole yields typically ranging from > 0.1 l/sec – 3.0 l/sec. However, boreholes drilled into the dolerite intrusions typically only yield marginal (> 0.0 l/sec – 0.1 l/sec) amounts of groundwater.
- The installation of an up-gradient borehole and a down-gradient borehole was undertaken at the geophysically sited drilling targets identified during the Limited Invasive Investigation undertaken as Phase 2 of this investigation.
- During the drilling exercise, the up-gradient borehole BH NL 1 recorded a blowyield of approximately 1000 l/hr (1 m³/hr), however, only seepage was encountered in the down-gradient borehole BH NL 2.
- The up-gradient borehole BH NL 1 blow yield indicated that it had intercepted a sufficient volume of water for a pump test to be carried out, and was therefore subjected to a 12 hour calibration and monitored recovery test, with the aim of using the pump test data to determine the characteristics of the aquifer underlying the proposed landfill site.
- Based on the results of the pump test the fractured and bedded sandstone aquifer underlying the site has a theoretical sustainable yield of 10.08 m³/day, whilst the inferred transmissivity value was estimated to be in the order of 0.665 m²/day.
- An initial groundwater sample could only be taken from borehole BH NL 1, since borehole BH NL 2 intercepted only seepage during the drilling and did not contain sufficient water for a sample to be collected at the time of sampling. It must however be noted that the lack of groundwater sample in borehole BH NL 2 is likely attributed to the relatively short time period between the drilling and pump testing activities and therefore borehole BH NL 2 should still remain viable as a long term groundwater monitoring point representing the aquifer down-gradient of the inferred landfill footprint.

- The two closest surface water sample points, Stream 1 and Stream 2, could also not be sampled since they too were dry at the time of the sampling. Due to the elevated location of the site, no up-gradient surface water sampling point could be identified.
- The initial groundwater quality monitoring in up-gradient borehole BH NL 1 highlighted elevated turbidity and total coliforms values which exceeded their respective SANS 241: 2011 standards for drinking water, however both levels are likely attributed to the recent drilling and pumptesting investigations.
- The hydrocensus conducted during the prior Limited Invasive Investigation undertaken during Phase 2, identified only a limited number of possible (environmental) receptors across the study area. The only receptor of concern at this stage of the investigation was identified to be Dam 1 located some 1000 m north north-east of the site.
- A risk / impact assessment was undertaken, most importantly through an aquifer classification, and based on this classification and the lack of fatal flaws the proposed location of the landfill is deemed geohydrologically suitable for the development of the new Newcastle Landfill Site. However it needs to be engineered / designed to appropriate standards and current best practices for a **G:L:B⁺** site so as to avoid contamination of the underlying aquifer.
- Based on an assessment of the available geohydrological data from this assessment, as well as from the prior phases of this project, should the liner be breached, then potential contaminants from the landfill site would take approximately 1830 years to travel the 1000 m from the site to the dam.
- The candidate landfill site has been assessed based upon a number of recommended ranking criteria and the findings of the Phase 2 and the Phase 3 investigations, and it appears that this site is highly suited to a possible landfill development.

12. **RECOMMENDATIONS**

- An additional sampling event should be undertaken at the site during the wetter “summer” months in December 2014 or January/February 2015. The samples should be analysed for the full suite of determinants as laid out in the “*DWAF Minimum Requirements for Waste Disposal by Landfill (2nd Edition – 1998)*”, and should form the baseline monitoring data for this proposed landfill site.

It must be noted that the results from the additional sampling event prior to any development occurring on the site, 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. These results will not affect the current submission and sale of the land, since they form the baseline quality for comparing results attained during sampling events undertaken during and after the construction and operational phases of the landfill site.

- It is important that the results of this final investigation are presented to the Municipality before the Public Meetings to verify that the information used and assumptions made during the study are valid.

- Once this has been verified, the findings of this final investigation must be presented to I & AP's and authorities as part of the EIA process, which has already commenced, to gauge public acceptance of our findings and obtain comment on the proposed candidate landfill site.
- The limitations of this study must be highlighted and the candidate landfill site assessment system should be presented to allow scores to be altered or weighted where necessary.

We trust that this meets with your requirements in this matter and will await comment on this report, before proceeding with further investigations in this regard.

