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Booth Ventures Waste (Midlands) Ltd

Report No. 5430-BLP-R-005-02
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Sandown Quarry Landfill

Environmental Permit Application – Waste Acceptance & Leachate Source Term

BOOTH VENTURES

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1 Introduction

1.1 Background

This document supports the permit application for Sandown Quarry Landfill Site and details the waste to be deposited. This document also provides information on the leachate quality associated with the proposed wastes.

In order to facilitate the landfilling of the site, a permit application is being applied for to allow for the import of wastes suitable for quarry restoration fill. HM Revenue and Customs (HMRC) made specific allowance for quarry restoration identifying a very limited list of suitable wastes in accordance with The Landfill Tax (Qualifying Material) Order 2011 (as amended).

In accordance with HMRC's LTG1 guidance[1], condition 8.4.1 states: "*Lower rate material which is used for the purpose of filling existing or former quarries may qualify for exemption. The following table provides a summary of the conditions that must be met to qualify for exemption. If the material disposed of consists only of materials listed in the Landfill Tax (Qualifying Material) Order 2011, a summary of which is set out of paragraph 4.2, or the material disposed of consists mainly of materials listed in the (Qualifying Material) Order 2011 save for incidental amount of standard rate material as described in paragraph 7.3 and:*

- the disposal takes place in a quarry
- there is planning consent in place to fill (or partly fill) the quarry, and;
- the permit only authorises the disposal of qualifying material

Then the disposal of material is exempt.

This report describes the wastes to be accepted with reference to the requirements of the Qualifying Material Order. The wastes acceptance procedures will be detailed in the site's Environmental Management System (EMS) and are summarised in Section 2 below.

1.2 Structure of Application and Accompanying Details

Section 2 of this report details the waste acceptance protocol for the site (structured characterisation, compliance testing and verification) and includes a list (including associated EWC codes) for both disposal and restoration activities.

Section 3 of this report introduces the rationale behind the derivation of an appropriate source term, the review forms part of a substantial dataset held by ByrneLooby (formerly TerraConsult) on similar infilling schemes throughout the UK. This section of the report explains how a leachate source term has been calculated for the proposed wastes taking account of actual leachate composition collected from similar and identical schemes.

[1] https://www.gov.uk/government/publications/excise-notice-lft1-a-general-guide-to-landfill-tax/excise-notice-lft1-a-general-guide-to-landfill-tax

2 Waste Acceptance

2.1 Background and Restoration Overview

There are three aspects to consider for the infilling at Sandown Quarry:

1. Recovery area (with inert wastes only) suitable for engineering associated with development of the new site haul road to allow the subsequent infilling of the site. Waste acceptance for this activity is considered in a separate permit application and not discussed further here. The associated area of site is depicted on drawing ESID 4 for reference.
2. Infilling 3.1Mm^3 (non-hazardous wastes), the permit boundary depicted on drawing ESID 4.
3. Restoration cover (non-hazardous wastes), selected materials will be utilised to assist in surface water control. A typical thickness of 1m of restoration soils is proposed over the cap for achieving the desired restoration profile hence ~153,000m^3 is required for a final 1m surface layer over the site (area of 15.3ha).

The waste types proposed for infilling and restoration (aspects 2 and 3 above) are presented in Table 1 and Table 2 accordingly.

2.2 Restoration Contours

The consented scheme (subject to planning approval) will allow for the restoration of the site in accordance with the pre-settlement contours depicted on drawing ESID 6. The contours allow for full site completion and long-term surface water management control.

2.3 Landscaping

The consented landscaping scheme will be in accordance with details approved via the twin tracked planning application, subject to approval by the LPA.

2.4 Waste Types

2.4.1 Waste Types for Disposal

Proposed waste types for disposal (integral for restoring the quarry void) are presented in Table 1.

2.4.2 Waste Types for Restoration

The proposed waste types for restoration (integral for assisting in surface water control and to provide a growing medium for the final land surface) are presented in Table 2.

The Site's restoration, reclamation and improvement of land (if required) will be achieved using appropriate waste materials under activities R5 (recycling or reclamation of other inorganic materials). Where enhancement is required, this will be conducted under R10 activities.

At the time of understanding the specific requirements for enhancement, i.e. in 20 years' time and post infilling (and delineated on an area basis and appropriate end-use), relevant approval will be obtained from the Environment Agency in regard to application rates and suitable waste types.

This cannot be elaborated upon further at this point as the imported soils have not been accepted at Site, hence enhancement cannot be specified for the restoration surface.

Site restoration is not anticipated for ~20 years based on the assumed infilling rates, details are provided in the ESID (5430-BLP-R-003-01).

