St Helena Government

HORSE POINT LANDFILL SITE HAZARDOUS WASTE MANAGEMENT MANUAL

Document: ERM-2015-008

Environmental Management Division

Saint Helena Government

Revision – May 2017

EMD
"Our Island. Our Environment. Our Responsibility."

St Helena Government

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MD – Mike Durnford – Environmental Risk Manager
PC – Patrick Crowie – Landfill Manager
DH – Derek Henry – Director of ENRD

CONTENTS

ANNEXES

Abbreviations and Acronyms

- COWI Danish Engineering Consultancy Company
- ENRD Environment and Natural Resources Directorate
- EMD Environmental Management Division
- H&SW Health and Social Welfare
- HPLS Horse Point Landfill Site
- PPE Personal Protection Equipment
- PRF Public Recycling Facility
- SHG Saint Helena Government

1.0 HORSE POINT LANDFILL SITE – HAZARDOUS WASTE MANAGEMENT MANUAL

1.1 Introduction

This management manual describes a series of procedures for hazardous waste management operations at Horse Point Landfill Site (HPLS). The procedures have been designed to meet the requirements of key documents summarised in Section 1.2, to safely store and dispose of wastes that are classified as being hazardous.

It is intended that the document is retained on site, for use by operatives in carrying out their daily duties.

This management manual is considered to be a 'live' document which should be routinely reviewed and updated by operational management, as a minimum on an annual basis.

1.2 Key Documents

This management manual has been written with the benefit of previously commissioned waste management reports, which reference hazardous waste management options:

- COWI (2011). Provision of Strategic Management Support for the Solid Waste Management Project. Recycling and Feasibility Study and Related Waste Issues. Saint Helena Public Health and Social Services Department;
- Jacobs Gibb (2002). CNTR 1323 – Hazardous Waste Disposal;
- Jacobs Gibb (2003). CNTR 013019 – Draft (Rev 1) Integrated 30 year Waste Management Strategy and Action Plan for St Helena;
- Saint Helena Government (2012). Solid Waste Management Strategy;
- Saint Helena Government (2013). Environmental Management Directorate Hazardous Waste Audit.

1.3 Hazardous Waste 'Definition'

'Waste that contains one or more hazardous properties that may cause harm to human health or the environment'.

1.4 Hazardous Waste Classification and Properties

Hazardous waste classifications and their properties are tabled below;

Table 1.0: Hazardous Waste Classifications and Properties

H1	"Explosive": substances and preparations which may explode under the effect of flame or which are more sensitive to shocks or friction than dinitrobenzene.
H2	"Oxidizing": substances and preparations which exhibit highly exothermic reactions when in contact with other substances, particularly flammable substances.

H3A	"Highly flammable": - liquid substances and preparations having a flash point below 21°C (including extremely flammable liquids), or - substances and preparations which may become hot and finally catch fire in contact with air at ambient temperature without any application of energy, or - solid substances and preparations which may readily catch fire after brief contact with a source of ignition and which continue to burn or be consumed after removal of the source of ignition, or - gaseous substances and preparations which are flammable in air at normal pressure, or - substances and preparations which, in contact with water or damp air, evolve highly flammable gases in dangerous quantities.
H3B	"Flammable": liquid substances and preparations having a flash point equal to or greater than 21°C and less than or equal to 55°C.
H4	"Irritant": non-corrosive substances and preparations which, through immediate, prolonged or repeated contact with the skin or mucous membrane, can cause inflammation.
H5	"Harmful": substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may involve limited health risks.
H6	"Toxic": substances and preparations (including very toxic substances and preparations) which, if they are inhaled or ingested or if they penetrate the skin, may involve serious, acute or chronic health risks and even death.
H7	"Carcinogenic": substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence.
H8	"Corrosive": substances and preparations which may destroy living tissue on contact.
H9	"Infectious": substances and preparations containing viable micro-organisms or their toxins which are known or reliably believed to cause disease in man or other living organisms.
H10	"Toxic for reproduction": substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce non-hereditary congenital malformations or increase their incidence.
H11	"Mutagenic": substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce hereditary genetic defects or increase their incidence.