Yours faithfully,



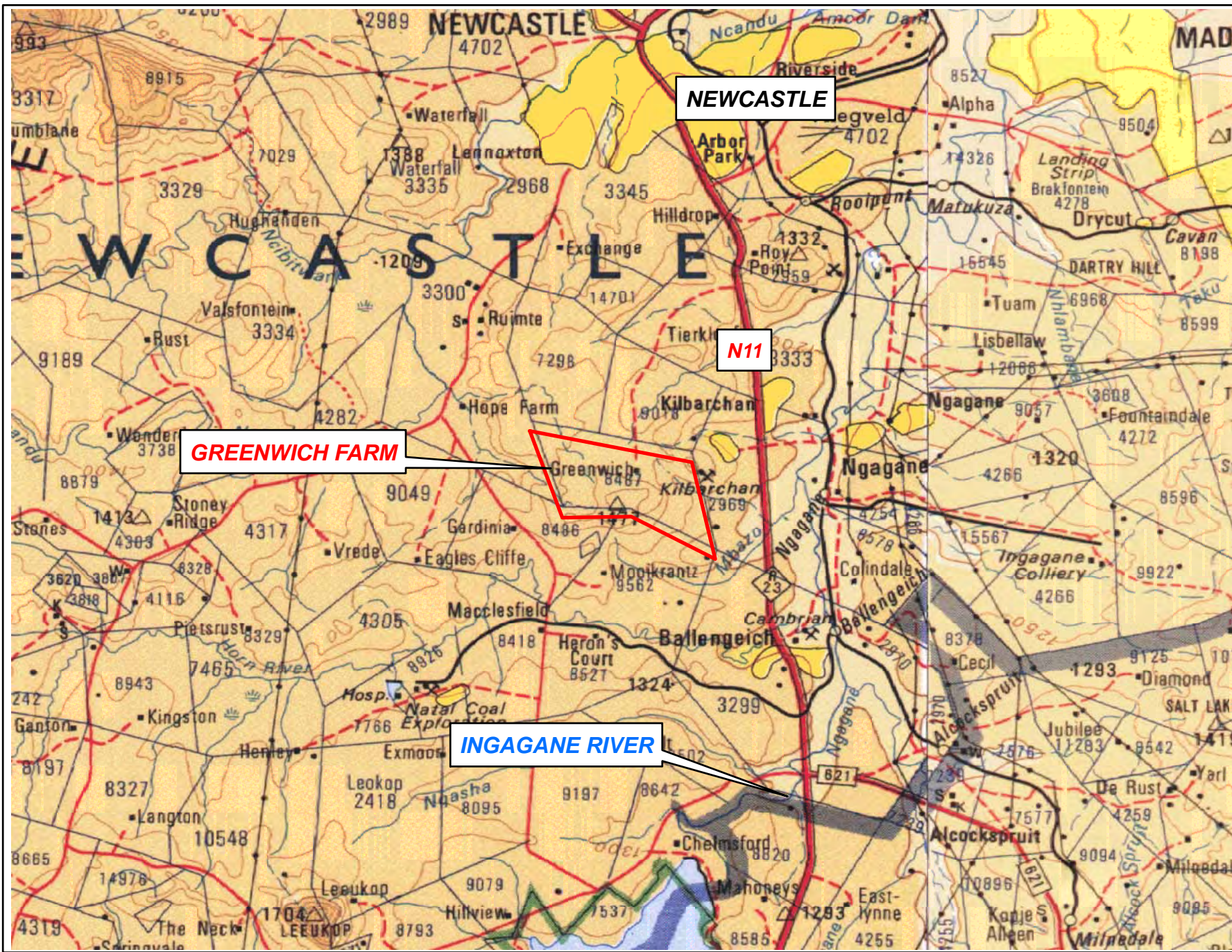
Taryn Swales
Geohydrologist



Rupert Sebire
Principle Geohydrologist

GEOMEASURE GROUP (Pty) Ltd

FIGURES



Legend:



**NEWCASTLE
CANDIDATE
LANDFILL SITE
DETAILED
GEOHYDROLOGICAL
INVESTIGATION**

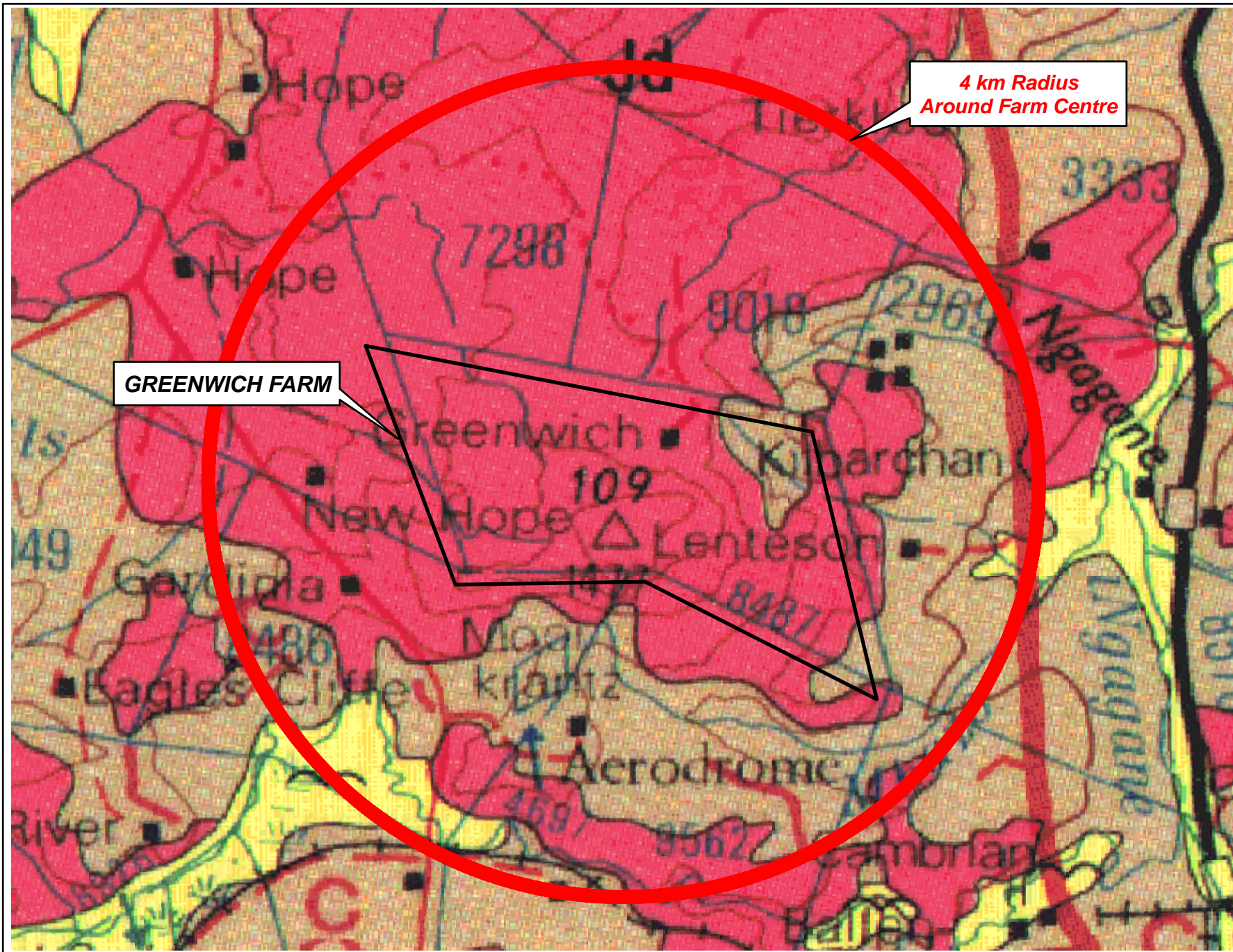
**LOCALITY
PLAN**

**DWG NO. 2012/328
FIGURE 1**

5 2,5 0 5 10 15 20 Kilometers



1 : 250 000 Digital Coverage from Chief Director: Surveys and Mapping



Legend:

- Quaternary Alluvium
- Jd Jurassic Dolerite
- Pv Vryheid Sandstone



**NEWCASTLE
CANDIDATE
LANDFILL SITE
DETAILED
GEOHYDROLOGICAL
INVESTIGATION**

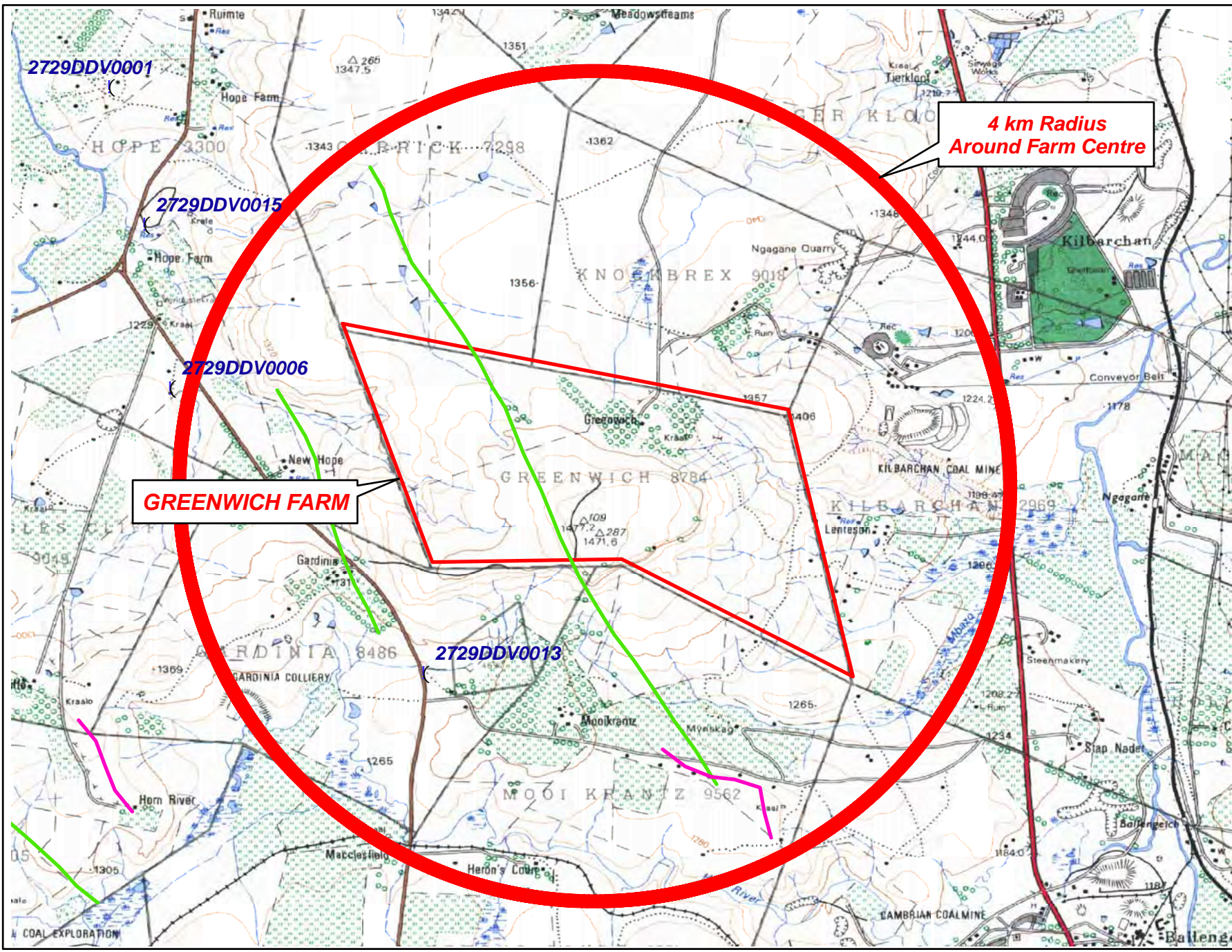
**GEOLOGICAL
PLAN**

2 1 0 2 4 6 8 Kilometers



1 : 250 000 Digital Coverage from Chief Director: Surveys and Mapping

**DWG NO. 2012/328
FIGURE 2**



GREENWICH FARM

**4 km Radius
Around Farm Centre**

- Legend:**
- GRIP BH Data
 - Dolerite Dykes
 - Geological Faults
 - Lineaments



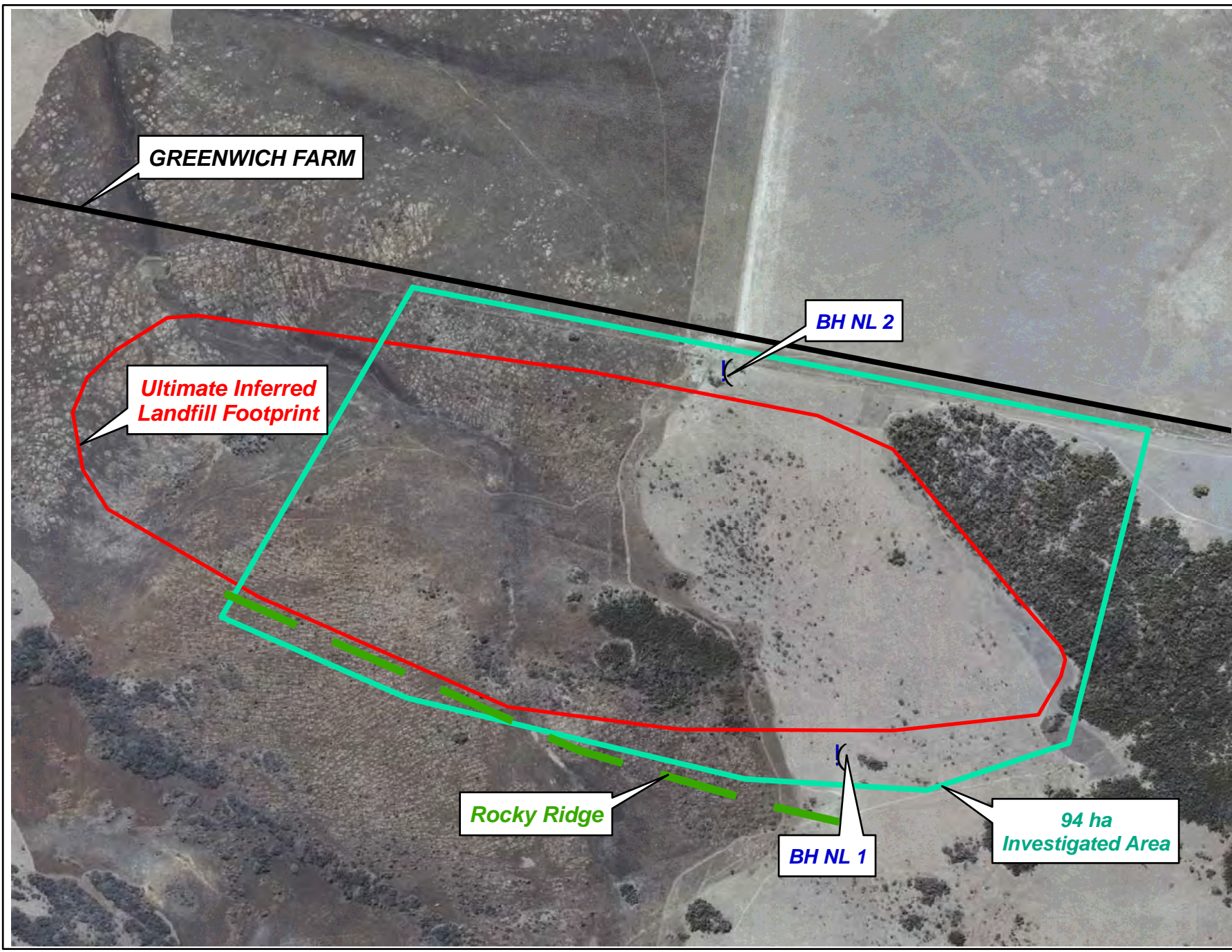
**NEWCASTLE
CANDIDATE
LANDFILL SITE
DETAILED
GEOHYDROLOGICAL
INVESTIGATION**




**AREA PLAN
SHOWING
GEOLOGICAL
STRUCTURES &
AVAILABLE
HYDROCENSUS DATA**



1 : 50 000 Digital Coverage from Chief Director: Surveys and Mapping

**DWG NO. 2012/328
FIGURE 3**

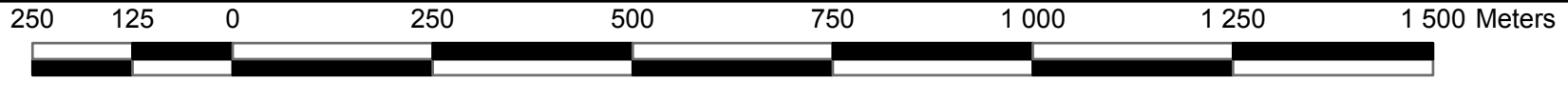


- Legend:**
-  Recently-Installed Monitoring BHs
 -  Ultimate Inferred Landfill Footprint (80 ha)
 -  Investigated Area (94 ha)