Table 1 Wastes to be Accepted for Disposal

EWC code	Description	Qualifying Material Order 2011 (as amended) Group and most likely suitable descriptions
01 01	**waste from mineral excavation**	
01 01 02	wastes from mineral non-metalliferous excavation	**Group 1 – Rocks and soils** naturally occurring: rock, clay, sand, gravel, sandstone, limestone, crushed stone, stone from demolition of buildings or structures, slate, sub-soil, silt.
01 04 10	dusty and powdery wastes other than those mentioned in 01 04 07	**Group 1 – Rocks and soils** naturally occurring: rock, clay, sand, gravel, sandstone, limestone, crushed stone, stone from demolition of buildings or structures, slate, sub-soil, silt. Or **Group 3 – Minerals processed or prepared** Moulding sands, including used foundry sand; clays, including moulding clay (including Fuller's earth and bentonite); excluding moulding sands containing organic binders, man-made mineral fibres made from glass–reinforced plastic and asbestos
01 04 12	tailings and other wastes from washing and cleaning of minerals other than those mentioned in 01 04 07 and 01 04 11	
01 04 13	wastes from stone cutting and sawing other than those mentioned in 01 04 07	
01 04	**waste from physical and chemical processing of non-metalliferous mineral**	
01 04 08	waste gravel and crushed rocks other than those mentioned in 01 04 07	**Group 1 – Rocks and soils** naturally occurring: rock, sand, gravel, sandstone, limestone, crushed stone.
01 04 09	waste sand and clays	**Group 1 – Rocks and soils** naturally occurring: clay, & sand.
10 01	**wastes from power stations and other combustion plants (except 19**	
10 01 01	bottom ash, slag and boiler dust (excluding boiler dust mentioned in 10 01 04)	**Group 5 – Ash** bottom ash and fly ash produced only from the combustion of wood, of waste or of both; bottom ash and fly ash from the combustion of coal, petroleum coke or of both, deposited in a cell containing the product of that combustion alone; and bottom ash and fly ash from the combustion of coal, of petroleum coke or of both, burnt together with biomass and deposited in a cell containing the product of that combustion and burning alone. Excluding fly ash from sewage sludge, municipal, clinical and hazardous waste incinerators.
10 03	**wastes from aluminium thermal metallurgy**	
10 03 16	skimmings other than those mentioned in 10 03 15	**Group 6 Low activity inorganic compounds** calcium based reaction wastes from titanium dioxide production, calcium carbonate, magnesium carbonate, magnesium oxide, magnesium hydroxide, iron oxide, ferric hydroxide, aluminium oxide, aluminium hydroxide, zirconium dioxide
10 08	**wastes from other non-ferrous thermal metallurgy**	
10 08 09	Other slags	**Group 4 - Furnace slags** Vitrified wastes and residues from thermal processing of minerals where, in either case, the residue is both fused and insoluble and slag from waste incineration.

EWC code	Description	Qualifying Material Order 2011 (as amended) Group and most likely suitable descriptions
10 08 11	dross and skimmings other than those mentioned in 10 08 10	**Group 6 Low activity inorganic compounds** calcium based reaction wastes from titanium dioxide production, calcium carbonate, magnesium carbonate, magnesium oxide, magnesium hydroxide, iron oxide, ferric hydroxide, aluminium oxide, aluminium hydroxide, zirconium dioxide
10 09	**wastes from casting of ferrous pieces**	
10 09 03	Furnace slag	**Group 4 - Furnace slags** Vitrified wastes and residues from thermal processing of minerals where, in either case, the residue is both fused and insoluble and slag from waste incineration.
10 09 06	casting cores and moulds which have not undergone pouring other than those mentioned in 10 09 05	**Group 3 – Minerals processed or prepared** Moulding sands, including used foundry sand; clays, including moulding clay (including Fuller's earth and bentonite); excluding moulding sands containing organic binders, man-made mineral fibres made from glass–reinforced plastic and asbestos.
10 09 08	casting cores and moulds which have undergone pouring other than those mentioned in 10 09 07	
10 10	**wastes from casting of non-ferrous pieces**	
10 10 06	casting cores and moulds which have not undergone pouring, other than those mentioned in 10 10 05	**Group 3 – Minerals processed or prepared** Moulding sands, including used foundry sand; clays, including moulding clay (including Fuller's earth and bentonite); excluding moulding sands containing organic binders, man-made mineral fibres made from glass–reinforced plastic and asbestos.
10 10 08	casting cores and moulds which have undergone pouring, other than those mentioned in 10 10 07	
10 11	**Waste from the manufacture of glass and glass products**	
10 11 03	waste glass-based fibrous materials	**Group 3 – Minerals processed or prepared** Moulding sands, including used foundry sand; clays, including moulding clay (including Fuller's earth and bentonite); excluding moulding sands containing organic binders, man-made mineral fibres made from glass–reinforced plastic and asbestos.
10 11 12	Waste glass other than those mentioned in 10 11 11	**Group 2 – Ceramics or concrete materials.** Glass, including fritted enamel; Excluding glass fibre and glass-reinforced plastic and concrete plant washings.
10 12	**Waste from manufacture of ceramic goods, bricks, tiles and construction products**	
10 12 06	Discarded moulds	**Group 3 – Minerals processed or prepared** Moulding sands, including used foundry sand; clays, including moulding clay (including Fuller's earth and bentonite); excluding moulding sands containing organic binders, man-made mineral fibres made from glass–reinforced plastic and asbestos.
10 12 08	waste ceramics, bricks, tiles and construction products (after thermal processing)	**Group 2 – Ceramics or concrete materials.** Ceramics, tiles, clay ware, pottery, china and refractories. Excluding glass fibre and glass-reinforced plastic and concrete plant washings.
10 13	**wastes from manufacture of cement, lime and plaster and articles and products made from them**	
10 13 14	waste concrete and concrete sludge	**Group 2 – Ceramics or concrete materials.** Concrete, including reinforced concrete, concrete block, breeze blocks and aircrete blocks.

