The Hub

Advanced material treatment, remediation and recycling technology

The Treatment Hub Swansea

EPR/ZP3933NJ Permit Variation Support Document

Reference – TTH/SSF/01-20/001

Issue No.	Issue Date	Description	Prepared by:	Checked by:	Approved by:
Original	January 2020	Original	Simon Farr	Phil Rees PLR Services	Neil McLeod
Revision 1	April 2020	Additional EWC's 16.03.03 & 10.03.20	Simon Farr	Phil Rees PLR Services	Neil McLeod
Revision 2	August 2020	Additional text in respect to Non-technical summary following review by Paul Williams (NRW 5th August 2020).	Simon Farr	Phil Rees PLR Services	Neil McLeod

The Hub

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1. Executive Summary:

This document provides the supporting evidence in reference to the submission of the required variation for the bespoke Environmental Permit EPR/ZP3933NJ.

Currently the Treatment Hub Ltd holds a bespoke permit (EPR/ZP3933NJ) at the former Alcoa Manufacturing (GB) Ltd existing site at Westfield Industrial Park, Waunarlwydd, Swansea, SA5 4SF. The Treatment Hub has operated under this permit since April 2014 acting as a regional specialist soils and waste management / treatment / recycling hub, primarily for the processing, treatment (if required) and re-use of contaminated soils.

The Treatment Hub proposes to vary to number of parameters of the existing Permit to reflect changes in operation since the Treatment Hub was formed in 2014.

In summary the main changes are follows:

- Variation of the Permitted volumes stored within the Treatment Hub at any one time
- Variation of waste handling procedures within the Treatment Hub to better reflect the types and subsequent processing of wastes,
- Variation of the actual soil management (processing) / treatment / recycling processes undertaken at the Treatment Hub

The current emphasis for the Treatment Hub is to provide a local facility for the processing and recycling of hazardous / non-hazardous soils and other waste streams and divert away from landfill (currently only available in England).

The original Permit Application (2013) was primarily for the treatment, processing and recycling of a limited number of individual waste streams across a restricted number of EWCs. The Permit application in respect to waste management was based on this premise. The permitted volume of 5,250 tonnes (Section 4.8.3 of the Sol Environmental document SOL0113ESP01 [Application Supporting Documentation – dated January 2013]) was based on 15% of the anticipated total annual throughput of Trostre Filter Cake. *This does not reflect current operational requirements or capabilities*. The permit variation proposes that the current Permitted Area allows for a capacity of up to **12,000 tonnes** for normal / existing operational requirements.

Following five years of operation, the original permit no longer meets the requirements of the current business model and market / customer requirements for the Treatment Hub. This document outlines the revised business model for ongoing / proposed activities at the Treatment Hub.

It was originally anticipated that the Treatment Hub would receive a limited number of waste batches per month. This has increased significantly over the previous 5-year operation period (as may be observed from the waste returns submitted on a quarterly basis over this period).

The majority of the received wastes are soils classified by the waste producer as hazardous (EWC 17-05-03) which like all soils, are heterogenous by nature. It is no longer necessary or practical to store and process / treat batches individually as most of the waste batches will undergo similar processing / treatment strategies (as required).

The Treatment Hub uses a range of processing / treatment strategies to recycle / return contaminated soils back to beneficial use for either restoration purposes or reuse at other construction sites. The Treatment Hub utilise experience gained through 5 years of onsite operation at the Treatment Hub and draw on experience gained through 20+ years of undertaking onsite remediation works through Envirotreat Technologies Ltd (who have carried out over 150 on-site remediation projects www.envirotreat.com.

Where treatment is required or considered beneficial, the facility utilises / proposes to utilise source reduction through natural biological attenuation / breakdown (over time) and / or leachate control, the latter being achieved through stabilisation techniques ranging from pH control though to E-Clay Stabilisation. Where possible we have identified / continue to identify several waste streams which compliment these processes or act as a full or partial replacement of raw materials used within these processes.

The objective will be to either process / treat (if required) the soils and materials for:

- reuse on construction sites requiring fill material (using the principles of the CL:AIRE Code of Practice – Definition of Waste)
- produce a material suitable for restoration purposes at sites with an appropriate exemption or restoration plan
- reuse as a raw material in product manufacture (in accordance with 'End-of-Waste' requirements)
- waste declassification to enable disposal at an inert/non-hazardous landfill (in accordance with landfill acceptance criteria). We have included this option for the provision of daily cover. Maintenance material which may be subject to Landfill Tax

The Treatment Hub, operating under permit EPR/ZP3933NJ, has demonstrated this model thereby diverting over 60,000 tonnes of contaminated materials away from landfill. This is fully accordance with the waste hierarchy principles and the zero waste objectives of the Welsh Government. The hub operation is designed to operate in accordance with waste hierarchy principles as far as practically possible.

