



**FARMSECURE CARBON**



**Draft Environmental Management Plan**

**Farmsecure Carbon: Renewable Energy Project Klipheuwel.**

258250 – 258250/KWE/EMP

01 September 2011

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## FARMSECURE CARBON

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### PROJECT 258250 - DRAFT ENVIRONMENTAL MANAGEMENT PLAN

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REV	DESCRIPTION	ORIG	REVIEW	WORLEY-PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
A	Draft for Review	P Kriel	M Luttig	N/A	2011-11-23	N/A	



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## 1. INTRODUCTION

WorleyParsons (Pty) Ltd was commissioned by Farmsecure (Pty) Ltd to conduct a Basic Assessment and compile an Environmental Management Programme (**EMP**) to ensure compliance with environmental legislation during the construction and operational phases of the Renewable Energy Project at the Zandam and Keibeas Piggeries at Klipheuwel in the Western Cape Province.

This document is in partial fulfilment of Section 24(N) of the National Environmental Management Act, Act No. 107 of 1998 for the proposed construction of an anaerobic digester and power generation plant and will be supported by the Environmental Authorisation issued on approval of the project. The Farmsecure renewable energy project consists of the following:

- An anaerobic digester that consists of a concrete structure or reservoir that is isolated from the air with a roof. This “dam” is partially buried.
- An internal combustion engine with an electrical generator connected to it to generate power. This part of the facility is housed in a small generation building.
- Electrical transmission equipment to connect the installation to the national electrical grid to deliver the electricity to third parties. This will also be installed in the building.

A Basic Environmental Impact Assessment (BAR) is currently being conducted for the abovementioned facility. WorleyParsons are also currently preparing a Waste Management License Application and Water Use License Application in line with the National Environmental Management: Waste Act (NEMWA), Act No 59 of 2008 and the National Water Act (NWA), Act 36 of 1998.

This Environmental Management Programme (EMP) includes the construction activities as well as the future operational activities associated with the installation. An Environmental Management Programme (EMP) is intended to define the management measures required to promote positive environmental consequences and to reduce the adverse environmental impacts of a project. An EMP defines the objectives of such measures and describes how they will be achieved. It must form part of the construction contractual agreements.

This EMP should always be read in conjunction with the any waste management license in terms of the National Environmental Management: Waste Act (NEMWA), Act No 59 of 2008, Environmental Authorisation (EA) in terms of Section 24 of the NEMA, Method Statement for Waste Disposal Operation and Minimum Requirements for the Classification and Disposal of Hazardous Waste issued by the Department of Water Affairs (DWA).



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## **2. CONSTRUCTION PHASE**

### **2.1 DEMARCATION OF THE SITE**

Prior to commencement of any activity, the entire affected area must be visited by an Environmental Control Officer (ECO) qualified to rescue significant indigenous species of flora and these should be transplanted to areas that will not be disturbed.

The construction camp is a dedicated area which will house all buildings, offices, lay down yards, vehicle wash areas, fuel storage areas, batching areas and other infrastructure that is required for the execution of the project and must be included in the demarcation.

**Responsible Person(s):** The Contractor and the Site Engineer.

During compilation of the project specification the Engineer **must** ensure that the management goals of the EMP are inserted into the contract documentation and then ensure that the contractor understands these goals once appointed and before work commences.

#### **Management Measures:**

1. To locate the site camp (if required) in an area with no or negligible environmental impact (i.e. in an already disturbed area on the site).
2. The Contractor shall take all reasonable measures to limit the extent of the area of disturbance due to construction activities (the area must be earmarked for construction activities, and the activities must be confined to that).
3. If required, any new construction camp area shall only be prepared once agreed with (in writing) the landowners and the Engineer.
4. All interested and affected parties must be kept informed on progress and related issues on a continual basis by the Engineer.

### **2.2 SITE CAMP SPECIFICATIONS AND MANAGEMENT**

The following specifications and standards refer to site camp establishment, if required. The specifications are comprehensive and include a wide range of activities and aspects.



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**Responsible Person(s):** The Contractor.

### 2.2.1 Construction Camp

The site camp must be planned in such a way so as to affect as small an area as practically possible and as agreed by Farmsecure.

### 2.2.2 Security and Access Control

Effective access control and security measures in line with Farmsecure and Zandam Farm Security and Access Control procedures must be implemented on site.

Access to the construction site camp needs to be controlled and restricted at all times. The entrance to the site camp needs to be manned by a guard and a lockable gate is to be supplied. Unauthorised entry to the camp site must be prohibited. Access of all contractor's personnel and suppliers that may have access onto the construction site to other parts of the Farmsecure installation must be strictly prohibited.

**Where and when applicable any vehicles and personnel entering and exiting the must be disinfected against any communicable diseases such as Foot and Mouth for instance in line with the access procedures.**



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### **2.2.3 Contractor's Boards**

The Contractor may erect temporary construction boards in areas agreed upon by the Engineer. These boards and any other advertising shall comply with the South African Manual for Outdoor Advertising Control (SAMOAC). The boards shall be removed immediately once construction has finished.