H12	Waste which releases toxic or very toxic gases in contact with water, air or an acid.
H13	"Sensitizing": substances and preparations which, if they are inhaled or if they penetrate the skin, are capable of eliciting a reaction of hypersensitisation such that on further exposure to the substance or preparation, characteristic adverse effects are produced. [As far as testing methods are available].
H14	"Eco-toxic": waste which presents or may present immediate or delayed risks for one or more sectors of the environment.
H15	Waste capable by any means, after disposal, of yielding another substance, e.g. a leachate, which possesses any of the characteristics above.

1.5 Limitations of the Report

This report is produced for the exclusive use of SHG to enable the effective management of hazardous waste at HPLS. It should not be relied upon for any other purposes unless formally agreed in writing by EMD.

2.0 GENERAL INFORMATION

2.1 Location

The site is located in the north eastern corner of the island in excess of 500m from residential development (Drawing HPLS1). HPLS is located in the north eastern corner of the island, at grid reference 15.3592S, 05.4040W. A detailed site plan is provided in Drawing HPLS2.

2.2 Waste Management

HPLS provides St Helena's waste management facility. Given the remote nature of the island, its limited economy and lack of international hazardous waste agreements the site comprises historical uncontained landfilling of all materials. Preparations for airport certification have enabled the re-development of the landfill so that a degree of waste segregation is possible, notably separation of:

- Domestic waste disposal into a netted, un-engineered, waste cell;
- Bulky waste disposal into an un-engineered un-netted cell;
- Green waste disposal into a separate stockpile;
- Hazardous waste disposal into an engineered hazardous waste cell; and
- Thermal treatment of select biosecurity, clinical and hazardous wastes in a Macrotec V70B incinerator.

In addition, a Public Recycling Facility (PRF) has been created, resulting in a reduction in the need for public access to the wider site.

3.0 SITE SECURITY AND SUPERVISION

3.1 Gate Controls

Waste delivery vehicle access to HPLS is gained through the main site entrance gate, located on the southern boundary of the site. A second gate provides public access to the PRF in the south western corner of the site (Drawing HPLS2).

The main gate will be open during working hours (see Section 4.0).

All vehicles loaded with hazardous waste for disposal must first report to the Landfill Manager before depositing waste.

The entrance gate to the PRF will be open during working hours.

Both entrances are secured with padlocked gates which will be closed and locked outside the normal hours of operation of the landfill, unless by operator authorised arrangement.

3.2 Supervision

At least one employee will remain at the site during hours that the main entrance gates are open.

On arrival at the landfill site, all drivers of vehicles carrying hazardous waste should report to the Landfill Manager, who will direct them to the appropriate area of the landfill to discharge their load, and also provide any additional instructions that may be necessary.

4.0 HOURS OF OPERATION

The normal working hours for Horse Point Landfill Site will be as follows:

Monday to Friday – 0900hrs to 1500hrs; hazardous waste disposal, commercial and domestic waste disposal, incinerator operations, bulky waste disposal and public recycling.

Saturday and Sunday – 0900hrs to 1500hrs; bulky waste disposal and public recycling only.

Public Holidays – Closed.

Access to the site will be closed after working hours and on Public Holidays.

The hours of operation will be strictly adhered to.

In the event of an emergency, or as deemed necessary, St. Helena Government may provide / authorize access to the landfill site at alternative times.

5.0 HEALTH AND SAFETY

The safety of site operating / management personnel and the public is of paramount importance at all times. Site employees shall not endanger themselves or others on the site. Employees are obligated to report unsafe practices and are empowered to notify other employees or site users acting in an unsafe manner. All accidents, injuries, or near misses are to be reported and the following steps are to be taken:

- Investigate the incident immediately;
- Find out the cause;
- Complete an Accident/Incident Report;
- Take immediate measures to correct the cause and prevent it reoccurring; and
- Conduct a safety meeting with all employees as soon as possible after the incident.

5.1 Safety Instructions – General

The safety instructions shall be subject to checks and periodic revision. The staff must be informed about all changes and revisions made to the instructions.

The Landfill Manager or his appointed representative shall be responsible for ensuring that each member of staff is acquainted with any updated issue of the safety instructions in force for HPLS.

Machinery may only be used for the purpose for which it was constructed. The following general rules must be observed:

- Any adjustments of machinery and movable parts of the same may only be done while the machinery is turned off;
- A machine must never be left running idle. The engine shall be turned off and the key removed from the machinery / vehicle, if the operator leaves the machine;
- No machinery or vehicle may be left with the shovel of the front loader lifted;
- At all times the windows of the cabin of any machinery or vehicle shall be kept clean, in order to ensure a clear view for the operator.