The Treatment Hub operates under permit EPR/ZP3933NJ leasing Building 2 from the site owners Garrison Barclay Estates (previously Alcoa Manufacturing), with an approximate permitted area of 2,575 m^2.

The existing Treatment Hub Permit (EPR/ZP3933NJ) allows for use of the building for the operation of a proprietary hazardous and non-hazardous waste treatment (physical and chemical immobilisation) process incorporating the use of modified clays and other stabilisation / binder chemicals. The Treatment Hub currently operates as a regional specialist soils and materials treatment hub.

This is a clarification of the original document.

The treatment process will be permitted by Natural Resources Wales as a Waste Recovery Installation and be operated in accordance with the EPR 2016 Regulations. The proposed Installation meets the description of a Part A(1) process activity as defined by Section 5.4 '*Recovery of Waste',* Paragraph A(1)c(iii) namely:

‘Unless carried on as part of other Part A activity, recovering hazardous waste in a plant with a capacity of more than 10 tonnes per day by means of the following operation-

(iii) recycling / reclamation of inorganic materials other than metals and metal compounds (R5).

All activities associated with the proposed installation will be carried out within the main building. There will be no processing or treatment activities carried out in any external areas. It is proposed to process / treat approximately 50,000 tonnes per annum.

The installation boundary of the installation is provided in Figure 1 below.

Figure 1 – Permitted Area under EPR/ZP3933NJ

LEASEHOLD BOUNDARY SHOWN IN RED

SITE INSTALLATION BOUNDARY SHOWN IN GREEN

It is proposed that a portable welfare facility (toilet) will be used for onsite welfare requirements, in addition to adjoining office and kitchen / welfare area. In addition, the Treatment Hub will lease an office in the main office block onsite.

Non-Technical Summary:

The Applicant (The Treatment Hub Ltd) intends to vary the existing permit at the former Alcoa Manufacturing (GB) Ltd existing site at Westfield Industrial Park, Waunarlwydd, Swansea, SA5 4SF. The company wishes to expand its range of treatment activities and operational volume.

Proposed Permit Changes:

The following proposed changes to the original Permit are:

- To vary the volumes of material stored within the Treatment Hub at any one time. It is proposed to increase the volume of stored materials from 5,250 tonnes up to 12,000 tonnes
- To increase the number of waste materials accepted due to market / customer requirements and previous experience of waste management in line with waste hierarchy principles. The following EWCs were added to the original permitted list of EWCs for the reasons stated within the supporting documentation *(for the reasons described)*
    - 16.03.03 (& 04), wastes not otherwise specified in this list, off-specification batches and unused products, inorganic wastes containing hazardous substances (inorganic wastes other than those mentioned in 16 03 03)
    - 10.03.20, wastes from thermal processes, wastes from aluminium thermal metallurgy, flue-gas dust other than those mentioned in 10 03 19
- To vary waste handling / management procedures at the Treatment Hub to reflect the range of waste types accepted and processing / treatment activities - the Treatment Hub has shown it is capable of processing / treating and recycling a greater number of EWC types and this has been demonstrated by the wider range of wastes undergoing treatment in conjunction with the listed EP activities. These activities are detailed within the Environmental Management System (EMS).
- To vary the processes undertaken at the Treatment Hub as set out below:

  S5.3part A (1) a) iii Blending or mixing prior to submission to any other activities listed in this section.

  S5.4A(1)(b) ii Physico-chemical treatment

Summary:

The Treatment Hub seeks to nominally process approximately 50,000 tonnes per annum of materials sourced from (mainly) the local area for the production of materials for supply into the construction sector and other appropriate markets. The site will be designed to accept both hazardous and non-hazardous granular materials and soils in accordance with stringent site waste acceptance procedures.

The facility will process / recover / treat a number of hazardous waste streams as required (this will include hazardous soils and other waste streams) in order to facilitate beneficial re-use and recovery.

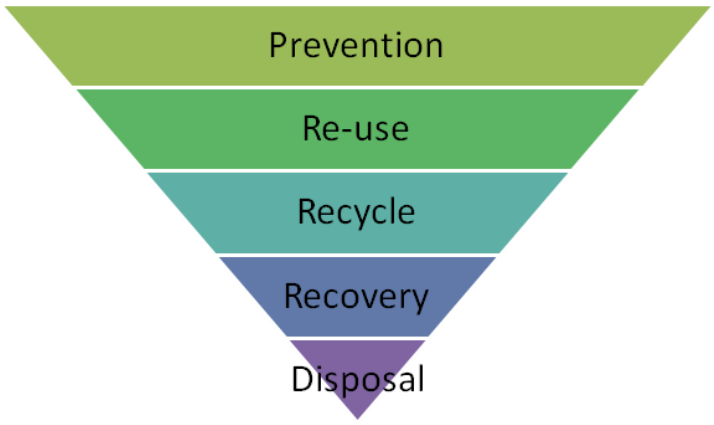
It is the applicant's intention to provide this service to the construction industry to process, treat (if required) and recycle contaminated wastes (soils and stones) arising from development sites and a number of local industrial businesses, predominantly within the steel, metals and general manufacturing sectors, waste materials that may be deemed to compliment the operation.