### **2.2.4 Eating Areas**

The Contractor's employees shall only eat in designated sheltered areas indicated by the Contractor and approved by the Engineer. The Contractor shall provide adequate scavenger-proof and weatherproof refuse bins in this area. Food preparation shall be done in a specifically demarcated area on site and no open fires are permitted, without exception. The contract will be executed in areas where existing hazardous activities exist (piggeries); all possible measures must be implemented to ensure that food is not contaminated. If contaminated food is ingested the contractor must have the necessary first aid responses in place.

### **2.2.5 Ablution Facilities**

The location of the toilets must be approved by the Engineer prior to establishment. The Contractor must provide the toilets in terms of the Health and Safety Act, Act 85 of 1993, Construction Regulation 28, which will dictate the number of toilets to be provided and is responsible for their maintenance and servicing on a daily basis. Where female workers are employed both sexes must be catered for. The contractor must take all reasonable precautions to ensure that no spillages occur when the toilets are cleaned or emptied. Any disposal of waste from toilets on site is strictly prohibited. The toilets must be maintained and kept clean at all times.

It is strictly prohibited to urinate or defecate anywhere other than in toilets. Toilets must be inspected for leaks daily and leaking toilets must be repaired immediately or removed from site.



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## 2.2.6 Soil Management

The construction of the anaerobic digester will include but not be limited to:

- the removal of in-situ topsoil
- the stockpiling of the topsoil
- the possible installation of subsurface drainage to divert groundwater away from the affected area
- the installation of a lining system that will include layers of concrete and other synthetic impermeable layers to prevent contamination of the existing soil and water regime by any of the substances housed within the digester.
- The construction of berms to facilitate the dam shaping as the structure will be partially below natural ground level.
- The protection of the embankments of the berms to prevent erosion during operation from occurrences such as rain events.

### 2.2.6.1 Erosion & Siltation

Erosion protection measures that need to be considered and implemented during construction of the digester (may include but not be limited to):

- Use of groundcover or grass;
- Stormwater canals;
- Hard landscaping such as gabions; and the
- Construction of cut off berms.
- Interim erosion and embankment protection to prevent and repair damage to soil embankments and grade separations during construction caused by vehicles and other construction plant.



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- Placing of geo-fabrics and other synthetic membranes that have the function of stabilising soil through mechanical stabilisation.
- Placement of earth retaining systems (Terra Force Blocks or similar)

All areas susceptible to erosion will be protected by the necessary drainage systems (temporary and permanent) as soon as construction commences.

#### 2.2.6.2 Topsoil Management

Topsoil to be removed and stored at the designated point (as per the site layout plan) after stripping and removal. Topsoil needs to be handled as little as possible – preferably only twice – once upon removal and once during rehabilitation.

Topsoil stockpiles may not exceed a height of 1.5 meters nor may they be kept for a period longer than one (1) year.

Topsoil stockpiles should be protected by a mulch cover (or similar protection). This mulch cover must not contain alien vegetation. Topsoil stockpiles to be kept free from weeds and contaminants.

Areas designated for stockpiling activities need to be marked on the site layout plan and managed accordingly. Topsoil stockpiles may not be compacted. Topsoil must be stockpiled separately for later rehabilitation/landscaping use. Topsoil shall be kept separate from overburden and is not to be used in the construction or building of roads etc.

Side slopes of stockpiles must be battered back in order to prevent collapse and to reduce the effect of erosion during rain events.

Where embankments have to be protected using vegetation such as grass or a combination of vegetation and geo-synthetic the construction procedure must follow the specification for construction works to ensure proper stabilisation

#### 2.2.6.3 Soil Management

Possible contaminants need to be stored as far away from stockpiles as possible.

Stockpiles need to be kept free from construction rubble, biological material, hydrocarbons, weeds and litter as these soil stockpiles are to be reworked. Soil stockpiles are to be stored in



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such a manner and place that will not cause damming of water (surface runoff), erosion gullies and or be washed away during the rainy season.

In order to prevent dust nuisance soil stabilisation measures i.e. soil wetting, will be implemented at all cleared areas and stockpile areas.

Where compacted in-situ layers require, the use of cement or lime stabilisation must be done so as not to contaminate the existing water table. This must be executed in line with the project specification and under the supervision of the Engineer

The construction will take place in the vicinity of a working piggery and care must be taken by the contractor to avoid contamination of materials that will be used for construction on virgin or undisturbed soil i.e. material that is outside the construction area. If it is suspected that soil contamination has taken place outside the construction area the necessary remedial action must be recommended and completed to the satisfaction of the Engineer and Farmsecure.

#### 2.2.6.4 Contaminated Soil

All contaminated soil is to be excavated to the depth of contaminant penetration, placed in an appropriate storage container i.e. drum or skip that is lined and labelled where after the contents is to be removed to a hazardous disposal facility such as Vissershok.

The visible remains of concrete, either solid, or from washings, must be physically removed immediately and disposed of as waste to a registered landfill site – equipped to handle this type of waste.

#### 2.2.7 Water Management

Potable water should be available at readily accessible points on site – this includes the construction servitude area.

The provision of water to any portion of the site must be approved by the Engineer and Farmsecure where no convenient or obvious water supply is available.

Measures have to be implemented to minimize standing water in the construction area. All spoil/stockpile areas have to be constructed in such a manner as to prevent erosion resulting from surface runoff.