Any persons under the influence of alcohol, medicine or drugs are not permitted on Horse Point Landfill Site. They must not operate any machinery.

5.2 Safety of Site Users

It is the Landfill Manager's responsibility to ensure the safety of site users (general public, public authorities and commercial businesses) by informing users of the landfill rules, and ensuring that the rules are adhered to. To protect the safety of site users the following basic rules shall apply:

- Only adults are allowed to unload vehicles and only in areas as directed by site operators;
- Children, and individuals not unloading waste must remain in vehicles;

- Smoking is not allowed on the main landfill area;
- Scavenging is kept to a minimum on the main landfill area; and
- Site users must leave the main landfill area immediately after unloading of vehicles.

To protect the safety of site users, the Landfill Manager shall:

- Control access to the site;
- Inform site users of the rules upon arrival at the site;
- Post and maintain adequate directional signs to segregate commercial and public vehicles;
- Enforce the site 10mph speed limit;
- Maintain an orderly site;
- Immediately inform users of any unsafe practices.

5.3 Working Safely Around Public Vehicles

When working around the public the following are important considerations:

- The actions of the public are unpredictable;
- Never stand / go / run behind vehicles;
- Maintain eye contact with the driver at all times;
- Keep tipping areas clear and level where practicable so vehicles can have easy access; and
- Check the ground for glass, pipe, wire, wood, or other debris that could cause tripping hazards, and / or foot puncture hazards.

5.4 Safe Equipment Operation

- No machine shall be operated by any individual unless the operator has been properly trained, is appropriately licenced and is competent in the handling and operation of the vehicle;
- Perform a pre-check walk-around;
- Check braking system;
- Always use a seat belt;
- Clean windows and adjust mirrors for optimum vision;
- No machine shall be operated unless all safety devices are in good repair and fully operational, i.e. brakes, backup alarms, fire extinguishers, lights, horn, etc.;
- Check site for safe operating conditions such as large bulky items that could cause equipment instability;

- Ensure area around the machine is clear before moving;
- Use stepping points and handholds when mounting and dismounting machinery;
- Do not crush sealed containers that contain unknown contents;
- Always use caution around site users who may not be aware of the dangers; and
- When parking the vehicle / machine always:
    - Park on a level surface;
    - Lower blades, buckets;
    - Move transmission lever to neutral;
    - Apply the parking brake; and
    - Park up-wind of cell areas and not on the deposited waste.

5.5 Personal Protective Equipment

Appropriate Personal Protective Equipment (PPE) for landfill site work includes wearing the following: approved ankle supporting safety boots and high visibility clothing.

Staff working outside of buildings engaged with handling of waste shall always wear PPE. This includes:

- Hi-visibility clothing;
- Safety footwear.

In addition, the following PPE must be available and used by landfill operators and others working on the site, when necessary:

- Head protection; and
- Ear protection (when around loud equipment); and
- Flame retardant overalls (when engaged in incinerator operations); and
- Trawl master gauntlets or nitrile gloves (when engaged in hazardous waste operations).

A first aid kit shall be available at the site. The contents of the kit shall be renewed when used or becomes out of date. At least one landfill operator, properly trained in first aid, shall be present on the site during all working hours.

The work on site must be organised in such a way, that direct contact with the waste is avoided. If this nevertheless happens, the affected body area must be washed with soap and water immediately. Dirty working clothes are to be replaced with clean clothes at the end of the working day.

In order to prevent the spreading of pathogenic microorganisms and hazardous materials it is prohibited for landfill staff to leave the site wearing working clothes or to take them home for washing. A washing machine is provided for this purpose.

All landfill operators and other personnel must shower at the end of the working day before leaving the site. A shower is provided for this purpose.

Eating, drinking and smoking are only permitted in designated areas of the site. Before and after eating, drinking and smoking, hands are to be washed thoroughly with soap and water.

6.0 HAZARDOUS WASTE MANAGEMENT

Refurbishment of the landfill has included the construction of two hazardous waste cells and the installation of a hazardous waste incinerator. These facilities enable the responsible management of hazardous waste and allow some hazardous waste to be thermally treated (including clinical and biosecurity waste).

6.1 Hazardous Waste Incinerator Operation

A separate hazardous waste incinerator operational manual (document ERM-2015-006) has been written for use by landfill staff. The manual also includes an air quality monitoring protocol and environment risk assessment.