The processed / treated material produced by The Treatment Hub will *inter alia*:

- generate a product (as for treated soils / aggregates which will be assessed and deemed suitable for reuse under the CL:AIRE Definition of Waste Code of Practice, where the processed material to be 'fully recovered' and therefore 'ceasing to be waste')
- generate a waste under an EWC Chapter 19 for restoration purposes
- be utilised for full / partial raw material replacement (using an end of waste protocol)
- be reused for a designated purpose at the original site (under the CL:AIRE Definition of Waste Code of Practice)
- be disposed of at landfill at a lower disposal rate

The Treatment Hub will operate in accordance with the Waste Hierarchy as shown in Figure 2 below. This is also in accordance with the zero waste objectives of the Welsh Government.

Figure 2 – Waste Hierarchy



In relation to contaminated soils:

There is little scope for the Treatment Hub to **PREVENT** the waste as much of the throughput is a consequence of historical industrial activity / legacy.

Working with Envirotreat, the Treatment Hub can offer integrated remediation solutions for Brownfield redevelopment to **REUSE** contaminated soils onsite under the auspices of Envirotreat's Mobile Treatment Licence / Permit (MTL / MTP).

Utilising proprietary technologies developed by Envirotreat, the Treatment Hub can **RECYCLE** and **RECOVER** contaminated soils for beneficial reuse at other construction / development sites or reuse locally for restoration purposes.

DISPOSAL will be restricted to waste which cannot be successfully recycled / recovered and will represent a very small proposition of all material imported.

THE TREATMENT HUB INTENDS TO ONLY ACCEPT MATERIALS WHICH CAN BE RECYCLED AND BROUGHT BACK TO BENEFICIAL REUSE.

There are numerous examples where the Treatment Hub has rejected wastes at the pre-acceptance stage for *inter alia* the following reasons:

- Commercially non-viable to treat
- No viable reuse criteria
- Low confidence in achieving treatment aims
- Not permitted to accept particular waste code
- Waste stream offers no benefit to the treatment operation (non-soil wastes)

The Treatment Hub wishes to continue operating a waste recovery installation for the processing / treatment (if required) of hazardous and non-hazardous soils and wastes.

Material Processing / Treatment:

The proposed activities are summarised below - in summary a number of activities are proposed / currently undertaken.

The installation shall be located entirely within the Building Unit 2 and will generally comprise of the following:

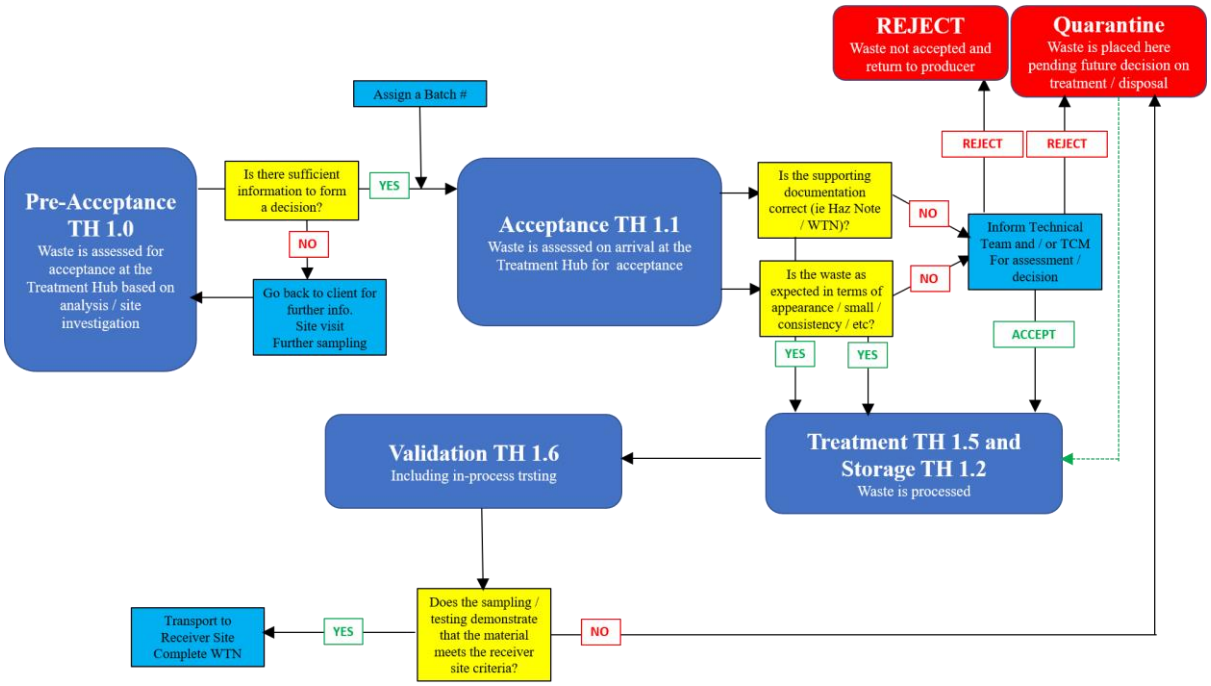
- Processing Area, comprising of:
    - Materials Delivery Area: Materials will be delivered by tippers, articulated lorries / skip lorries and stored pending processing / treatment
    - Materials Handling: Materials will be handled using excavator(s) and loading shovels, including temporary stockpiling pending further assessment
    - Material Processing / Treatment (which may consist of one or a combination of the following):
        - Stockpiling pending further assessment (analytical testing)
        - Processing of materials without treatment (following assessment)
        - Stockpiling pending natural biodegredation and ongoing assessment
        - Additional of agents to assist handling / further treatment
        - Addition of additives which will promote natural biodegradation processes
        - Addition of additives which will promote stabilisation (pH control, cementitious materials, modified clays [E-Clays])
        - Addition of additives which will promote breakdown of hydrocarbon contamination
        - Screening either to remove oversize or produce aggregates
        - Crushing oversize material to product aggregates