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No water may be abstracted or released into any of the water bodies found within the construction servitude area. No dumping of foreign materials in water bodies is allowed.

#### 2.2.8 Waste Management

“Solid waste” is divided into two categories namely 1) General Waste which refers to any waste that does not pose an immediate threat to man or the environment i.e. household domestic waste, wrapping material and office waste. 2) Industrial Waste which refers to certain dry industrial and commercial waste i.e. construction debris, excess cement/concrete, timber, drums, wire, and nails. The Contractor must set up a waste control and removal system. The appropriate bins must be used such as 240l bins for General Waste and 5.5m<sup>3</sup> bulk steel containers for industrial waste.

Waste disposal shall be managed by the Site Engineers to ensure the separation of waste on site and the correct disposal of all wastes produced during the construction phase. Where possible, appropriate material shall be reused or recycled.



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### 2.2.9 Concrete Batching Areas

Cement and concrete are regarded as hazardous to the environment due to their high pH and chemical composition. Should concrete batching take place, the Contractor must submit a method statement for mixing of concrete for approval by the Engineer/ECO indicating where the mixing will take place and the methods to ensure that waste water and materials are contained in the batching area and disposed of correctly. Concrete shall not be mixed directly on the ground. Concrete will be mixed on mixing trays consisting of wooden boards or plastic sheets, underlain by an impermeable plastic layer or alternatively in a manner that prevents contamination of soil, surface water or groundwater. The contractor must ensure that the batch plant is operated strictly in terms of Regulation 18 of the Construction Regulations, promulgated in terms of section 43 of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)(hereinafter referred to as the "Construction Regulations, 2003").

### 2.2.10 Materials Handling and Storage

The Contractor is responsible for ensuring that any materials delivery service providers and/or plant operators are informed of all procedures and restrictions (e.g. which access roads to use, "no go" areas, speed limits, dust control, etc) required to comply with the EMP before they arrive at site and off load any materials. The Contractor shall ensure that the service providers and/or plant operators are supervised during off-loading by someone with an adequate understanding of the requirements of the EMP. The person must be authorised to take the necessary actions if the service providers do not adhere to the requirements of the EMP.

#### 2.2.10.1 Hazardous Substances

The Contractor shall comply with all relevant national, regional and local legislation with regard to the transport, use and disposal of hazardous materials, as well as the Operations plan compiled for the site.

The Contractor shall provide the Engineer with a list of all hazardous materials that may be used on site, together with the storage, handling and disposal procedures of the materials. This information shall be made available to everyone on site. The location of the hazardous material store shall be within the demarcated construction camp area or other suitable designated area. Prior to establishment the Engineer shall approve the location and design of the store.

#### 2.2.10.2 Fuel (Petrol and Diesel) and Oil



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If fuel is required for use during construction, it shall be stored in a designated area within the construction camp or at a location as agreed upon by the Engineer. The Contractor shall ensure that all liquid fuels (petrol and diesel) as well as oils and lubricants are stored in tanks with lids, which are kept firmly shut. The area where tanks are located shall be bunded or similarly designed to contain any spillages. (Please refer to SANS 10089-1: 2008). The contractor shall specify appropriate containers when ordering from the petroleum service company. These will be approved by the Engineer before installation on site.

Where possible, the Contractor shall ensure the refuelling of vehicles takes place only at the fuel storage area in the construction camp. Where this is not possible, the Contractor shall notify the Engineer and get approval of the refuelling method to be used. The surface under the refuelling area shall be protected against pollution to the satisfaction of the Engineer/ECO prior to any refuelling activities. Any leaking equipment shall be repaired immediately or removed from the site. Refuelling shall be carried out by means of pumps with hoses that enter the fuel receptacle, or gravity fed hoses fed from elevated tanks. The use of hand held funnels are strictly prohibited.

#### 2.2.11 Equipment Maintenance and Storage

All vehicles, plant and equipment shall be kept in good working order and serviced regularly in line with manufacturer's specifications. Leaking plant and equipment must be repaired immediately or removed from the site. All maintenance of equipment and vehicles shall be performed in the workshop or other suitable designated area. The Contractor shall demarcate an area in which equipment, plant and vehicles may be stored. The location of this area shall be approved by the Engineer. The Contractor must take measures to ensure that the surface of the designated area is not contaminated as a result of leaks from the plant and machinery. The construction vehicles and mobile plant must be operated in compliance with Regulation 21 of the Construction Regulations, 2003.



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## 2.2.12 Embankments

Where construction personnel will be working in trenches or next to steep embankments all vertical slopes must be shored if higher than 1,5m. All embankments must be battered back to avoid slip failures when embankments may fail. The contractor must in all cases where shoring or battering back is not used, have approval from the engineer before such work commences.

## 2.3 GENERAL CONSTRUCTION SPECIFICATION

**Responsible Person(s): Contractor and Site Engineer.**

The Engineer must ensure that the installation is constructed in accordance with the approved Design Drawings and Project Specification. The work shall also be subject to all Farmsecure procedures and policies.