The incinerator is currently being used exclusively to manage hazardous waste associated with the airport project. The incinerator will be handed over to Saint Helena Government at the end of the project, where it will replace the incinerator in Rupert's Valley. At handover, the incinerator will be fully serviced by the supplier and a 2 year service pack provided. During the servicing, landfill staff will be given training associated with incinerator operation.

6.2 Hazardous Waste Cell Operation

The first hazardous waste cell will be used exclusively to manage airport construction hazardous waste which cannot be thermally treated at the incinerator. The second hazardous waste cell is for use by Saint Helena Government.

The main hazardous waste types to be disposed within the hazardous waste cell include (but are not limited to);

- Vehicle Batteries
- Waste Motor and Cooking Oil
- Paint
- Incinerator ash
- Leachate
- Other wastes containing hazardous properties

7.0 HAZARDOUS WASTE RECEPTION AND DISPOSAL

7.1 Hazardous Waste

Hazardous waste is received at HPLS by the Landfill Manager in the following ways:

- From the public by delivery to the PRF during opening hours;
- From the public and commercial sector by agreed delivery to the incinerator or hazardous waste cell; and
- Clinical waste by specialised direct delivery to the incinerator.

All hazardous waste shall be assessed and segregated by the Landfill Manager for appropriate disposal (thermal incineration or disposal in the hazardous waste cell).

Internal site hazardous waste movements shall be performed by site staff to one of the following locations:

- Hazardous waste incinerator for thermal treatment; or
- Engineered hazardous waste cell for burial.

7.2 Hazardous Waste Reception

On arrival at the landfill site, all vehicles carrying hazardous waste should report to the Landfill Manager. Who will then direct them to either the incinerator or hazardous waste cell (except for vehicle batteries, paint and motor / cooking oil wastes which can be safely disposed within the PRF) and indicate the appropriate location to discharge their load. The Landfill Manager may also provide additional instructions which may be necessary for the safe operation of the landfill.

The Landfill Manager may log the following information for each delivery of hazardous waste by a public body or commercial operator:

- Date and time of delivery;
- Vehicle registration number;
- Identity of the hazardous waste producer;
- Estimation of volume of hazardous waste; and
- Type of hazardous waste verified by visual inspection (where possible).

Any information may be recorded in a data management system and used to track the hazardous waste produced and disposed on St. Helena.

7.3 Specific Hazardous Waste Types

All hazardous wastes will be deposited directly to the incinerator or hazardous waste cell unless a separate procedure is described in the following sub-sections.

7.3.1 Asbestos

The process for the reception and disposal of asbestos is as follows:

- Upon arrival at the landfill site the vehicle shall pass through the security gate and the driver shall report to the Landfill Manager. Asbestos waste shall be checked by the Landfill Manager to ensure that it is sealed, labelled as asbestos and double bagged;
- The Landfill Manager will direct them to the asbestos disposal cell to discharge their load and may also provide additional instructions as necessary;
- The vehicle shall travel along the site haul road to the asbestos disposal cell;
- The driver shall position the vehicle at a safe location and discharge the waste where instructed by the Landfill Manager;
- Once the waste has been discharged, the vehicle shall drive along the haul road and leave the site via the security gate.
- The landfill 360^{o} excavator **SHALL <u>NOT</u> COMPACT THE WASTE** but shall apply waste cover soils as required;

7.3.2 Septic Tank Waste

Septic tank waste shall continue to be disposed at Horse Point Landfill Site until the islands sewage treatment upgrade has been completed in 2017 (TBC), where-after septic tank waste will be disposed and treated at the relevant sewage treatment works.

Vehicles delivering this waste to the site presently discharge the waste into the sewage pond to soak-away into natural ground. This area support lush vegetation growth which could be an attractant to feral pigeons. This area shall be managed to reduce its attractiveness to birds, especially feral pigeons, through regular vegetation clearance and draining of any standing water.

7.3.3 Vehicle Batteries

The process for the reception and disposal of vehicle batteries is as follows:

- Upon arrival at the landfill site the vehicle shall pass through the public access security gate and the driver shall dispose of vehicle batteries in the relevant storage container within the Public Recycling Facility as signposted.
- The driver does not need to report to the Landfill Manager upon arrival or when leaving the site via the public access security gate.