EWC code	Description	Qualifying Material Order 2011 (as amended) Group and most likely suitable descriptions
		Excluding glass fibre and glass-reinforced plastic and concrete plant washings.
16 01	**end-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance (except 13, 14, 16 06 and 16 08)**	
16 01 20	glass	**Group 2 – Ceramics or concrete materials.** Glass, including fritted enamel; Excluding glass fibre and glass-reinforced plastic and concrete plant washings.
15 01	**Packaging**	
15 01 07	Glass packaging	**Group 2 – Ceramics or concrete materials.** Glass, including fritted enamel; Excluding glass fibre and glass-reinforced plastic and concrete plant washings.
16 01	**End-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance**	
16 01 20	Glass	**Group 2 – Ceramics or concrete materials.** Glass, including fritted enamel; Excluding glass fibre and glass-reinforced plastic and concrete plant washings.
17 01	**Concrete, bricks, tiles and ceramics and gypsum based materials**	
17 01 01	Concrete	**Group 2 – Ceramics or concrete materials.** Concrete, including reinforced concrete, concrete blocks, breeze blocks and aircrete blocks. Excluding glass fibre and glass-reinforced plastic and concrete plant washings.
17 01 02	Bricks	**Group 2 – Ceramics or concrete materials.** Ceramics, including bricks, bricks and mortar. Excluding glass fibre and glass-reinforced plastic and concrete plant washings.
17 01 03	Tiles and ceramics	**Group 2 – Ceramics or concrete materials.** Ceramics, tiles, clay ware, pottery, china and refractories. Excluding glass fibre and glass-reinforced plastic and concrete plant washings.
17 01 07	mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06	**Group 2 – Ceramics or concrete materials.** Glass, including fritted enamel; Ceramics, including bricks, bricks and mortar, tiles, clay ware, pottery, china and refractories. Excluding glass fibre and glass-reinforced plastic and concrete plant washings.
17 02	**Wood, Glass and Plastic**	
17 02 02	Glass	**Group 2 – Ceramics or concrete materials.** Glass, including fritted enamel;

EWC code	Description	Qualifying Material Order 2011 (as amended) Group and most likely suitable descriptions
		Excluding glass fibre and glass-reinforced plastic and concrete plant washings.
17 05	**Soil (including excavated soil from contaminated sites) stones and dredging spoil**	
17 05 04	soil and stones other than those mentioned in 17 05 03	**Group 1 – Rocks and soils** naturally occurring: rock, clay, sand, gravel, sandstone, limestone, crushed stone, stone from demolition of buildings or structures, slate, sub-soil, silt. ***Including components of the following groups*** **Group 2 – Ceramics or concrete materials.** Glass, including fritted enamel; Ceramics, including bricks, bricks and mortar, tiles, clay ware, pottery, china and refractories; Concrete, including reinforced concrete, concrete blocks, breeze blocks and aircrete blocks. Excluding glass fibre and glass-reinforced plastic and concrete plant washings. **Group 3 Minerals,** processed or prepared: Moulding sands, including used foundry sand; Clays, including moulding clay absorbents (including Fuller's earth and bentonite); Mineral absorbents; Man-made mineral fibres, including glass fibres; Silica; Mica; Mineral abrasives Excluding moulding sands containing organic binders; man-made mineral fibres made from glass-reinforced plastic and asbestos. **Group 4 - Furnace slags** Vitrified wastes and residues from thermal processing of minerals where, in either case, the residue is both fused and insoluble **Group 5 – Ash** bottom ash and fly ash produced only from the combustion of wood, of waste or of both; bottom ash and fly ash from the combustion of coal, petroleum coke or of both, deposited in a cell containing the product of that combustion alone; and bottom ash and fly ash from the combustion of coal, of petroleum coke or of both, burnt together with biomass and deposited in a cell containing the product of that combustion and burning alone. Excluding fly ash from sewage sludge, municipal, clinical and hazardous waste incinerators.
17 05 06	dredging spoil other than those mentioned in 17 05 05	**Group 1 – Rocks and soils** naturally occurring: rock, clay, sand, gravel, sandstone, limestone, slate, sub-soil, silt.
17 05 08	track ballast, soil and stones other than those containing dangerous substances	
17 09	**Other construction and demolition wastes**	
17 09 04	Mixed construction and demolition wastes other than those	**Group 1 – Rocks and soils** naturally occurring: rock, clay, sand, gravel, sandstone, limestone, crushed stone, stone from demolition of buildings or structures, slate, sub-soil, silt.