## 2.4 EMERGENCY PROCEDURES AND REPORTING

**Responsible Person(s): Contractor.**

The Contractor shall ensure that emergency procedures for the following situations are submitted to the Engineer for approval prior to site establishment. These procedures must be in accordance with the Occupational Health and Safety Act No 85 of 1993 and the Construction Regulations, 2003 and fall in line with the Farmsecure Emergency Procedure

### 2.4.1 Fire

The Contractor shall advise the relevant fire control authority of a fire as soon as one starts and shall not wait until it is out of control. The Contractor shall ensure that his/her staff and the staff of Subcontractors are aware of the procedure to be followed in the event of a fire. These procedures must be in accordance with Regulation 27 of the Construction Regulations, 2003. The contractor has duty of care to inform the relevant Farmsecure representative if any installation that is not part of the contract is on fire.

### 2.4.2 Accidental Leaks and Spillage's

The Contractor shall ensure that his/her staff and the staff of Subcontractors are aware of the procedure to be followed for dealing with spills and leaks. The Engineer and other relevant authorities will be informed immediately of the following:

1. The point of origin and time of occurrence of the spillage.



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2. The nature and name of the spilled substance.

A spill kit must be available on site and the Site Engineer must be able to utilise such a kit correctly. The Engineer will inform the company responsible for environmental oversight immediately in order that the relevant remedial actions can be followed.

The clean-up of spills and any damage caused by the spill or leak shall be for the Contractor's account. The Contractor shall submit a method statement for management of accidental leaks and spillage's of any liquid material to the Engineer for approval.

## **2.5 ENVIRONMENTAL AWARENESS TRAINING**

**Responsible Person(s):** Contractor/Environmental Management Section

Staff of the Contractor and Subcontractors must be trained to ensure an understanding among personnel of the requirements of the EMP. This training must be presented at the level of the employees and records must be available to indicate that everyone has attended. If new personnel are appointed the induction must be done with them before they commence duties on the site.

If so required by the policies and procedures of Farmsecure, training and induction must also be done in line with the requirements of the facility as a whole. The personnel of the Contractor and Subcontractor are always subject to the SHEQ requirements of Farmsecure.

## **2.6 ENVIRONMENTAL IMPACT MANAGEMENT MATRIX FOR CONSTRUCTION ACTIVITIES**

Following is a matrix outlining activities that may have an impact on the environment during construction. Mitigating measures are proposed to minimise and manage all impacts. The matrix also identifies the responsible person/s that is accountable for the enforcement of the management measures.



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ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE Objective and Target	PERFORMANCE INDICATOR	RESPONSIBILITY
<i>Demarcation of the site</i>	Biodiversity	Protection / Loss of Biodiversity	<p><u>Objective</u> Conservation of indigenous flora and fauna within and surrounding the project site.</p> <p><u>Targets</u></p> <ol style="list-style-type: none"> <li>1) The total site area is to be visited by a suitably qualified Environmental Officer to rescue significant indigenous species of fauna and flora and to transplant them to areas that will not be disturbed.</li> <li>2) The site will generally be demarcated according to the Specifications as laid out in section two of the EMP.</li> <li>3) No areas on the site are to be cleared without the approval of the Environmental Officer.</li> <li>4) All employees of all contractors must be made to understand that unauthorised plant harvesting is illegal and they will be prosecuted if they are caught removing any indigenous plants from the site without the authorisation of the Environmental Officer.</li> <li>5) Gathering of firewood, fruit, plants for traditional medicines and crops or any other natural material on site or in areas adjacent to the site is prohibited.</li> <li>6) Hunting and snaring of any wildlife on or adjacent to the site is strictly prohibited.</li> </ol>	<ol style="list-style-type: none"> <li>1) Preservation of biodiversity and environmental integrity</li> <li>2) No unnecessary removal of flora/fauna</li> </ol>	Contractor/Site Engineer/ Environmental Officer