- Storage Area:
    - Materials pending assessment
    - Materials pending processing / treatment as required
    - Materials undergoing treatment
    - Processed materials awaiting validation testing
    - Treated materials awaiting validation testing
    - Validated materials awaiting collection off site
    - Quarantine

These areas will not remain static (due the constraints of the building design).

Where treatment is required or considered beneficial, the process flowchart is as shown in Figure 3 below.

Figure 3 – Process Flowchart (Treatment Requirement)



Validation:

All processed / treated stockpiles will be assessed prior to release for shipping. The frequency and suites of analysis required may be determined by the receiver site, typical minimum of one sample per 250 tonnes will be adopted based on total concentrations of likely hazardous components (metals and TPH).

2. Description of the Treatment Process:

The treatment / recovery process is a combination of natural biodegradation processes and physico-chemical operations designed to stabilise / treat any potential contamination issues associated with the hazardous and non-hazardous contaminated soils and other waste streams industrial filter cake and/or other selected wastes. *These processes will be used only where required or considered beneficial.*

The Treatment Hub wishes to carry out the following operations in accordance with the permit variation application form.

The Treatment Hub does not wish to expand its range of acceptable EWCs at this variation stage to simplify the process, other than the inclusion of 16.03.03 and 10.03.20.

The rationale for 16.03.03 will allow the Treatment Hub to accept and process waste cement from a local supplier. Currently this cement goes to landfill and although out of date still has significant benefit to the treatment operations at the Treatment hub and would wholly / partly negate the need to bring in virgin cement, the production of which has a significantly high carbon footprint. Accepting this material would satisfy the requirements of BAT 11, 22 and 23. This has become more critical with the closure of Western Bio Energy which currently supplies regular volumes of Bottom Ash and Fly Ash which served as a partial replacement for the use of cement and other cementitious materials.

The rationale for 10.03.20 will allow the Treatment Hub to accept and process waste non-hazardous flue dust from a local manufacturing facility. Currently this waste goes to landfill. At the Treatment Hub we have undertaken a number of trials which has demonstrated that the material is a highly effective drying agent, the material does not include any components (contaminants) which will impact any of the treatment strategies used. The material would be used to replace the Fly Ash previously taken from Western Bioenergy which has now ceased all operations on site. Accepting this material would satisfy the requirements of BAT 11, 22 and 23.

See Table 1 below for summary of existing EWCs.