EWC code	Description	Qualifying Material Order 2011 (as amended) Group and most likely suitable descriptions
	mentioned in 17 09 01, 17 09 02 and 17 09 03	***including components of the following groups*** **Group 2 – Ceramics or concrete materials.** Glass, including fritted enamel; Ceramics, including bricks, bricks and mortar, tiles, clay ware, pottery, china and refractories; Concrete, including reinforced concrete, concrete blocks, breeze blocks and aircrete blocks. Excluding glass fibre and glass-reinforced plastic and concrete plant washings. **Group 3 Minerals,** processed or prepared: Moulding sands, including used foundry sand; Clays, including moulding clay absorbents (including Fuller's earth and bentonite); Mineral absorbents; Man-made mineral fibres, including glass fibres; Silica; Mica; Mineral abrasives. Excluding moulding sands containing organic binders; man-made mineral fibres made from glass-reinforced plastic and asbestos. **Group 4 Furnace slags** Vitrified wastes and residues from thermal processing of minerals where, in either case, the residue is both fused and insoluble. **Group 5 – Ash** bottom ash and fly ash produced only from the combustion of wood, of waste or of both; bottom ash and fly ash from the combustion of coal, petroleum coke or of both, deposited in a cell containing the product of that combustion alone; and bottom ash and fly ash from the combustion of coal, of petroleum coke or of both, burnt together with biomass and deposited in a cell containing the product of that combustion and burning alone. Excluding fly ash from sewage sludge, municipal, clinical and hazardous waste incinerators.
19 01	**wastes from incineration or pyrolysis of waste**	
19 01 12	bottom ash and slag other than those mentioned in 19 01 11	**Group 5 – Ash** bottom ash and fly ash produced only from the combustion of wood, of waste or of both; bottom ash and fly ash from the combustion of coal, petroleum coke or of both, deposited in a cell containing the product of that combustion alone; and bottom ash and fly ash from the combustion of coal, of petroleum coke or of both, burnt together with biomass and deposited in a cell containing the product of that combustion and burning alone. Excluding fly ash from sewage sludge, municipal, clinical and hazardous waste incinerators.
19 02	**wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**	

EWC code	Description	Qualifying Material Order 2011 (as amended) Group and most likely suitable descriptions
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05	**Group 1 – Rocks and soils** naturally occurring: rock, clay, sand, gravel, sandstone, limestone, crushed stone, stone from demolition of buildings or structures, slate, sub-soil, silt.
19 03	**stabilised/solidified wastes**	
19 03 05	stabilised wastes other than those mentioned in 19 03 04	**Group 1 – Rocks and soils** **Group 2 – Ceramics or concrete materials** **Group 4 Furnace slags** **Group 5 – Ash**
19 03 07	solidified wastes other than those mentioned in 19 03 06	
19 04	**vitrified waste and wastes from vitrification**	
19 04 01	vitrified waste	**Group 1 – Rocks and soils** **Group 2 – Ceramics or concrete materials** **Group 4 Furnace slags** **Group 5 – Ash**
19 12	**Waste from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified.**	
19 12 05	Glass	**Group 2 – Ceramics or concrete materials, g**lass, including fritted enamel.
19 12 09	Mineral (for example sand, stones)	**Group 1 – Rocks and soils** naturally occurring: rock, clay, sand, gravel, sandstone, limestone, crushed stone, stone from demolition of buildings or structures, slate, sub-soil, silt. **Group 3 Minerals,** processed or prepared: Moulding sands, including used foundry sand; clays, including moulding clay (including Fuller's earth and bentonite); mineral absorbents; Man-made mineral fibres, including glass fibres; Silica; Mica; Mineral abrasives. Excluding moulding sands containing organic binders; man-made mineral fibres made from glass-reinforced plastic and asbestos.
19 12 12	Treated bottom ash including IBA and slag other than that containing dangerous substances	**Group 4 Furnace slags** Vitrified wastes and residues from thermal processing of minerals where, in either case, the residue is both fused and insoluble. **Group 5 – Ash** bottom ash and fly ash produced only from the combustion of wood, of waste or of both; bottom ash and fly ash from the combustion of coal, petroleum coke or of both, deposited in a cell containing the product of that combustion alone; and bottom ash and fly ash from the combustion of coal, of petroleum coke or of both, burnt together with biomass and