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<i>Site Camp Management</i>	Surface and Groundwater protection	Pollution	<u>Objective</u> Prevention of further degradation of surface and groundwater. <u>Targets</u> 1) The contractor will take precautions to prevent contamination of the water resources through proper planning and design of the temporary sanitation infrastructure at the site. 2) Site staff shall not be permitted to use any stream, river, other open water body or natural water source adjacent to or within the designated site for the purpose of bathing, washing of clothing or for any construction or related activities. 3) The contractor must ensure that water is not permitted to stagnate on the site during construction.	1) No further degradation of surface and groundwater resources.	Contractor/Site Engineer
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<i>Solid Waste Management</i>	Surface/ Groundwater r and soil protection	Pollution Health hazard	<u>Objective</u> Minimise and correctly manage waste disposal. <u>Targets</u> 1) All waste generated will be collected and temporarily stored within designated areas as established in the Specifications for Site Camp Establishment in Sections 2.2 of the EMP. The waste types will be separated into general, industrial, building rubble, hazardous etc. 2) The waste must be disposed of at a licensed landfill or other disposal facility according to the type of waste. 3) Where possible, appropriate material shall be reused or recycled. 4) The dumping and burial of construction material, except backfill material, will not be permitted and this waste must be taken to an officially licensed disposal site.	1) No visible trace or burial of waste on site.	Contractor/Site Engineer.
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<i>Fuel storage and use</i>	Soil and Water protection	Contamination	<p><u>Objective</u> Provide protection and adequate measures to ensure soil / water conservation and prevention of pollution.</p> <p><u>Targets</u> 1) Fuel storage tanks and other chemical reagents will be stored according to the Environmental Specifications for Site Camp Establishment outlined in section 2.2 of the EMP. Contaminated water will be separated from uncontaminated water. 2) An emergency action plan will be prepared to address any accidental spillages of hazardous materials into any watercourses or onto soil surfaces <b>if hazardous substances are used in the construction process.</b> 3) This emergency plan will include the following minimum requirements:</p> <ul style="list-style-type: none"> <li>• The Engineer will immediately be informed of the incidence of spillage, the name of the chemical involved, as well as the time and location of the spillage. This information must be provided to the company tasked with environmental oversight as soon as possible to ensure that adequate remedial measures can be implemented.</li> <li>• All cleanups of spillages are for the contractor's account.</li> </ul>	<p>1) No pollution of soil. 2) No erosion of soil</p>	Contractor/Site Engineer.
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<i>Concrete Mixing and Management</i>	Soil and Water protection	Contamination and Damage to sensitive vegetation.	<u>Objective</u> Concrete mixing to be carried out away from sensitive areas and on an impermeable surface. <u>Targets</u> 1) Prevent pollution and unnecessary spillages. 2) Proper rehabilitation of areas used for concrete mixing. 3) Ensure the protection of sensitive vegetation. 4) Concrete mixing will be conducted on mixing trays consisting of wooden boards or other suitable material, which is underlain by an impermeable plastic layer. Care should be taken to prevent contaminated water from spilling onto soils and into watercourses. 5) No vehicles transporting concrete to the site may be washed on the site. 6) Lime and other powders must not be mixed in excessively windy conditions.	1) Mixing on impermeable surface. 2) Correct rehabilitation and closure of site.	Contractor/ Site Engineer/ Environmental Officer
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<p><i>General Construction</i></p>	<p>Geology and Soils</p>	<p>Erosion</p>	<p><u>Objective</u> To ensure minimal soil erosion.</p> <p><u>Targets</u></p> <ol style="list-style-type: none"> <li>1) Implement an approved site-specific stormwater management plan</li> <li>2) Prevent soil erosion as far as possible</li> <li>3) Once an area has been cleared of vegetation, the topsoil layer should be removed and stockpiled in a designated area for reuse during rehabilitation.</li> <li>4) Rehabilitation of areas cleared of vegetation</li> <li>5) Stockpile management measures to be implemented:             <ul style="list-style-type: none"> <li>• Stockpiles should not obstruct natural water pathways</li> <li>• Stockpiles should not exceed 2m in height unless specified otherwise by the Engineer</li> <li>• Depending on the weather conditions and duration of stockpiling, adequate measures for protection against rain and wind must be implemented</li> <li>• Alien vegetation and weeds must be removed regularly</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1) Stormwater management plan implemented.</li> <li>2) Stabilisation of exposed steep slopes.</li> <li>3) Top soiling and re-vegetation must commence immediately after the completion of work on an area.</li> <li>4) Stockpiles managed appropriately</li> </ol>	<p>Contractor/ Site Engineer</p>
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	Noise generation	Nuisance	<p><u>Objective</u> To ensure minimal noise to surrounding property and activities.</p> <p><u>Targets</u> 1) Prevent unnecessary nuisance and minimise noise as much as possible. 2) Notify surrounding residents/businesses of the possible noise impact 3) Construction vehicles and equipment must be inspected and repaired on a regular basis to prevent excessive noise generation 4) All vehicles and equipment may not exceed acceptable operational noise levels.</p>	<p>1) Notify residents/businesses adjacent to the site of the commencement of noisy activities. 2) Noisy activities must be restricted to the times given in the Project Specification, Special conditions of contract and General Conditions of Contract.</p>	Contractor/Site Engineer
	Release of dust/vehicular emissions into the atmosphere.	Reduces visibility Nuisance.	<p><u>Objective</u> Construction surfaces and access roads must be kept damp to minimise dust. All construction vehicles and equipment are to be maintained in good working order.</p> <p><u>Target:</u> 1) Ensure that construction surfaces do not cause excessive dust during excavation. 2) Haulage roads must be watered down regularly. 3) Covering of dust producing delivery loads. 4) No fires allowed onsite. 5) Construction vehicles and equipment must be inspected and repaired on a regular basis to prevent excessive emissions to the atmosphere. 6) Stockpiles must be managed appropriately to reduce dust nuisance.</p>	1) Minimal dust/vehicular pollution	Contractor/Site Engineer.



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Safety & security	Vehicles/ equipment and hazardous areas	Injury of individuals in the vicinity of construction area	<u>Objective:</u> No incidents or accidents  <u>Targets:</u> 1) Speed limits for vehicles must be set and indicated in the vicinity of the construction areas 2) No equipment must be left unattended at any time. 3) Potentially hazardous areas or structures are to be clearly demarcated as such prior to construction and access into these areas must be strictly controlled.	1) No incidents or accidents	Contractor/Site Engineer.
	Access to the site	Compromised safety and security on construction site	<u>Objective:</u> Access Control to the site is well managed.  <u>Targets:</u> 1) Construction Access Roads to be identified and demarcated. 2) No equipment must be left unattended at any time. 3) The Contractor to implement an approved access control management system for employees and vehicles, in line with the Farmsecure Access Control Management System. 4) Construction vehicle access must be restricted to demarcated areas. 5) The Contractor must instruct his/her employees on the Access Control System.	1) No unlawful and unauthorised access to the site.	Contractor/Site Engineer.