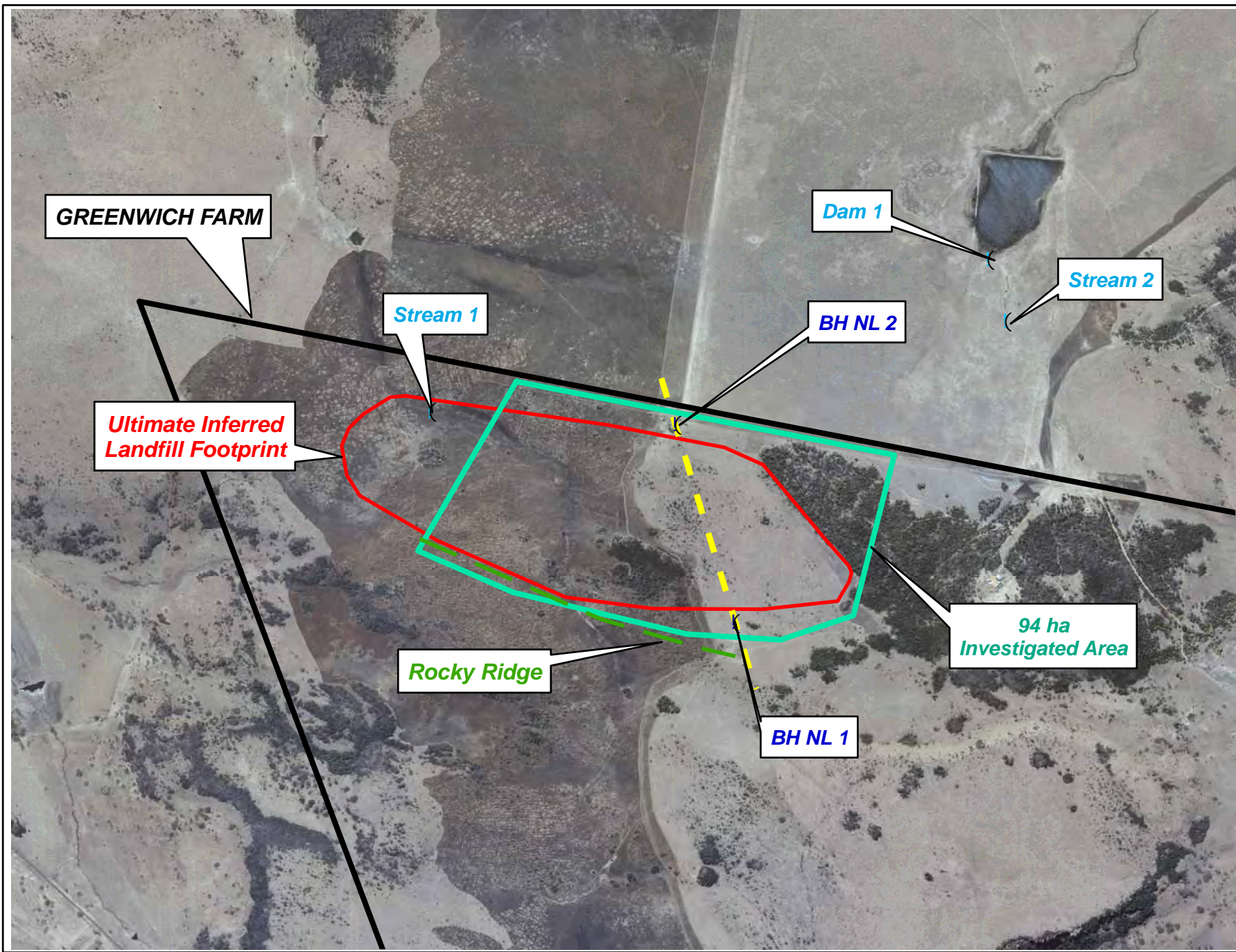
**NEWCASTLE
CANDIDATE
LANDFILL SITE
DETAILED
GEOHYDROLOGICAL
INVESTIGATION**





**GEOHYDROLOGICAL
SITE PLAN**



1 : 10 000 Digital Coverage from Chief Director: Surveys and Mapping

**DWG NO. 2012/328
FIGURE 4**

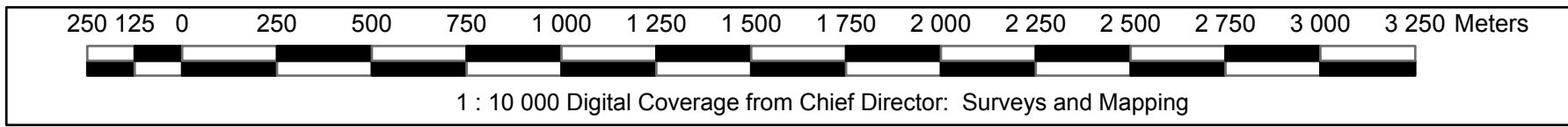


- Legend:**
-  Recently-Installed Monitoring BHs
 -  Ultimate Inferred Landfill Footprint (80 ha)
 -  Investigated Area (94 ha)
 -  Conceptual Site Model Section NNW to SSE