Table 1 - Types of Waste that are Permitted/Accepted on the Site

10 **WASTES FROM THERMAL PROCESSES**
- 03 waste from thermal aluminium metallurgy
  - 03 inorganic wastes containing hazardous substances
  - 20 flue gas dust other than those mentioned in 10 03 19

11 **WASTES FROM CHEMICAL SURFACE TREATMENT AND COATING OF METALS AND OTHER MATERIALS; NON-FERROUS HYDRO-METALLURGY**
- *01 wastes from chemical surface treatment and coating of metals and other materials (for example galvanic processes, zinc coating processes, pickling processes, etching, phosphating, alkaline degreasing, anodising)*
  - 09 sludges and filter cakes containing dangerous substances
  - 10 sludges and filter cakes other than those mentioned in 11 01 09

16 **WASTES NOT OTHERWISE SPECIFIED IN THE LIST**
- 03 off-specification batches and unused products
  - 03 inorganic wastes containing hazardous substances
  - 04 inorganic wastes other than those mentioned in 16 03 03

17 **CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)**
- 05 *soil (including excavated soil from contaminated sites), stones and dredging spoil*
  - 03 soil and stones containing dangerous substances
  - 04 soil and stones other than those mentioned in 17 05 03

19 **WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE**
- 01 *wastes from incineration or pyrolysis of waste*
  - 05 filter cake from gas treatment
  - 11 bottom ash and slag containing dangerous substances
  - 12 bottom ash and slag other than those mentioned in 19 01 11
  - 13 fly ash containing dangerous substances
  - 14 fly ash other than those mentioned in 19 01 13

- 02 *wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)*
  - 05 sludges from physico/chemical treatment containing dangerous substances
  - 06 sludges from physico/chemical treatment other than those mentioned in 19 02 05

- 03 *stabilised/solidified wastes (4)*
  - 04 wastes marked as hazardous, partly (5) stabilised
  - 05 stabilised wastes other than those mentioned in 19 03 04
  - 06 wastes marked as hazardous, solidified
  - 07 solidified wastes other than those mentioned in 19 03 06

13 *wastes* from soil and groundwater remediation
- 01 solid wastes from soil remediation containing dangerous substances
- 02 solid wastes from soil remediation other than those mentioned in 19 13 01
- 03 sludges from soil remediation containing dangerous substances
- 04 sludges from soil remediation containing dangerous substances
- 05 sludges from groundwater remediation containing dangerous substances
- 06 sludges from groundwater remediation other than those mentioned in 19 13 05

Treatment Protocols:

Treatment can involve a combination of the techniques as summarised below. It is commonly the case, particularly for soils which are by definition heterogeneous, that NO treatment is required to achieve required outcomes.

The natural biodegradation process will involve the temporary stockpiling of contaminated soils for a period whereby the hydrocarbon contamination levels have decreased to an acceptable level.

The physico-chemical processes involves the treatment of contaminated soils and wastes by the addition of additives / wastes which enable treatment (remediation) of the contaminated soils and wastes to achieve the required outcomes to enable them to be fully recycled as products or restoration materials (as outlined above), through chemical immobilisation to treat potential pollutants of concern and to ensure that the treated product is non-polluting.

These processes include primarily, additives / wastes which reduce the mobility (leachability) of identified contaminants (metals, hydrocarbons, etc) and in addition, additives / wastes which promote a reduction in total contamination levels (i.e. reduction of hydrocarbon concentration through step reduction). This can include *inter alia*:

- simple pH control through the addition of additives / wastes (cement / Cendri / fly ash / bottom ash / high lime filter cake) to reduce to metal mobility
- Formation of low solubility salts through the addition of cementitious additives / wastes (cement / Cendri / fly ash / bottom ash)
- Advanced stabilisation using modified clays (E-Clays). The treatment process involves encapsulation in which there are no material changes to the individual components. The designated clay formulation will comprise modified pillared clays designed to absorb and chemically immobilise the identified contaminants of concern, further additives are used to compliment this treatment process. The use of modified clays provides additional safeguards in this respect as the contaminants of concern will be chemically immobilised within the clay matrix structure. This immobilisation process will also significantly reduce the risks associated with potentially leachability of the hydrocarbons / metal contaminants within the treated medium, thereby addressing the requirement for the treated material to be non-polluting. In addition, cementitious additives will provide the necessary physical properties to enable the treated material to be used as a product.

Crushing / screening processes involve the removal of oversize material from the waste stream. This can be done prior to further treatment or generally following treatment. The screening process which removes oversize materials produces a consistent product suitable for many applications, the size of the screen can be adjusted to suit the required application. The oversize material can, likewise, be suitable for a number of applications or can be further crushed (and screened) to meet bespoke client requirements.

The above is considered the Best Available Techniques that are currently available for the treatment of the waste streams accepted at the Treatment Hub. Many of the techniques employed have been successfully utilised in the remediation of over 150 Brownfield sites throughout the UK.

Akin to Envirotreat, the Treatment Hub is constantly reviewing alternative techniques to give better outcomes and commercial advantages. This has been undertaken and is ongoing, as means of an example, many waste soils arriving during inclement weather are very wet and not amenable to stockpiling, the moisture content can impede the determined treatment strategy and as simple as increasing the risk of carrying mud offsite.

Historically, at the Treatment Hub, cement or bentonite would have been used improve the consistency, both are which are considered as high energy products (in terms of carbon footprint) and commercially non-viable.