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<i>Rehabilitation</i>	Rehabilitation of site after construction	Mitigation of environmental impacts of the activity.	<u>Objective</u> Rehabilitate the site to an environmentally acceptable level. <u>Targets:</u> 1) Ensure that excessively rocky and cover material are removed. 2) Cover soil is not to be compacted so as to allow natural settling of soil. 3) Ensure that the site camp establishment infrastructure such as offices, workshop areas, storage facilities is removed once they have been used. 4) Ensure that all packaging material, danger tape and temporary markers, fences, etc. needed for construction is removed. 5) Replace topsoil layer in areas identified by the Engineer and Environmental Officer immediately upon completion of such an area and at an agreed distance behind the work front, to ensure re-vegetation of identified areas.	1) Restoration of disturbed areas.	Contractor/Site Engineer.
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### **3. OPERATIONAL PHASE**

#### **3.1 ENVIRONMENTAL IMPACT MANAGEMENT MATRIX FOR CONSTRUCTION ACTIVITIES**

##### **3.1.1 Operational Standards**

**Responsible Person(s):** Site foreman and Site Engineer.

Activities on site must be managed and operated in accordance with:

1. An environmental management system that identifies and minimises risks of pollution
2. Conditions of the waste management license issued in terms of NEM:WA
3. Written instructions issued by the Director of the Department of Environmental Affairs (Environmental Authorisation)
4. This Environmental Management Programme
5. The Ground Water Monitoring Plan
6. Geohydrological study undertaken by Geoss
7. Method Statement for the operation of the plant, Farmsecure
8. Operating and Management Manual that will be issued during commissioning of the plant.
9. The Conceptual Rehabilitation Plan for the site

The operation and management of the site must be undertaken by sufficient persons who are competent in respect of the responsibilities to be undertaken by them.

The designated Site Supervisor has the following responsibilities and duties:

- Monitor and ensure compliance and correct implementation of all mitigation measures and provisions as stipulated in the documentation outlined above;



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- Identifying potential measures in respect of improved waste management, including the more efficient recovery, re-use and recycling of the waste; and
- Reporting any non-compliance with any of the Waste License and Environmental Authorisation conditions or requirements or provisions of NEM and NEMWA to the licensing authority.

### 3.1.2 Permissible Waste

**Responsible Person(s):** Facilities operators.

In accordance with the aforementioned conditions, the operators must continually ensure that the following is examined:

- 3.1.2.1 Leakages on pipes and channels from Piggeries to Collection Pit, from the Pit to the Digester, from Digester to Separator and from the separator to the Storage Lagoon.
- 3.1.2.2 Blockages of pipes and channels.
- 3.1.2.3 Integrity of structures such as leaks or cracks in concrete structures etc.
- 3.1.2.4 Proper operation of equipment such as separator, gas engine, generator and emergency gas flare.
- 3.1.2.5 Housekeeping ie. The site should be kept clean and well maintained at all times.

### 3.1.3 Security and Access Control

**Responsible Person(s): License Holder and Site Supervisor.**

Effective access control must be ensured by having the site fenced to a minimum height of 1.8 metres, with gates of the same height at all entrances.

Notices, which are weatherproof, durable and legible, must be displayed at each entrance to the site. These notices shall prohibit unauthorised entry and state the hours of operation, the name, address and contact details of the License Holder and the responsible person for the facility, in at least three official languages.

### 3.1.4 Emergency Preparedness

**Responsible Person(s):** License Holder and Site Supervisor.



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The Site Supervisor has to ensure that there is an Emergency Preparedness Plan on site that provides a detailed explanation of what should be done in the various emergency situations. This plan has to be known to all persons working on site and has to also provide emergency contact information (police, ambulance, closest emergency centre, etc.). The plan is to be reviewed annually and after each emergency and or accident. The plan needs to address, amongst other issues, the following:

- Spillage;
- Fire and Explosion Hazard
- Structural Failures;
- Natural disasters (such as floods);
- Natural Hazards such as Snake Bite and spread of livestock communicable diseases.
- Liner Integrity / Leak detection.

Personnel must be supplied with the relevant Personnel Protective Equipment PPE as is appropriate for the site. Clear signage with illustrations for the relevant equipment must be placed at all the entrances to ensure compliance. All personnel must be trained in the use of PPE and must always ensure that other personnel and visitors have appropriate gear.



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### 3.1.5 Nuisance Control

**Responsible Person(s):** Site Supervisor.

The Site Supervisor is to ensure that the following nuisance control measures are to be implemented and maintained throughout the lifespan of the operation.

#### 3.1.5.1 Fire

Due to the flammability of the methane gas, under no circumstances will fires be allowed on the site therefore no special permission will be required. The digester area must be well ventilated to minimize the fire hazard.

Appropriate methane detection equipment must be installed in the vicinity of the digester to warn of possible leaks. The equipment must be fitted with the necessary alarm and the Site Supervisor must initiate the proper response to ensure safety of personnel and protection of equipment.

Use of any spark generating electrical equipment near the digester should be prohibited unless such equipment is equipped with spark arrestors.