**NEWCASTLE
CANDIDATE
LANDFILL SITE
DETAILED
GEOHYDROLOGICAL
INVESTIGATION**

**HYDROCENSUS &
RECEPTORS
SITE PLAN**

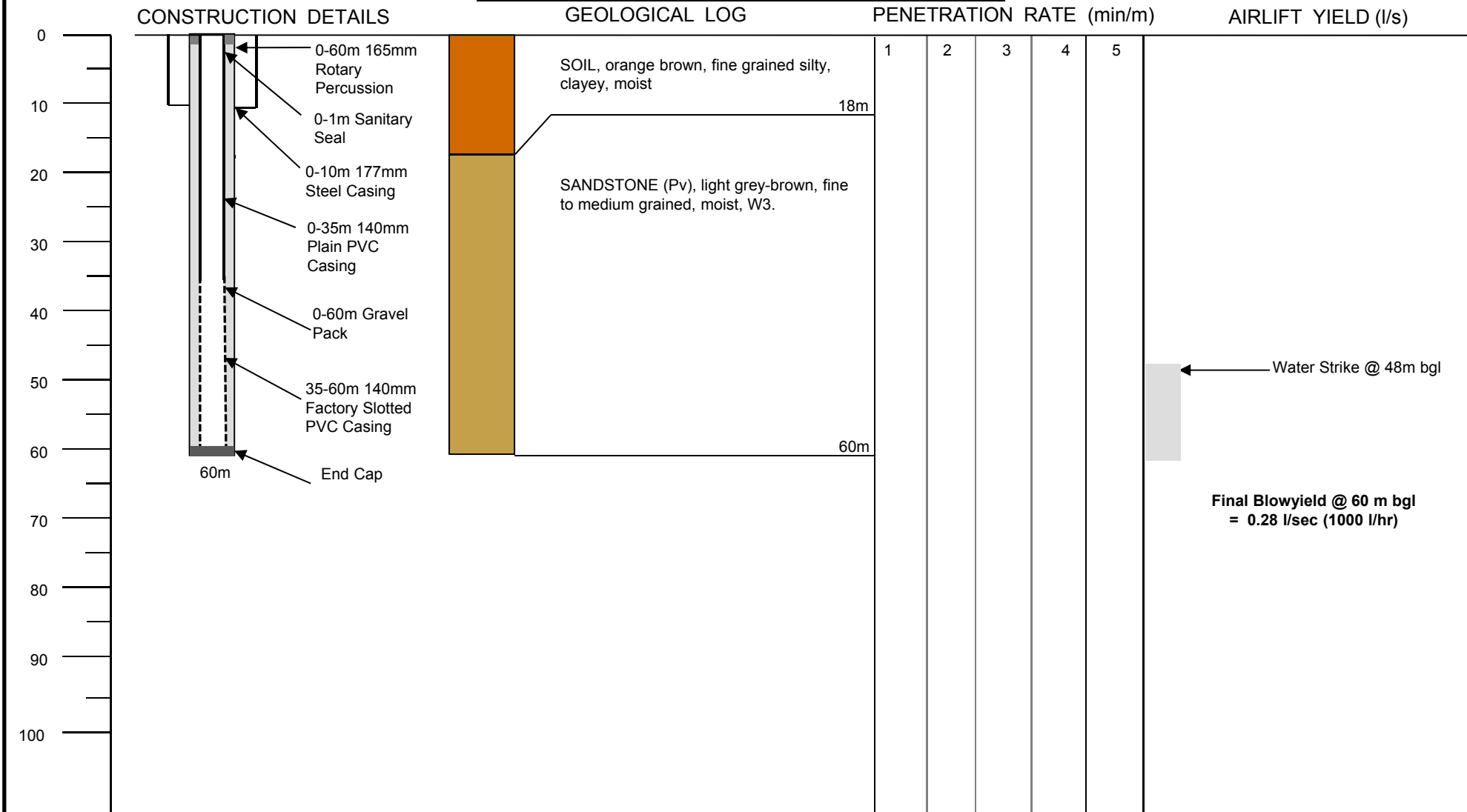


**DWG NO. 2012/328
FIGURE 5**

APPENDIX A

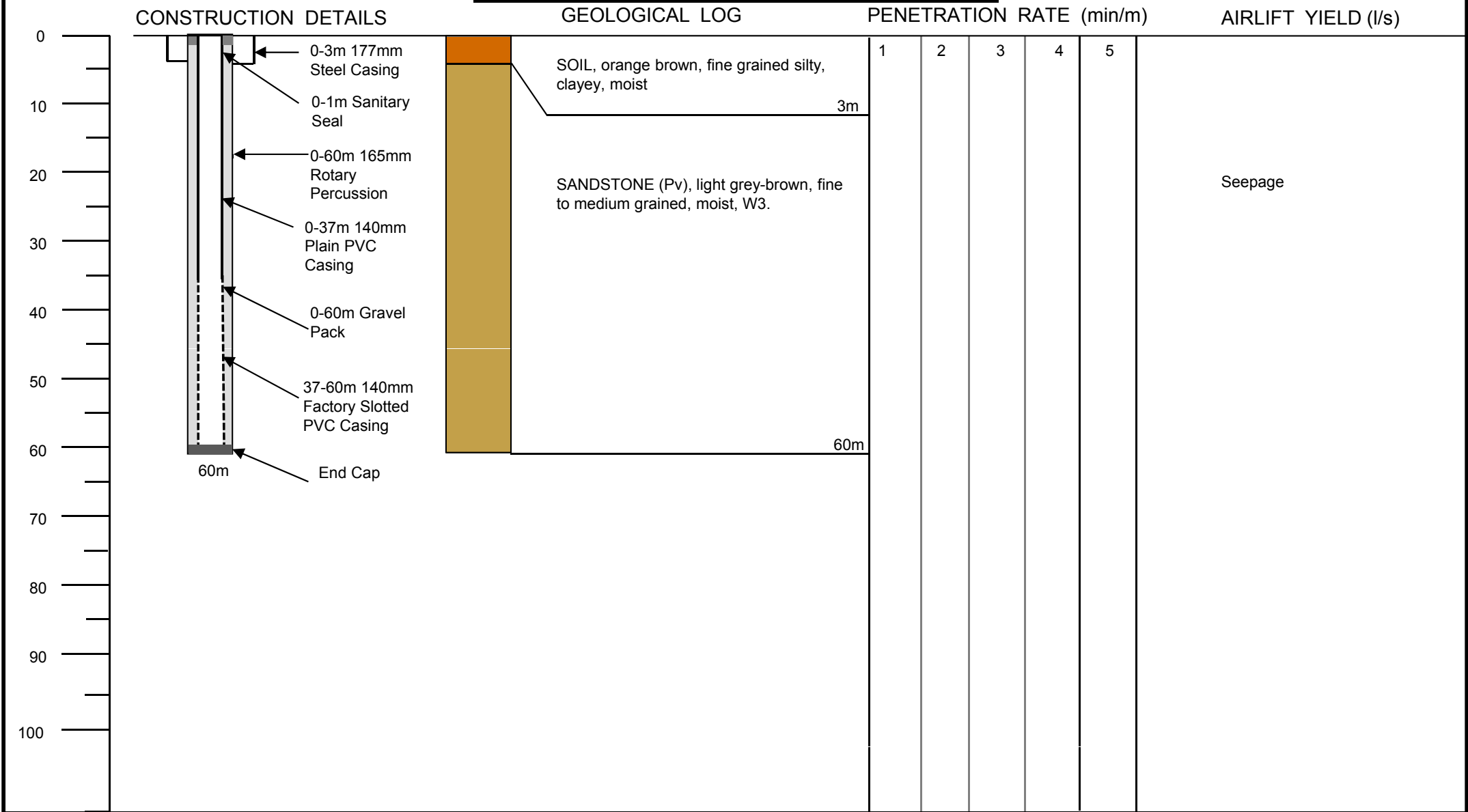
GEOLOGICAL AND CONSTRUCTION BOREHOLE LOGS

BOREHOLE GEOLOGICAL AND CONSTRUCTION LOG



PROJECT: Newcastle Landfill DATE DRILLED: 03/04/2014 BH NUMBER: BH NL1 (KZN 140114)	LOGGED BY: Taryn Swales CONTRACTOR: Duckworth Drilling MACHINE: Schramm DRILLER: Anthony/Richard	BOREHOLE COORDINATES 27° 51' 20.01" S 29° 55' 12.85" E	JOB NO. 2012/328	GEOMEASURE GROUP <small>Groundwater & Environmental Consultants</small> <small>Unit 3, Burnside Office Park, No1 Builders Way, Hillcrest, 3610 Tel: 031 765 1900 Fax: 031 765 1935</small>
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BOREHOLE GEOLOGICAL AND CONSTRUCTION LOG



PROJECT: Newcastle Landfill
DATE DRILLED: 05/04/2014
BH NUMBER: BH NL2
 (KZN 140115)

LOGGED BY: Taryn Swales
CONTRACTOR: Duckworth Drilling
MACHINE: Schramm
DRILLER: Anthony/Richard

BOREHOLE COORDINATES
 27° 50' 49.48" S
 29° 55' 15.75" E

JOB NO.
 2012/328


GEOMEASURE GROUP
Groundwater & Environmental Consultants

Unit 3, Burnside Office Park, No1 Builders Way,
 Hillcrest, 3610
 Tel: 031 765 1900 Fax: 031 765 1935