The main processes of the operations are summarised below:

Pre-Acceptance:

Waste enquiries are generally received by phone / email and directed to the Technical Department for assessment. This forms part of the Pre-Acceptance Procedure for waste management. Based on the information received a decision is taken on whether the Treatment Hub can accept the waste or not. The level information is waste specific, and the following is taken into consideration:

- Contamination profile of the waste, both the type of contamination and concentrations are considered in determining the suitability of the waste for recycling. Wastes will range in respect to the ease to treat and will be commercially valued accordingly or not accepted if deemed non-suitable
- Volume - small volumes (typically less than 100 tonnes) require basic characterisation for the soil / waste in determining the suitability of the waste for recycling. Larger deliveries require more comprehensive site investigation / site testing.
- Site history (more reflective of contaminated soils), a lower degree of confidence is placed in sites with intensive and varied industrial heritage which may result in complex contamination issues not fully defined in the site investigation. Often clarification is sought as to which soils require disposal at the Treatment Hub as this is not often clear. Equally important is how the groundworks contractor proposes managing the soils onsite to achieve the onsite remediation requirements
- Site visit / assessment, this generally follows on from the point above and can involve site attendance to:
    - Assess onsite contamination
    - Assist client with soil management
    - Commission Envirotreat to undertake the site remediation on behalf to the client to best manage onsite contamination through onsite treatment, soil management.
    - Client history - a lower degree of confidence is placed on some clients who have previously sent materials not as described at the waste pre-acceptance stage. On this basis further information sought and greater Waste Acceptance assessment on receipt required
    - Current capacity within the Treatment Hub to safely process / treat – this generally and restrict higher value wastes which require more lengthy / complex waste treatment.

- Treatability assessment – this is not generally required for contaminated soils (as a consequence of confidence and experience gained in over 20 years of carrying out onsite remediation and the treatment outcomes). Treatability is generally restricted to:
    - new waste streams to assess treatment outcomes (time / effort / resultant material) to determine commercial viability
    - where an identified waste stream is identified as a possible partial / total replacement for an existing additive in the treatment process

The process is as defined by EMS (TH-1.0 Waste Pre-Acceptance).

Batch Numbers:

Unique batch numbers are used the Treatment Hub as an easy means to identify individual wastes stream coming to the Treatment Hub. Often many soils come from similar sounding addresses, similar postcodes, from the same clients or from different parts of the same site. The unique Batch Number allows for clear identification of the waste and the compilation of all data relating to this waste in a single digital record. The Batch Number is also used from a commercial aspect to record acceptance rates, volumes received and invoicing details.

Generally, batch numbers are not assigned at this stage on the basis many **pre-acceptance** approvals are not actually received at the Treatment Hub, with the material going elsewhere, project not proceeding. Equally, many **pre-acceptance** assessments form part of a tendering process and are not realised for many months.

Batch numbers are assigned once the material is confirmed as coming in (this can be as short as a couple of days before). Generally, the numbers are taken / used consecutively, the format being two numbers (year) – two numbers (month) – three numbers (individual consecutive number). For example:

19-12-002, this relates to waste coming in December (12) of 2019 (19) and is individual number 002.

Due to the nature of the treatment operations it is not possible to practically treat individual batches. This is especially the case for small consignments (say less than 100 tonnes) where (following **acceptance**) they will be with other wastes undergoing a similar treatment strategy.

A batch number can cover a single or number of deliveries over a certain period of time:

- this could be a calendar month in respect to regular waste streams,
- over a number of days / weeks in respect to deliveries of contaminated soils from construction sites (and may span across more than one calendar month). In the event that deliveries from a particular site cease for a period (quite normal), generally a ***new*** batch number may be assigned, and existing pre-assessment reused only in the waste producer confirms the material is as previously defined.

Acceptance:

Operator-owned vehicles or registered waste carriers will deliver permitted / acceptable waste to the site. All deliveries are pre-arranged and planned. This allows for advanced planning on receipt of the waste with the site operatives as to what will happen to the waste delivery on receipt. Key aspects of this will relate to:

- Volume of waste to be received and over what time period
- Contamination profile and respective EWC
- What wastes are already in the reception area
- Whether pre-acceptance determined further (onsite and / or analytical) testing prior being processed and the material therefore being placed in a quasi-quarantine until complete – this enables the processing (treatment) of the waste using the Best Available Techniques. Historically, a number of wastes have been accepted in compliance with the duty of care based on the information supplied and later found to be different than stated and therefore quarantined pending acceptance or rejection
- All duty of care paperwork (Hazardous Waste Consignment notes and Waste Transfer Notes, etc) are checked on receipt for correctness, completion and consistency with what waste is expected. Any inconsistencies are reported to the Technical Team and / or TCM prior to acceptance
- Equally, the waste itself is assessed against what is described on the paperwork and what is expected (based on previous data received / assessed). Should the waste be inconsistent with what is expected, advise is sought from the Technical Team and / or TCM prior to acceptance on appropriate action. Historically, wastes have been rejected at this stage and returned or quarantined. It is often the case that the discrepancy can be easily corrected, for example where the waste was much wetter than anticipated and agreement is reached to add a higher rate of drying agent to resolve. Other discrepancies are much harder to assess without further analytical testing / assessment. The Treatment Hub utilise VOC headspace analysis, albeit this has limited capability, we are currently reviewing the effectiveness of handheld XRF for the rapid assessment of metal contaminants, however in the interim, many wastes have to be accepted in compliance with the duty of care.

This process is as defined by EMS (Procedure TH-1.1 Waste Acceptance).

Processing / Treatment Operation:

Once wastes have completed the **acceptance** stage, they will be processed / treated / stockpiled according to the proposed treatment strategy depending on end use.

Hazardous waste soils will require a number of smaller batches being combined into larger stockpile for treatment, taking due account of compatibility.

Treatment can take a number of routes and is dependent on predominantly the contamination profile (type and concentration of contaminants). A number of generic treatment protocols have been drawn up which outline the treatment and includes methodology, environmental and Health & Safety considerations (see Figure 4 below).

Figures 5, 6 and 7 below show *some* of the possible routes for the processing for hazardous and non-hazardous soils.

The flow chart does not show at potential pre-treatment on receipt of the waste soils. The routes follow either a predominantly natural biological degradation process or a stabilisation process to reduce mobility of contaminants. Some waste soils may require a period of natural biological degradation followed by a stabilisation process. Some waste soils may require longer periods of natural biological degradation due to more elevated concentration of hydrocarbons and therefore may be treated separately to those requiring shorter periods of natural biological degradation due to lower levels of hydrocarbons.

Equally some waste soils may require more complex stabilisation to achieve required outcomes than other waste streams and may be treated separately accordingly. Some wastes of acceptance are found not to require processing / treatment and following a thorough assessment are shipped.

Figure 4 – Typical Treatment Protocol (Example)

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Waste Stream Technical Protocol

Reference	**TP – 4**
Description of waste	Bottom ash for incineration
EWC	19-01-11
Suppliers	**Western Bioenergy (via Egan Waste)**
Treatment Routes	**A. Material to be used as full / partial replacement for cement.**
	B. Material used for pH control of soils.
General Pre-Acceptance and Acceptance criteria	Inspect waste consignment note
	Check every load • Visually
	Spot / random samples and testing for metals and pH
Methodologies **A. Material to be used as full / partial replacement for cement.**	1. Bottom ash to be mixed with soil in either a skip of stockpile with (required quantity) of Bottom and mixed until homogenous / dry. 2. pH analysis of sample of mixed soils assessed post treatment and post 24 hour (1 part soil to 5 part water). pH to be less than 11.5 prior to leaving
Methodologies **B. Material to be used pH control.**	1. Bottom ash to be mixed with soil in either a skip of stockpile with (required quantity) of Bottom and mixed until homogenous. 2. pH analysis of sample of mixed soils assessed post treatment and post 24 hour (1 part soil to 5 part water). pH to be less than 11.5 prior to leaving.
Health and Safety considerations	Hazardous – heavy metals and elevated pH.
	Good housekeeping and good personal hygiene.
	Use dust suppression during delivery and moving material. Consider dust mask FFP3
Environmental Considerations	Material may become dusty using delivery / use. Use dust suppression during delivery and moving material. Consider dust mask FFP3
Validation	Following treatment resultant stockpile material to be assessed by chemical analysis to assess against restoration site requirements. Particular attention to metals and pH.
Prepared by	Simon Farr
Date prepared	06/01/20
Date updated / reviewed	N/A

Figure 5 – Waste Processing / Treatment / Recycling (Hazardous Soils)