7.3.4 Motor / Cooking Oil

The process for the reception and disposal of motor / cooking oil (200 litres or less) is as follows:

- on arrival at the landfill site the vehicle shall pass through the public access security gate and the driver shall dispose of motor / cooking oil in the relevant storage receptacle within the Public Recycling Facility as signposted.

- The driver does not need to report to the Landfill Manager upon arrival or when leaving the site via the public access security gate.

- For large / commercial deliveries of waste motor oil e.g. Connect St Helena, delivery to HPLS will be via pre-booked arrangement with the Landfill Manager only.

7.3.5 Paint

The process for the reception and disposal of paint (200 litres or less) is as follows:

- Upon arrival at the landfill site the vehicle shall pass through the public access security gate and the driver shall dispose of paint in the relevant storage bay within the Public Recycling Facility as signposted.

- The driver does not need to report to the Landfill Manager upon arrival or when leaving the site via the public access security gate.

- For large / commercial deliveries of paint, delivery to HPLS will be via pre-booked arrangement with the Landfill Manager only.

7.4 Accidental Hazardous Waste Disposal

Accidental disposal of hazardous wastes will occur within HPLS, primarily within the bulky waste cell when hazardous waste is not identified to the Landfill Manager upon delivery to the site or when persons disposing of wastes do not know it is hazardous.

In the event that hazardous waste is found within the bulky waste cell or Public Recycling Facility then these wastes will be safely removed by landfill staff and disposed in the appropriate manner, dependent on waste type.

Successful implementation of hazardous waste management will be attained through adhering to the protocols described in this document.

7.5 On-going Procedure Review

The above procedures will be reviewed and updated (as required) on at least on an annual basis.

8.0 PUBLIC RECYCLING FACILITY

The Public Recycling Facility (PRF) is located adjacent to the landfill site office and the main site entrance. The site shall be open to the public at the designated times, who will be able to deposit their waste into designated hard standing bays and containers (see Drawing HPLS2).

The facility provides the public and commercial entities with an opportunity to deposit waste at HPLS in person. The facility enables the segregation of recyclable waste and some hazardous waste (motor / cooking oil, paint, batteries, waste electrical equipment) for appropriate disposal. This provides for significantly improved site health and safety by reducing the volume of public traffic movements within the main working site and allows better management of wastes e.g. waste is disposed in the correct area within the main working site. The separated waste within the PRF is available for the public to retrieve for spare parts or reuse.

Waste from the PRF which is not retrieved by the public shall be collected periodically and taken directly to the relevant disposal area on the site. Acceptable waste at the PRF will include:

- Glass;
- Cans (to be introduced in 2017);
- Scrap Metal;
- Wood;
- Paint;
- Motor and Cooking Oil;
- Tyres;
- Vehicle and Domestic Batteries;
- White Goods and Small Electrical Appliances
- Textiles and Clothing;
- Furniture; and
- Paper and Cardboard

The frequency of clearance will be dictated by the speed of waste accumulation. Where materials are likely to be desirable to the public they shall be maintained in the area of facility as the availability of space dictates.

The process of removing hazardous waste from the PRF is as follows:

- When the landfill operator is removing materials from the PRF for disposal, public access to the area will be prevented;
- Depending on the volume of hazardous waste present, either the hazardous waste will be loaded into the trailer by the JCB tele-handler, or the JCB tele-handler will transport the hazardous waste directly; and

- Hazardous waste will be taken to the incinerator or hazardous waste cell for disposal.

9.0 AIRPORT OPERATIONS

The management of hazardous waste at HPLS will not impact on airport operations as hazardous wastes are not attractants to feral pigeons.

10.0 HAZARDOUS WASTE CELL MANAGEMENT

10.1 Hazardous Waste Cell – Disposal

Each cell shall be filled on a phased basis. One cell is for the airport contractor's non-incineratable hazardous wastes and the other cell for SHG use. The phased approach is intended to minimise the generation of leachate, reduce odours, manage landfill gas and encourage the progressive restoration of the site.

10.2 Hazardous Waste Cell – Health and Safety

Hazardous waste cells will be enclosed with a minimum six foot high fence and with securable gated access. The cells will be separated internally via fencing.
Hazardous waste signage will be positioned at the waste cells and on the main HPLS sign outside of the site.