APPENDIX B

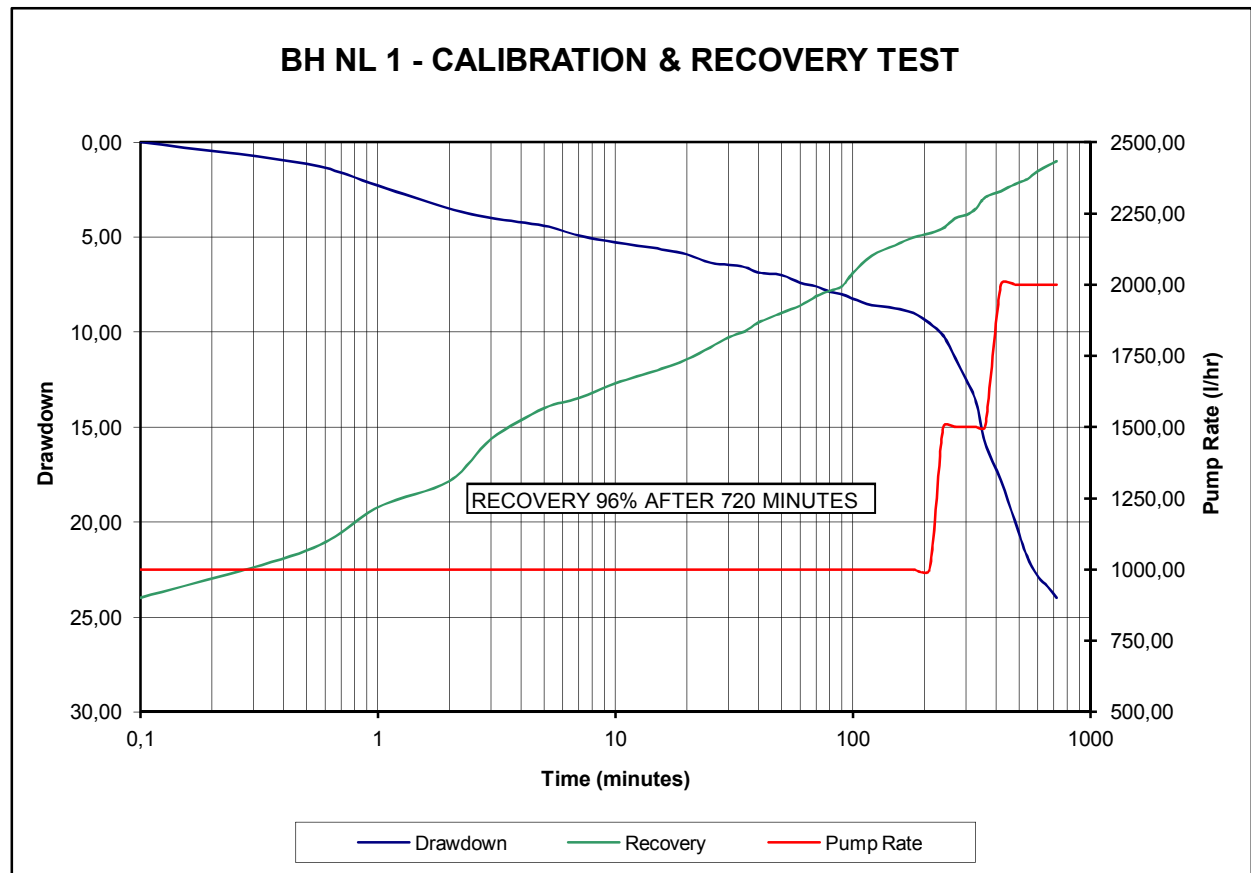
MANAGEMENT RECOMMENDATION SHEET & PUMPTEST DATA ANALYSIS

PUMPTEST ANALYSIS AND RECOMMENDATIONS

BOREHOLE NUMBER: BH NL 1		PUMP TEST DATE: 07/05/2014	
LOCATION: NEWCASTLE LANDFILL SITE		COORDINATES: 27° 51' 20,01" S and 29° 55' 12,85" E	
<u>BOREHOLE INFORMATION</u>		<u>DRAWDOWN TEST</u>	
Completed Depth (mbgl)	60,00	Length of Pumptest (min)	720
Diameter (mm)	165	Final Drawdown (mbswl)	23,97
Casing (m)	60,00	Average Pumprate (l/s)	0,31
Water Strikes (mbgl)	48,00	Volume Extracted (kl)	13,39
Static Water Level (mbgl)	16,00	<u>RECOVERY TEST</u>	
Test Pump Intake (mbgl)	59,00	Length of Recovery (min)	720
Available Drawdown (m)	43,00	Recovered Water Level (mbswl)	1
Airlift Yield (l/hr)	1000	Recovery %	96
Airlift Yield (l/s)	0,28	Recovery Δ s	7,37
		Transmissivity (m ² /day)	0,6652
<u>PUMP RECOMMENDATIONS</u>		<u>RECOMMENDED ABSTRACTION RATE</u>	
Pump Installation (mbgl)	50	Abstraction (l/hr)	1008
Dynamic Water Level (m)	40	Abstraction (l/s)	0,28
Recommended Pump	N/A	Rec. Daily Pump Cycle (hrs/day)	10
		m ³ /day on Rec. Pump Cycle	10,08
<u>BOREHOLE MONITORING RECOMMENDATIONS :</u>			
Please note that the above recommendations have been provided for aquifer characterisation only, since this borehole is for landfill monitoring purposes only and will not be equipped with a pump for water supply.			
HILLCREST OFFICE: Unit 3 Burnside Office Park, 1 Builders Way, Hillcrest, 3650. TEL: (031) 765 1900		 GEOMEASURE GROUP <small>Groundwater & Environmental Consultants</small>	
GAUTENG OFFICE: 173 Tulbagh Street, Pomona, Kempton Park, 1619. TEL: (011) 396 3866			

BH NUMBER: BH NL1
DATE : 07 May 2014
BH DEPTH (mbgl): 60,00
SWL (mbgl): 9.41 16,00
Pump Intake (mbgl) 59,00
Available DD (m) 43,00
Pump Type Submersible

TIME	D/D	P/RATE	RECOVERY
0,1	0,00	1000,00	23,97
0,5	1,15	1000,00	21,49
1	2,30	1000,00	19,21
2	3,50	1000,00	17,82
3	4,00	1000,00	15,61
5	4,40	1000,00	14,00
7	4,92	1000,00	13,47
10	5,27	1000,00	12,68
15	5,60	1000,00	12,00
20	5,91	1000,00	11,42
25	6,35	1000,00	10,80
30	6,46	1000,00	10,27
35	6,58	1000,00	9,95
40	6,86	1000,00	9,49
50	7,00	1000,00	8,98
60	7,40	1000,00	8,60
70	7,59	1000,00	8,11
80	7,88	1000,00	7,82
90	8,00	1000,00	7,57
100	8,24	1000,00	6,88
120	8,58	1000,00	5,96
150	8,74	1000,00	5,43
180	9,00	1000,00	5,00
210	9,53	1000,00	4,80
240	10,19	1500,00	4,52
270	11,38	1500,00	4,00
300	12,51	1500,00	3,83
330	13,67	1500,00	3,49
360	15,82	1500,00	2,90
420	17,80	2000,00	2,58
480	19,93	2000,00	2,21
540	21,79	2000,00	1,95
600	22,83	2000,00	1,51
660	23,39	2000,00	1,24
720	23,97	2000,00	1,00



APPENDIX C

**TABULATED WATER QUALITY RESULTS & LABORATORY
CERTIFICATE**

ANALYTICAL ANALYSIS IN ACCORDANCE WITH SANS 241 (2011)