All electrical equipment must be maintained in line with supplier's specifications to avoid electric fires.

#### 3.1.5.2 Electric shock

When working in the electrical generation portion of the facility all the necessary Personnel Protective Clothing must be worn and all care should be taken to avoid shock. Access must be restricted and signage erected to prohibit unauthorised personnel or visitors from entering the facility.

No live repairs to be done and power to be switched off during repairs. If switchgear is not secureable clear signage to be placed on switches during power-offs.

#### 3.1.5.3 Littering



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With proper access control to ensure that no other waste is deposited, littering will not be a problem at the site. Operational personnel must however still ensure that the site is kept clean and that litter is disposed of in the bins provided.

#### 3.1.5.4 Dust

Access roads where there is a potential for dust generation must be regularly watered with processed water to minimise dust.

### 3.2 OPERATIONAL MANAGEMENT OF THE WASTE TO ENERGY SITE.

**Responsible Person(s):** Site Supervisor and Operators.

#### 3.2.1 Vehicles and Equipment Management

The contractor and / or the Site Supervisor will ensure that:

- All vehicles and equipment are in good working order.
- All vehicles and equipment will be inspected on weekly basis by operators.
- Vehicles and other equipment are operated by employees who are certified competent in handling the vehicle or equipment.
- Vehicles must have a clear entrance and exit route to the site to ensure the safety of the employees.
- Employees will only ride on vehicles which have space intended for this purpose.
- All vehicles will be stored and serviced in an area designated for this purpose.

#### 3.2.2 Traffic Management

The shortest possible route must be established between the Farmsecure site and the entrance to the Piggery.



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Warning signposts, clearly indicating the associated hazards, must be erected along the fence line at intervals not exceeding 50m. The entrance to the Farmsecure site must be controlled through an electronically operated access gate.

All unsurfaced roads must be regularly graded. Two-way traffic must be possible in all weather conditions. Suitable signs must also be erected on site, to direct vehicle drivers appropriately and to control speed.

### **3.2.3 Operational Procedures**

The site is to be operated in accordance with the method statements and Operating Manuals issued by the suppliers of the equipment and the Operating and Management Manual for the plant.

### **3.2.4 Soil Management**

The various soil protective/management measures that were installed during the construction phase of this project have to be upheld and properly maintained.

Any signs of erosion after major rain events must be addressed timeously

### **3.2.5 Water Management**

Any and all possible mechanisms need to be put in place to prevent possible water (surface and ground) contamination as a result of site operations.

#### **3.2.5.1 Stormwater Management**

A Stormwater Management Plan for the Farmsecure disposal facility has been developed for the site. This plan is to form the basis for stormwater control measures to be implemented for the site as per the site design.

It is necessary that surface runoff be managed appropriately in order to simultaneously address erosion control measures. The stormwater and drainage system needs to be cleaned of debris on a bi-weekly basis.

#### **3.2.5.2 Water saving measures**



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No free running hoses are allowed to be used on site and water for the mixing of concrete must be batched. Where water is used for dust suppression only processed effluent water will be used, under no circumstances can potable water be used for dust suppression. Water used for moisture management in soil compaction should also be batched by volume where possible. Washing of vehicles must be done responsibly to avoid wastage.



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### 3.3 COMPLIANCE MONITORING AND AUDITING

#### 3.3.1 General Operations Monitoring

**Responsible Person(s):** Site Supervisor.

The waste stream will be monitored via visual inspection in order to ensure that the load to be processed, contains only waste that is suitable for digestion. Volumes will be calculated daily and records kept up to date.

#### 3.3.2 Monitoring Methods and Parameters

**Responsible Person(s):** License Holder and Site Manager.

All tests required in terms of the Waste License must be carried out in accordance with methods prescribed and obtainable from the South African National Standards (SANS), referred to in the Standards Act, 2009 (Act 8 of 2008).

No other method of analysis may be used except if written proof is submitted to the licensing authority which specify that the methods proposed is at least equivalent to the SANS method.

#### 3.3.3 Monitoring

##### 3.3.3.1 Monitoring of Waste entering process

**Responsible Person(s):** License Holder, Site Supervisor.

Waste entering the facility will be monitored on a monthly basis to establish the quality of the waste. The waste will be collected in line with the procedure as described in the operational manual. Care must be taken to ensure that the waste is not contaminated once collected.

Testing must be done by an accredited laboratory and results and interpretation of results must be kept up to date and available for inspection by the relevant authorities on the site.

##### 3.3.3.2 Effluent monitoring



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Volumes of effluent must be measured daily and the register kept up to date. The information must be available at all times.

The quality of the effluent must be tested as described in the manual and this register must also be updated and results and interpretations be kept on site.

### 3.3.3.3 Gas monitoring

Results of inline gas monitoring must be recorded and kept up to date at all times. The necessary emergency shutdown procedures must be adhered to when any emergency incidents occur.

The exhaust gas consists only of CO<sub>2</sub> and therefore monitoring is not required.

Any flared gas must be recorded and incidents reported to the relevant authorities in line with the requirements of the WML and the Environmental Authorisation.

Flaring of gas must be restricted to emergencies and maintenance shutdowns.