EWC code	Description	Qualifying Material Order 2011 (as amended) Group and most likely suitable descriptions
		deposited in a cell containing the product of that combustion and burning alone. Excluding fly ash from sewage sludge, municipal, clinical and hazardous waste incinerators.
19 12 12	Residue from waste processing	**Group 1 – Rocks and soils** naturally occurring: rock, clay, sand, gravel, sandstone, limestone, crushed stone, stone from demolition of buildings or structures, slate, sub-soil, silt. ***including components of the following groups*** **Group 2 – Ceramics or concrete materials.** Glass, including fritted enamel; Ceramics, including bricks, bricks and mortar, tiles, clay ware, pottery, china and refractories; Concrete, including reinforced concrete, concrete blocks, breeze blocks and aircrete blocks. Excluding glass fibre and glass-reinforced plastic and concrete plant washings. **Group 3 Minerals,** processed or prepared: Moulding sands, including used foundry sand; Clays, including moulding clay (including Fuller's earth and bentonite); Mineral absorbents; Man-made mineral fibres, including glass fibres; Silica; Mica; Mineral abrasives. Excluding moulding sands containing organic binders; man-made mineral fibres made from glass-reinforced plastic and asbestos. **Group 4 Furnace slags** Vitrified wastes and residues from thermal processing of minerals where, in either case, the residue is both fused and insoluble. **Group 5 – Ash** bottom ash and fly ash produced only from the combustion of wood, of waste or of both; bottom ash and fly ash from the combustion of coal, petroleum coke or of both, deposited in a cell containing the product of that combustion alone; and bottom ash and fly ash from the combustion of coal, of petroleum coke or of both, burnt together with biomass and deposited in a cell containing the product of that combustion and burning alone. Excluding fly ash from sewage sludge, municipal, clinical and hazardous waste incinerators.
19 13	**Waste from soil and groundwater remediation**	
19 13 02	Solid waste from soil remediation other than those containing dangerous substances	**Group 1 – Rocks and soils** naturally occurring: rock, clay, sand, gravel, sandstone, limestone, crushed stone, stone from demolition of buildings or structures, slate, sub-soil, silt. including components of the following groups **Group 2 – Ceramics or concrete materials.** Glass, including fritted enamel;

EWC code	Description	Qualifying Material Order 2011 (as amended) Group and most likely suitable descriptions
		Ceramics, including bricks, bricks and mortar, tiles, clay ware, pottery, china and refractories; Concrete, including reinforced concrete, concrete blocks, breeze blocks and aircrete blocks. Excluding glass fibre and glass-reinforced plastic and concrete plant washings. **Group 3 Minerals,** processed or prepared: Moulding sands, including used foundry sand; Clays, including moulding clay (including Fuller's earth and bentonite); Mineral absorbents; Man-made mineral fibres, including glass fibres; Silica; Mica; Mineral abrasives; Excluding moulding sands containing organic binders; man-made mineral fibres made from glass-reinforced plastic and asbestos. **Group 4 Furnace slags** Vitrified wastes and residues from thermal processing of minerals where, in either case, the residue is both fused and insoluble.
20 01	**20 01 separately collected fraction (except 15 01)**	
20 01 02	Glass	**Group 2 – Ceramics or concrete materials.** Glass, including fritted enamel; Excluding glass fibre and glass-reinforced plastic and concrete plant washings.
20 02	**Garden and park wastes (including cemetery waste)**	
20 02 02	soil and stones, excluding top soil and peat	**Group 1 – Rocks and soils** naturally occurring: rock, clay, sand, gravel, sandstone, limestone, crushed stone, stone from demolition of buildings or structures, slate, sub-soil, silt.

Table 2 Wastes For Restoration

EWC Code	Description
01	**WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS**
01 04	**Wastes from physical and chemical processing of non-metalliferous minerals.**
01 04 08	Waste gravel and crushed rocks other than those mentioned in 01 04 07
01 04 09	Waste sand and clays
17	**CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)**
17 05	**Soils (excluding soils from excavated sites), stones and dredgings**
17 05 04	Soils and stones including chalk other than those mentioned in 17 05 03
17 05 06	Dredging spoil other than those mentioned in 17 05 05
19	**WASTES FROM WASTE MANAGEMENT FACILITIES, OFF SITE WASTE WATER TREATMENT PLANTS AND PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION / INDUSTRIAL WASTE**

19 12	**Wastes from mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 09	Minerals (for example sand, stones)
19 13	**Wastes from soil and groundwater remediation**
19 13 02	Solid wastes from soil remediation other than those mentioned in 19 13 01
20	**MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATLEY COLLECTED FRACTIONS**
20 02	**Garden and park wastes (including cemetery waste)**
20 02 02	Soil and stones

2.5 Waste Acceptance Procedure

Waste acceptance will be a structured hierarchy with appropriate points of control for the identification and validation of suitable wastes for use in the disposal activity at the site. This can be summarised as follows:

- Level 1. Basic characterisation through pre-submission of an appropriate waste classification (EWC codes, site investigations etc);
- Level 2. Compliance testing;
- Level 3. On-site verification.

Each stage in the proposed waste acceptance scheme is detailed further below.

2.5.1 Level 1: Waste Characterisation

Table 1 and Table 2 details the list of wastes to be accepted at the Site for disposal and recovery in the restoration scheme respectively.