11.0 WASTE COVER SOILS

Waste cover soils shall be sourced from the stockpiled material excavated to form domestic waste cells. All waste shall be covered with an adequate amount of cover soils with such frequency that it:

- Prevents windblown litter;
- Prevents odours being a problem off-site;
- Ensures that scavenging birds are not attracted to the site;
- Ensures that flies and vermin are not attracted to the site or infest the site;
- Ensures that the risk of fire on or within the site is minimised; and
- Ensures that the visual appearance of the site is not seriously detrimental to the amenity of the locality.

Waste cells shall be covered with available soil material to a minimum depth of 150 mm.

To minimize cover soil usage and maintain waste void space, the following steps shall be taken:

- Minimize the waste surface area requiring soil cover;
- Leave the waste surface smooth and void-free after compaction.

12.0 RESTORATION AND CAPPING

Once the final waste surface elevation has been achieved within a cell, capping and restoration of the cell will commence. This shall consist of a regulating layer, capping layer and restoration soils.

Regulating Layer: is a layer of excavated soil materials placed over the final waste levels to provide an even free draining surface.

Capping Layer: This layer consists of a minimum of 500mm of clay compacted to form a low permeability barrier. The clay cap should be placed in 150mm thick layers and compacted with 8 passes of the tracked loading shovel or 360^{o} excavator. ‘Clay’ shall be sourced from the stockpiles of deeper excavated materials collected as part of the domestic waste cell excavation process.

Restoration Soils: Restoration ‘soils’ shall be placed over the clay equal to a depth of 500mm. Soils shall be placed and care shall be taken not to compact the soils. Should areas become compacted the surface shall be carefully ripped using the bucket teeth of the 360^{o} excavator. Soils shall be sourced from the stockpiles of near surface materials excavated as part of the domestic waste cell excavation.

13.0 LANDFILL GAS MANAGEMENT

As part of the capping and restoration scheme, a simple passive venting system shall be used to allow any landfill gas produced to vent rather than build up beneath the capping layer.

Upon completion of waste placement in a cell, a 1m x 1m (minimum dimensions) hole will be excavated into the top of the waste, penetrating a minimum of 0.5m.

Within the excavation, a 2.5m long 100mm diameter pipe shall be installed. The lower 400mm of the pipe shall be perforated to allow gas to flow. Perforations shall be 5mm in diameter and drilled at 100mm intervals along the length of the pipe and at 90^{o} around the pipe perimeter (pipes may be drilled on site).

Once the pipe has been installed the excavation within the waste shall be backfilled with clean 20mm single size stone.

The pipe will penetrate up through the cap and restoration soils. Care must be taken not to damage the pipe when placing the clay cap and restoration soils. Within 500mm of the pipe, placement and compaction of the clay cap around the pipe should be undertaken using shovels to place 100mm layers of clay and a steel rammer to compact each layer.

At the surface, the pipe shall protrude by 0.5m and shall be fitted with a T-Junction to form a cowl preventing materials falling into the pipe and deterring access by vermin.

An alternative method of construction can be to excavate a hole upon completion of the capping and restoration. In this case a 1m x 1m (minimum dimensions) hole would be excavated through the soils into the top of the waste, penetrating a minimum of 0.5m. Care must be taken to excavate the soils and clay separately from the waste, for later use, and the excavated waste disposed of to the active cell. Backfilling would then be undertaken as described above. This method would eliminate the risk of damaging the pipe with mechanical plant when installing the cap and restoration soils.

14.0 ENVIRONMENTAL MANAGEMENT

14.1 Litter

The Landfill Manager shall carry out a daily visual litter inspection on arrival at site and may record the findings in a Site Diary. Areas of litter which require attention shall either be cleared by site staff or reported to the Environmental Risk Manager for further action to be taken.

14.2 Perimeter Fence

The perimeter fencing and gates shall be inspected monthly by the Landfill Manager. Any identified need for repair or maintenance shall be reported to the Environmental Risk Manager for further action to be taken.

14.3 Groundwater and Leachate Monitoring

Landfill leachate is a potentially polluting liquid, which unless managed and / or treated, and eventually returned to the environment in a carefully controlled manner, may cause harmful effects on the groundwater and surface water that surround a landfill site.

Groundwater and Leachate monitoring shall be undertaken by EMD using the monitoring borehole located down gradient of the active cell and hazardous waste cell area of the landfill (HPL BH01).

The borehole shall be utilized to monitor groundwater and leachate levels and quality. Details of the proposed environmental monitoring regime are presented in Table 1.0 below.