### 3.3.3.4 Groundwater Monitoring

**Responsible Person(s):** Site Supervisor.

#### **General Specifications and Requirements**

The borehole monitoring network established for the farm must be maintained in such a manner so as to ensure that unobstructed sampling can be undertaken.

Monitoring is done on production boreholes and monitoring boreholes are not required.

#### **Background Monitoring**

Samples from the boreholes in the borehole network where the groundwater in the borehole is at an expected higher hydraulic pressure level than the hydraulic pressure level of the groundwater under the site, must be considered as background monitoring.

#### **Detection Monitoring**

Monitoring is to be conducted at the downstream boreholes of the borehole network as follows:



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- Bi-annually for variables as listed in ???????? Waste License; and
- Annually for variables as listed in paragraph (b) of Annexure IV to the Waste License

#### **Investigative Monitoring**

If a water quality variable listed under the detection monitoring programme shows an increasing trend in the opinion of the licensing authority, the License Holder must initiate a monthly monitoring programme for the water quality variables.

#### 3.3.3.5 Surface Water Monitoring

**Responsible Person(s):** License Holder, and Site Supervisor.

Surface water runoff should be sampled monthly and tested to show compliance and in the event of non-compliance all facilities should be checked for leaks or spillages. If detected leaks should be repaired and spillages must always be dealt with inline with the relevant procedure.



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### 3.3.4 Auditing

#### 3.3.4.1 Internal Audits

**Responsible Person(s):** License Holder and / or Site Supervisor.

Internal auditing must be conducted quarterly by the license holder. Auditors must attend the necessary training to ensure competence in auditing before such audits are undertaken. Official audit reports must be compiled by the relevant auditor and the findings of these audits must be available to the external auditor and the authorities. Non conformances raised during audits must be addressed and closed-out to ensure further compliance.

#### 3.3.4.2 External Audits

**Responsible Person(s):** License Holder and / or Site Supervisor.

The license holder must appoint an independent external auditor to audit the site annually and this auditor must compile an audit report documenting the findings of the audit. Findings raised in audits must be addressed and corrective actions included for auditing in quarterly compliance audits. The external audit report must be submitted by the license holder to the licensing authority on an annual basis.

The external auditor team must consist of the following persons:

- An Environmental Assessment Practitioner with ECO experience; and
- A Professional Registered Engineer.

The external audit report must:

- Specifically state whether the facility is in compliance with the Site Documentation, with specific reference to whether the conditions of the WML and Environmental Authorisation are adhered to;
- Include an interpretation of all available data and test results regarding the operation of the site and all its impacts on the environment;



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- Specify target dates for the implementation of the recommendations by the license holder to achieve compliance;
- Contain recommendations regarding non-compliance or potential non-compliance and must specify target dates for the implementation of the recommendations by the license holder and whether corrective action taken for the previous audit non conformities were adequate; and
- Show monitoring results graphically and conduct trend analysis.

### 3.4 RECORD KEEPING AND REPORTING

#### 3.4.1 Record Keeping

**Responsible Person(s):** License Holder and / or Site Supervisor..

Record of the following must be kept:

- Waste processed;
- Amount of waste recycled/reused/recovered/treated;
- Amount of organic soil amendment applied to land on the farm;
- Borehole data and chemical analysis; and
- Records demonstrating compliance to the license conditions, provisions and requirements.

The above information must be reported to the licensing authority on an annual basis, included in the Audit Report.

All records kept must adhere to the following standards:

- Records must be legible;
- Records must be made as soon as practicable and should form part of the external audit report;



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- If amended, amendments must be done in such a way that the original and any subsequent amendments remain legible and are easily retrievable;
- Records must be retained in accordance with documented procedures as approved by the licensing authority.

### 3.4.2 Reporting

**Responsible Person(s):** License Holder and / or Site Supervisor.

#### 3.4.2.1 Monitoring and Auditing

The analysis and interpretation of monitoring results must be reported to the licensing authority as outlined within the Waste License and Environmental Authorisation's conditions and requirements.

External Audit Reports must be submitted to the licensing authority within 30 days from the date on which the external auditor finalised the report.

#### 3.4.2.2 Incident Reporting and Public Complaints

An incident and complaints register is to be kept by the license holder. This register is to be available to the external auditor as well as the licensing authority for audit purposes.

#### 3.4.2.3 General Notifications and Reporting Requirements

The license holder must notify and / or report the following to the licensing authority:

- The occurrence or detection of any incident on the facility, or incidental to the operation of the site, which has the potential to cause, or has caused pollution to the environment, health risks, nuisance conditions or water pollution within 24 hours.
- In the event of any malfunction/breakdown or failure of equipment or techniques, accident or fugitive emission which cause, is causing or may cause significant pollution, the licensing authority must be informed without delay.



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- Prior written notice must be given to the licensing authority of the permanent cessation of any operational activities, full or partial cessation of the operational activities for a period likely to exceed 3 months or longer, and full or partial resumption of the operational activities after cessation of such activities for a period exceeding 3 months.

#### 4. DECOMMISSIONING AND REHABILITATION

**Responsible Person(s):** License Holder and / or Site Supervisor.

The site or any portion thereof must be rehabilitated in accordance with a closure report and rehabilitation plan. This plan must be submitted to the Director of the licensing authority for approval at least one year prior to the intended closure of the site, or any portion thereof