The European Waste Catalogue (EWC) code of wastes will be checked against any relevant available data provided (e.g. waste description, waste source or chemical testing) to confirm that the waste coding is correct, it can be accepted under the permit and it is suitable for the proposed activities. The waste enquiry procedure requires the following information, where available and applicable, to be gathered from any potential waste load prior to acceptance:

- The identity of the producer;
- Source and origin of the waste (including full site address);
- Volume of the material to be deposited;
- Information on the process producing the waste (description and characteristics of raw materials and products);
- If the waste has gone through some treatment, then a full description of the waste treatment applied;
- Code according to the EWC;

- Appearance of the waste (smell, colour, physical form); and
- Data on the composition and chemical properties of the waste. This is provided by customers as a site investigation report including full laboratory chemical analysis. The Operator will ensure the analysis provided for any material is sufficient for a hazardous waste assessment, which will be undertaken in accordance with the Waste Framework Directive and relevant Environment Agency (Agency) guidance[2].

This data will be reviewed by a suitably qualified person to ensure that all sampling is representative of the source of the waste and an appraisal of the composition, including the likelihood of hazardous properties, will be undertaken.

Certain types of waste can be classified and accepted as inert without requiring testing if it meets the description in the Annex to the Landfill Directive and the following is confirmed:

- It comes from a single source;
- It is well characterised and described; and
- It carries no risk of contamination, for example from a site that has not previously been developed.

In the case of suspicion of contamination (either from visual inspection or from the knowledge of the origin of the waste) the waste will be tested (or refused acceptance on site). If waste acceptance testing is required, the appropriate data will be requested and will be reviewed by a suitably qualified person.

Only waste that is shown to be compliant with the sites Permit, following the basic waste characterisation, will be accepted for use at the landfill. If deemed acceptable a quote will be issued to the customer, including the correct EWC for inclusion on their waste transfer note. Sometimes the EWC is supplied by the customer but the Operator will always undertake the Basic Waste Characterisation anyway to ensure the EWC is correct.

If the composition of a waste stream subsequently changes, the Operator will stop the importation of the material and request additional / new information to enable them to carry out basic waste characterisation again.

Where the results of basic waste characterisation show a waste stream is not acceptable for use at the site, the customer is informed, and the waste is not accepted.

A copy of the site investigation report, analytical test data and any other relevant documentation relating to a waste stream that has been accepted at the Site, is kept on file and can be made available for inspection by the Agency if requested.

[2] WM3. Waste Classification: Guidance on the classification and assessment of waste (1st Edition v1.2.GB)

2.5.2 Level 2: Compliance Testing

If the Operator has a regularly arising waste stream from the same source, checks are carried out to ensure that the properties determined by the basic waste characterisation have not changed.

The Operator always ensure that the site investigation information, provided as part of the basic waste characterisation, is fully representative of all material proposed for import at the site.

A volume / tonnage of material, to be imported and recovered, will be agreed at the time of basic waste characterisation and the provision of a quotation. Once records obtained at the site 'booking in' cabin show the imports are close to the agreed volumes / tonnages the 'booking in' operative (BIO) will notify the administration department, who will then contact the customer to discuss additional imports. If additional material from the same source is still proposed for import, additional information, listed in Section 3.1.1 of this document, will be requested to demonstrate continued compliance with the Permit. Records of the additional information requested is kept on file and can be made available for inspection by the Agency if requested.

Sampling of material from random loads arriving at the site is carried out on a monthly basis. The Operator undertake sampling on a different date each month. On the designated day, the site operative will select and stop a vehicle at random, at any point during that day, to allow the collection of a sample from the vehicle. The samples are sent to their laboratory for chemical analysis to ensure the material meets the conditions of the sites permit.

A schedule of proposed sampling dates, a random waste sampling record and the laboratory chemical analysis scheduled for each sample, are included in the EMS. This schedule is kept by the admin team and can also be found on the wall on the site 'booking in' cabin. Records containing actual sampling dates and the corresponding laboratory chemical testing results are kept on record and can be made available for inspection by the Agency if requested.

2.5.3 Level 3: Onsite Verification

The BIO carries out visual checks on each load arriving on site. This verifies that the waste arriving at the site is the expected waste and that there are no visual signs of contamination. Visual inspections are also carried out on every load to ensure that there are no non-permitted waste types within the load.

All incoming vehicles will enter via the site entrance and check in at the 'booking in' cabin. The documentation accompanying the load shall be checked by the BIO and shall include, but not be limited to, the Carriers Certificate of Registration and Duty of Care Waste Transfer Note. If the BIO is satisfied that the waste conforms to the documentation and conditions of the Permit, the waste is accepted and the suitable amendments are made to waste transfer note. Where it cannot be demonstrated that a waste conforms to the documentation and conditions in the Permit it is rejected from Site and the Agency are notified immediately.

The information to be recorded in respect of each load will be where appropriate:

- Pre-treatment details;
- Waste type;
- Date;
- Time;
- Customer name;
- Vehicle registration number and type;
- Ticket number; and
- Carriers registration number.