Table 2.0: Proposed Groundwater and Leachate Monitoring Schedule

Monitoring Location	Frequency	Measurement and Analytical Suite
Groundwater and Leachate Monitoring Borehole HPL BH01	Monthly	Groundwater level (mAMSL)
	Quarterly	Temperature, pH, electrical conductivity, chloride, ammoniacal-nitrogen, total alkalinity (CaCO3), magnesium, potassium, sulphate, calcium, sodium, total organic carbon (TOC), total oxidised nitrogen (TON), manganese, iron, chromium VI, copper, lead, zinc, nickel (suite dependent upon available laboratory facilities and monitoring equipment)
	Annual	Hazardous Substance Suite to be determined (dependent upon relevant laboratory facilities and monitoring equipment)

Environmental Monitoring Location Data Sheet can be found at Annex B.

The recommended approach to sampling of groundwater and leachate within and around landfill sites can be found within document TGN02 – Monitoring Landfill Leachate, Groundwater and Surface Water, available at www.environment-agency.gov.uk

Monitoring results will be maintained and reviewed periodically by EMD with findings being reported back to the operational management team.

14.4 Leachate Disposal

Any leachate extracted will be containerized and incinerated (where possible) or safely disposed within the hazardous waste cell.

14.5 Surface Water Management

Whilst the site is not designed to provide engineered containment, it is important to minimize the volume of leachate produced by the infiltration of precipitation and runoff into the waste mass. Final restoration levels for the general waste cells have been designed to help shed surface water thereby preventing infiltration and generation of leachate.

14.5.1 Surface Water Management – Hazardous Waste Cells

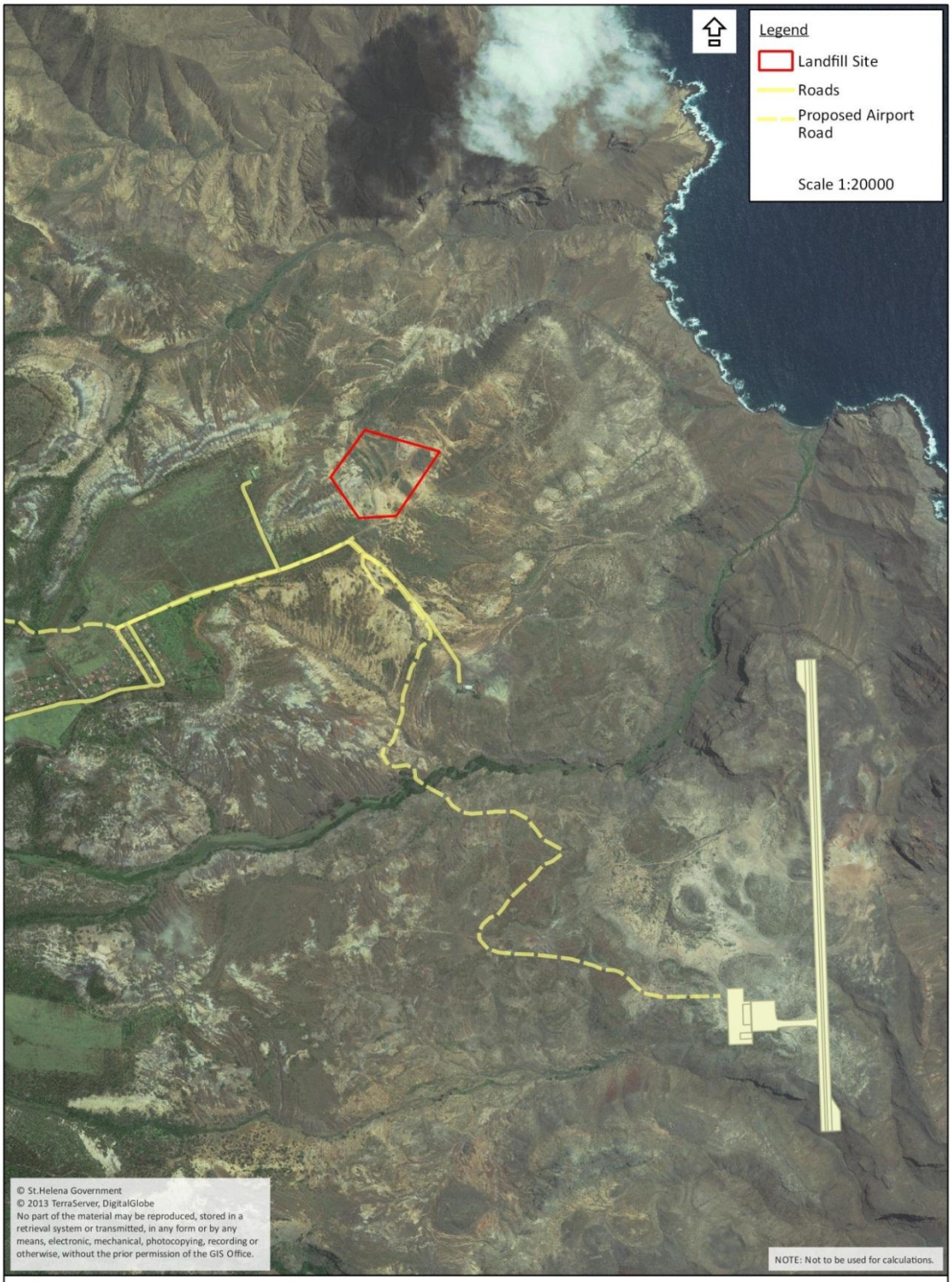
Most surface water within hazardous waste cells will evaporate.