PROJECT: NEWCASTLE LANDFILL GEOHYDRO INVESTIGATION

DETERMINANT	Risk	Units	Standard Limit	Sample Name: Up-gradient BH
PHYSICAL - WATER QUALITY				
Odour	Aesthetic	-	Inoffensive	-
pH	Operational	pH units	≥ 5.0 to ≤ 9.7	7,00
Colour	Aesthetic	mg/l Pt-Co	≤ 15	<1,00
Turbidity	Aesthetic	NTU	≤ 1	7,10
Conductivity	Aesthetic	mS/m	≤ 170	11,00
MACRO CHEMICAL - DETERMINANDS				
Ammonia as N	Aesthetic	mg/l	≤ 1.5	0,11
Calcium as Ca		mg/l	ns	6,70
Chloride as Cl	Aesthetic	mg/l	≤ 300	<5,00
Fluoride as F	Chronic Health	mg/l	≤ 1.5	0,24
Magnesium as Mg		mg/l	ns	3,30
Nitrate / Nitrite as N	Acute Health - 1	mg/l	≤ 11	0,05
Potassium as K		mg/l	ns	0,30
Sodium as Na	Aesthetic	mg/l	≤ 200	7,50
Sulphate as SO ₄	Acute Health - 1	mg/l	≤ 500	<0,3
Total Alkalinity as CaCO ₃		mg/l	ns	46,00
Total Hardness as CaCO ₃		mg/l	ns	30,00
MICRO CHEMICAL - DETERMINANDS				
Iron as Fe	Chronic Health	ug/l	≤ 2000	270,00
Manganese as Mn	Chronic Health	ug/l	≤ 500	<0,02
Dissolved Copper as Cu	Chronic Health	ug/l	≤ 2000	<10,00
Dissolved Lead as Pb	Chronic Health	ug/l	≤ 10	<1,00
MICROBIOLOGICAL - DETERMINANDS				
E. Coli	Acute Health - 1	Count / 100 ml	0	0,00
Total Coliforms	Operational	Count / 100 ml	≤ 10	38,00

Black - Within Standard Limits

Red - Exceeds Standard Limits

ns - not stated

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2014/05/19

ANALYTICAL REPORT

OUR REF: GEOMEASURE GROUP 7187/14
(O/N: 2012/328)

COMPANY NAME: GEOMEASURE GROUP

CONTACT ADDRESS: P O BOX 1194, HILLCREST, 3650

CONTACT PERSON: TARYN SWALES

SAMPLER: MIDLANDS PUMPS

SAMPLE TYPE: WATER SAMPLE

DATE SUBMITTED: 2014/05/12

Determinand	Units	Method No	SANS 241-1 (2011) RECOMMENDED LIMITS	Results
				7187/14 NEWCASTLE LANDFILL SITE
Ammonia	mg N/l	64	<1.5	(0.11)
Chloride	mg Cl/l	16	<300	<5
Colour*	mg Pt-Co/l	48	<15	<1
Conductivity at 25°C	mS/m	2	<170	11
Dissolved calcium	mg Ca/l	8A	not specified	6.7
Dissolved copper	mg Cu/l	24A	<2	<0.01
Dissolved lead*	µg Pb/l	-	<10	<1
Dissolved magnesium	mg Mg/l	9A	not specified	3.3
<i>E. coli</i>	colonies per 100ml	31	0	0
Fluoride	µg F/l	18	<1500	240
Nitrate/Nitrite	mg N/l	65	<11	(0.05)
pH at 25°C	pH units	1	5.0 - 9.7	7.0
Potassium	mg K/l	7A	not specified	0.3
Sodium	mg Na/l	6A	<200	7.5
Sulphate	mg SO ₄ /l	67	Acute Health ≤500 Aesthetic ≤250	<0.3
Total iron	mg Fe/l	20A	Acute Health ≤2.0 Aesthetic ≤0.3	0.27
Total alkalinity	mg CaCO ₃ /l	10	not specified	46
Total coliforms	colonies per 100ml	31	<10	38
Total hardness*	mg CaCO ₃ /l	Calc.	not specified	30
Total manganese	mg Mn/l	19A	Acute Health ≤0.5 Aesthetic ≤0.1	<0.02
Turbidity	NTU	4	Operational ≤1 Aesthetic ≤5	7.1

Technical Signatory: Chemistry_____ Bacteriology_____

- This report relates only to the samples tested. This report shall not be reproduced, except in full, without the written approval of **TALBOT LABORATORIES**
- Test marked * in this report are not SANAS accredited and are not included in the SANAS accreditation schedule for our laboratory.
- Opinions and interpretations expressed herein are outside the scope of SANAS accreditation.
- Figures reported in () were analysed after preservation according to the laboratory's preservation procedure.
- Note: results marked ** have been sub-contracted to a peer laboratory.
- Note: Estimates of Uncertainty of Measurement may be obtained from the laboratory.

**APPENDIX
UNCERTAINTY OF MEASUREMENT**

Determinand	Uncertainty of measurement (MoU)	Determinand	Uncertainty of measurement (MoU)
Ammonia	± 0.28	Oxygen absorbed	± 0.46
Chemical oxygen demand (filtered)	± 6.38	pH at 25°C	± 0.04
Chemical oxygen demand (sett)	± 6.38	Potassium	± 0.06
Chemical oxygen demand (total)	± 6.38	Sodium	± 0.08
Chloride	± 2.24	Sulphate	± 0.04
Conductivity at 25°C	± 0.44	Suspended solids at 105°C	± 3.88
Dissolved aluminium	± 0.26	Total iron	± 0.04
Dissolved calcium	± 0.03	Total alkalinity	± 3.14
Dissolved chromium	± 0.04	Total aluminium	± 0.26
Dissolved copper	± 0.02	Total calcium	± 0.03
Dissolved iron	± 0.04	Total chromium	± 0.04
Dissolved lead	± 0.04	Total copper	± 0.02
Dissolved magnesium	± 0.06	Total dissolved solids at 180°C	± 4.12
Dissolved manganese	± 0.04	Total lead	± 0.04
Dissolved nickel	± 0.04	Total magnesium	± 0.06
Dissolved zinc	± 0.04	Total manganese	± 0.04
Fluoride	± 0.17	Total nickel	± 0.04
Hexavalent chromium	± 0.02	Total solids at 105°C	± 1.62
Nitrate/Nitrite	± 0.34	Total zinc	± 0.04
Orthophosphate	± 0.02	Turbidity	± 0.36

Estimates of Uncertainty of Measurement for microbiological analyses can be provided on request.