2.5.4 Rejection Procedures

Discrepancies found as a result of the above procedures will result in the load being rejected from the site. The driver will be asked to leave the site and the customer will be notified.

If a load / vehicle has been rejected, details of the carrier, vehicle registration, waste source, description, date, time etc. are recorded and kept on file. These records can be made available if the Agency requests.

If any discrepancies cannot be found during visual inspection at the site 'booking in' cabin, but then are found once the load has been tipped, the waste is immediately reloaded onto the vehicle and the driver will be asked to leave the site. The Technically Competent Manager (TCM) and the BIO will be notified, who in turn, will notify the customer.

The Site's EMS includes details of the rejection procedures.

2.5.5 Site Records

Copies of all records required in accordance with the Permit are maintained and kept on file and can be made available for inspection by the Agency if required.

All waste transfer notes will be kept on file for a minimum of two years. Waste transfer notes can be made available during this period for inspection by the Agency if required.

2.6 Operational Practice

2.6.1 Personnel

The operation will be staffed as a minimum by the following personnel:

- Site Business Manager/Contract Manager
- Closed Site Operations Supervisor

- Weighbridge Operator
- Machine Operator
- CQA supervision in accordance with the approved CQA plan.

Should additional personnel be required by site operations, this resource will be brought in on a reasonably practicable timescale.

2.6.2 Resources

The operation shall require the following resources, in addition to the staffing and material resource as listed above:

- Plant. This typically will be a bulldozer equal to a Caterpillar D6 in size
- Tractor and Water Bowser for dust suppression activities
- Wheel wash facilities

2.6.3 Delivery

Prior to arrival at the site all waste material will be assessed and approved to ensure it is suitable for receipt, is a listed waste type and meets the relevant (if applicable) engineering requirements at Site. Once approved, and issued with a unique approval number, the waste must be booked into the site, giving at least 24 hrs notice.

Importation of recovery, disposal or restoration wastes to Sandown Quarry Landfill will only be carried out by a registered waste carrier, under relevant Duty of Care. On arrival at the weighbridge, the load will be checked and visually inspected for conformance. All incoming loads must be sheeted.

Waste materials will either be direct placed or stored in temporary stockpiles for placement at a later date as required.

2.6.4 Storage

The designated phased infilling area will be divided into suitable working phases and the creation of any temporary stockpiles will, where practicable, be adjacent to the phase for which the soils are to be used for restoration. This will only become relevant in the final stages of infilling the void.

The restoration materials will be tipped in appropriate designated stockpiles. Soil stockpiles will be placed at appropriate locations preferably near to the area being restored.

2.6.5 Quarantine

The site manager will designate a quarantine area for each phase of the infilling / restoration work to temporarily isolate any restoration materials deemed unsuitable for use prior to removal off site.

2.6.6 Application

Imported recovery, disposal and restoration materials will be placed in accordance with the design and restoration contours as approved by the permit. All waste will be accepted in accordance with the legal obligations imposed by the extant permit and the Duty of Care and the Operators Integrated Management System.

3 Leachate Source Term

3.1 Overview

The application is to restore the quarry void with QMs as defined in the supporting application documents.

Any leachate generated from the non-hazardous QM's will differ significantly from a typical Municipal Solid Waste (MSW) leachate as there is not a putrescible component to the waste stream. Consequently, the significant ammoniacal-N and dissolved organic matter (as represented by the COD) as well as other soluble salts will not be present as readily degradable organic matter and soluble salts are specifically excluded from the list of wastes described as QMs. Given that the proposed waste types are unlikely to contain a degradable organic content, elevated ammoniacal-N and BOD is not expected to be associated with site. Similarly, solvents, refined petroleum fuels or other chemical sources will be excluded. In simple terms, source characterisation will preclude any significantly contaminated soils.

For the purposes of assessment, a source term has been derived for initial screening based on the leaching data that ByrneLooby (formerly TerraConsult) have compiled from 7 sites (including a hazardous soil landfill) over a 7-10 year period, as well as QMs data from identically proposed infill schemes (Table 3). These concentrations are applicable to the infilling / disposal aspect of the sites restoration and have been quantitively assessed in the supporting Hydrogeological Risk Assessment.