In the event of excess surface water within hazardous waste cells, this will be managed using a Chemical Hand Pump. The hand pump will be able to accommodate a range of chemicals. It will have a capacity of 60 litres per minute and a lift of 6m.

Surface water extracted using the hand pump will be containerized and safely disposed within the hazardous waste cell.

DRAWINGS

Drawing HPLS1: Site Location



Horse Point Landfill Site, Site Location Plan.

Drawing No: HPLS 1
Created by: Samantha Cherrett. Checked by: Ceri Sansom on 06/03/15

Drawing HPLS2: Landfill Site Plan

ANNEX A – DATA RECORDING

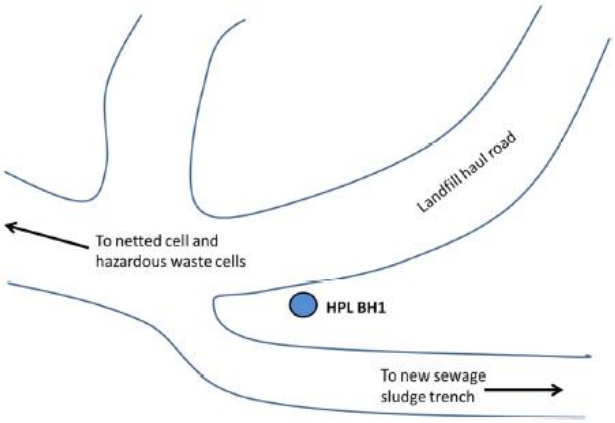
It is recommended that a formal system of data and information capture is applied to the operation of Horse Point Landfill Site, to allow practices, trends and incidents to be monitored and periodically assessed.

An example of a suitable 'Hazardous Waste Diary' pro forma is provided below.

Day							
Date							
Weather Conditions							
Hazardous Waste Cell							
Hazardous Waste Loads Received	No.	Time	Name	Vehicle Reg.	Hazardous Waste Type	Estimated Quantity	Disposal Location
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
Issues, Incidents, Observations							
Recorded by (Name):							

This sheet is provided as an example and should be reviewed and amended as considered necessary by operational management to ensure that all relevant information and data is captured.

ANNEX B – ENVIRONMENTAL MONITORING LOCATION DATA SHEET

Monitoring Location Sketch	Location ID	
	**HPL BH1**	
	Directions	
	In Horse Point Landfill. At junction of new haul road within the landfill and the sewage sludge trench access road. Approximately 50m down slope from the hazardous waste cells.	
	Grid Reference	
	0215024, 8235667 (WGS84)	
	Installed Monitoring Equipment	
	Monitoring borehole (50mm ID plain case and screen). Waterra hi-flow sample tube.	
Photograph	**Datum (mASL*)**	406 (+/-3m error). Top of borehole, plain case.
	**Date Selected**	17/03/15
	Monitoring Frequency (weekly/monthly)	Monthly groundwater level dip. Quarterly datalogger download. Quarterly water quality testing.
	Equipment Required for Data Collection	Interface meter, water sampling bottles and labels, laboratory chain of custody sheets, field water quality equipment, field laptop.
	Maintenance Schedule	Interface probe –annual. Regular calibration of field water quality equipment.

*metres Above Sea Level (mASL).