Table 3 Source Term Waste Leaching Data compared to Drinking Water Standards

Determinand	Soil Infill Site data			No. of Samples	% of samples < LOD	DWS	Comment
	25%ile	Median	95%ile				
	mg/l					mg/l	
Hazardous Metals							
Cadmium	0.00003	0.00010	0.00060	593	66	0.005	Below DWS at source
Mercury	0.00003	0.00010	0.00025	331	87	0.001	Below DWS at source
Non-hazardous Metals							
Lead	0.001	0.001	0.300	580	89	0.01	Above DWS at source
Nickel	0.007	0.011	0.052	579	3	0.02	
Chromium	0.001	0.002	0.015	586	60	0.05	Below DWS at Source
Copper	0.002	0.007	0.039	566	31	2	Below DWS at source
Zinc	0.003	0.006	0.128	383	19	5	
Non-Hazardous Metalloid							
Arsenic	0.003	0.005	0.021	593	4	0.01	Above DWS at source
Matrix and Minor ions							
Chloride	69	133	637	768	0	250	Above DWS at source
Sulphate	607	912	1731	600	1	250	
Ammoniacal-N	0.2	1.1	15.6	757	11	0.39*	Above DWS at source
Herbicide and Hydrocarbons - µg/l							
Mecoprop	5.8	12.5	33.7	61	77	0.0004 (MRV)	Above DWS at source
Benzene	1.3	1.5	2.0	50	96	0.001 (MRV)	Above DWS at source
Toluene	1.1	1.2	3.7	68	96	0.004 (MRV)	Above DWS at source

DWS from 2016 No. 614WATER, ENGLAND AND WALES, The Water Supply (Water Quality) Regulations 2016 https://www.legislation.gov.uk/uksi/2016/614/pdfs/uksi_20160614_en.pdf, Minimum Reporting Values, MRV concentrations (https://www.gov.uk/government/publications/values-for-groundwater-risk-assessments/hazardous-substances-to-groundwater-minimum-reporting-values#:~:text=o%2Dxylene%20and%20m%2Fp,to%203%20micrograms%20per%20litre)

*Ammonium (as NH_4) DWS 0.5mg/l
All naphthalene data < LOD (number of samples = 55)

This leachate source term is derived from non-inert soil-forming wastes and similar materials, and is also valid for a Landfill Tax Complaint LOI test waste source containing either Transfer / Recovery Site Trommel Fines as well as asbestos wastes co-disposed with the soils.

As it can be seen, by virtue of the collated source term summary presented above in Table 3 that these sites have a separate geochemistry to biochemically derived solutions (i.e. typical landfill leachates with significant concentrations of ammoniacal-N) as the bulk organic content is excluded prior to disposal.

The majority of the selected substances (most pertinent to environmental risk to groundwaters and surface waters) are below DWS concentrations at source based on the reviewed data.

As a geochemically derived liquor, calcium and sulphate are limited by the solubility of gypsum (which equates to approximately 1,500mg/l sulphate and 700mg/l calcium under oxidising to anoxic conditions) and ammoniacal-N is consistently low (95th%ile concentration of 15.6mg/l, median concentration of 1.1mg/l).

Chloride is typically <500mg/l in these sites, with median and average concentrations of 133mg/l and 214mg/l respectively however in localised areas of some sites there may be very short-term increases, or localised anomalous data of greater concentrations, as such the overall dataset 95th %ile concentration of 637mg/l is reported. It is recognised that infrequent or short term "outliers" can skew statistical appraisals but are not reflective of the overall bulk infill chemistry. This can occur for all substances analysed.

Another significant factor for low organic and soil-based wastes is that the primary vector which mobilises heavy metals, *i.e.* as colloidal organo-metallic complexes which additionally are not present. Consequently, metals such as nickel and chromium which are also uniquely present within methanogenic and acetogenic leachates (as compared to other metals which can be present in UK groundwaters and geological strata) are in the case of nickel low within soil disposal sites whilst chromium is invariably absent (60% of all data reported at < LOD).

Copper and zinc data report occasional outliers are reported, these concentrations are insignificant compared to the 2mg/l and 5mg/l DWS. Arsenic is also environmentally low, with concentrations reducing to less than the 10µg/l DWS after a short initial stabilisation period.

In regard to hazardous metals, both cadmium and mercury are below DWS concentrations (95%ile) however it is also apparent that the majority of the dataset (593 samples and 331 samples respectively) are reported at <LOD for 66% and 87% of all samples analysed. Lead is reported above DWS at the 95%ile concentration however it is noted that ~90% of the entire dataset (580 samples) is reported at <LOD (Table 3).

Specific organic substances are rarely reported in soil cells, *i.e.* the majority of substances are reported as "below detection level" or <LOD. Small quantities of mecoprop can be reported, with almost all data reported as less than the 18µg/l EQS. However, it is not reported above 1µg/l for some of the sites evaluated and <LOD for almost 80% of the dataset (61 samples). All other organic

substances reported are single occurrences, which are not repeated on consecutive hazardous substance screens.

4 Summary

The application proposes to utilise non-hazardous soils for the infilling and restoration of the current void, waste acceptance criteria will accord with WM3 guidance in regard to the definition of non-hazardous. A significant dataset has been reviewed in deriving a source term from similar infilling schemes. Hence the source term is considered statistically robust.

Waste Acceptance Procedures outlined herein, in addition to Booth Ventures EMS will ensure that wastes that do not confirm with the Qualifying Materials Order, including those that contain putrescible / biodegradable wastes are excluded from disposal. Ongoing monitoring of the source term will validate the Conceptual site Model. And source term outlined herein.

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