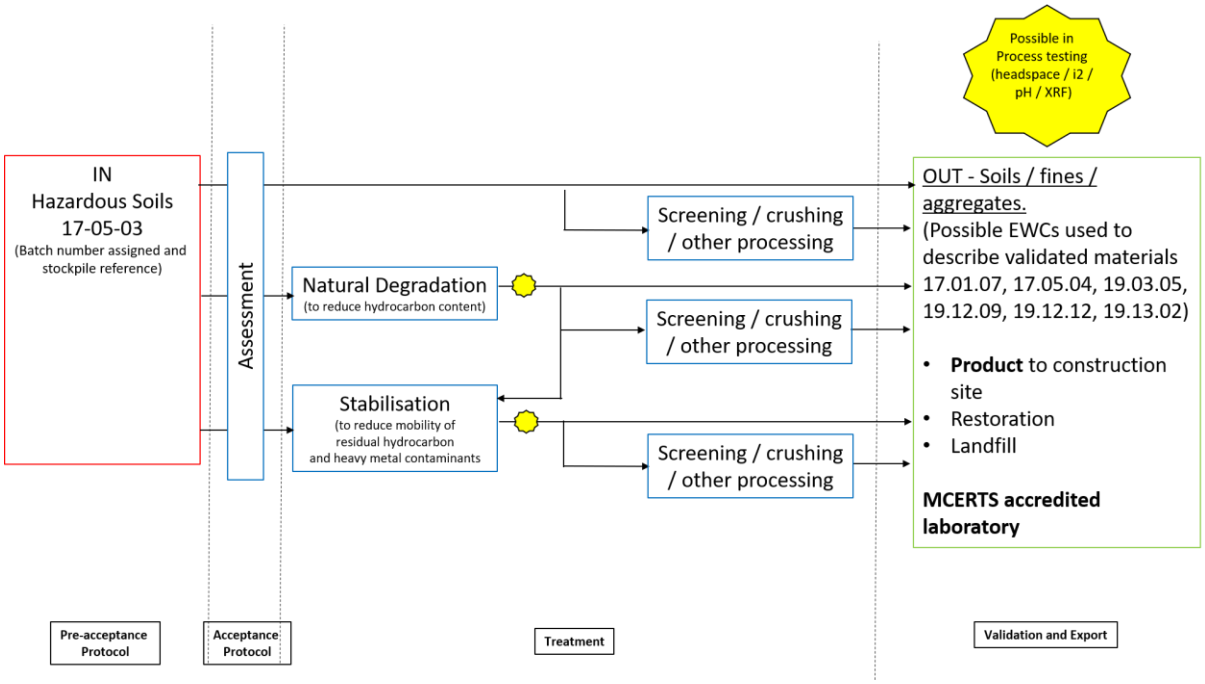


Figure 6 – Waste Processing / Treatment / Recycling (Non- Hazardous Soils)

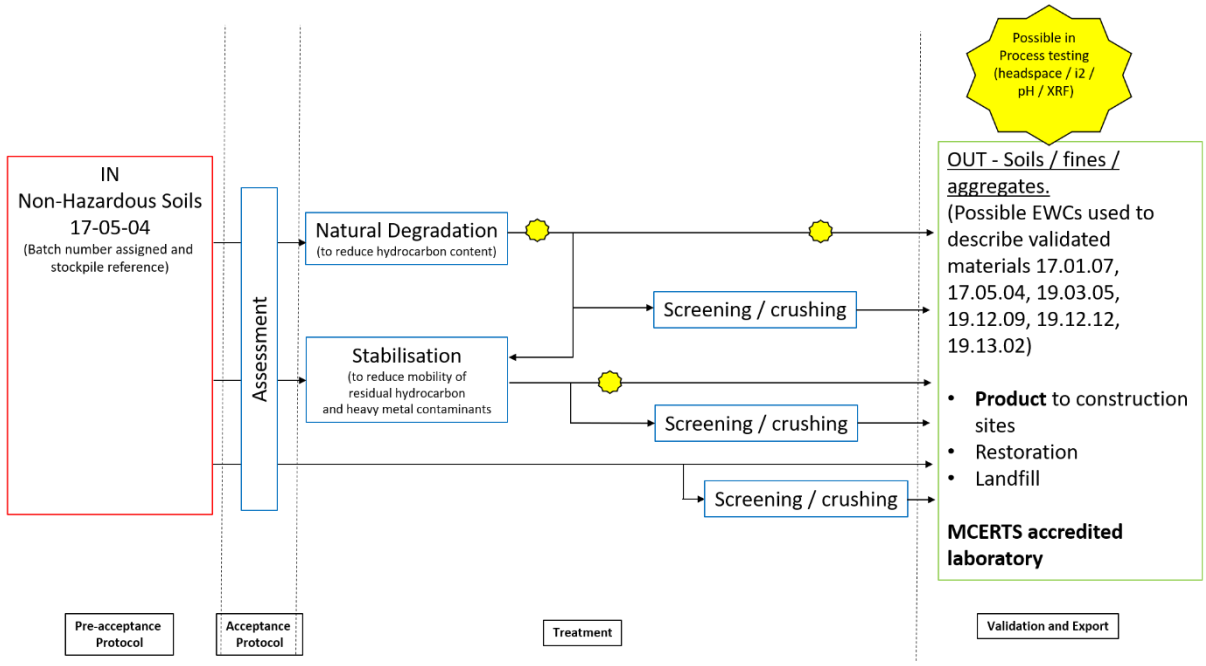
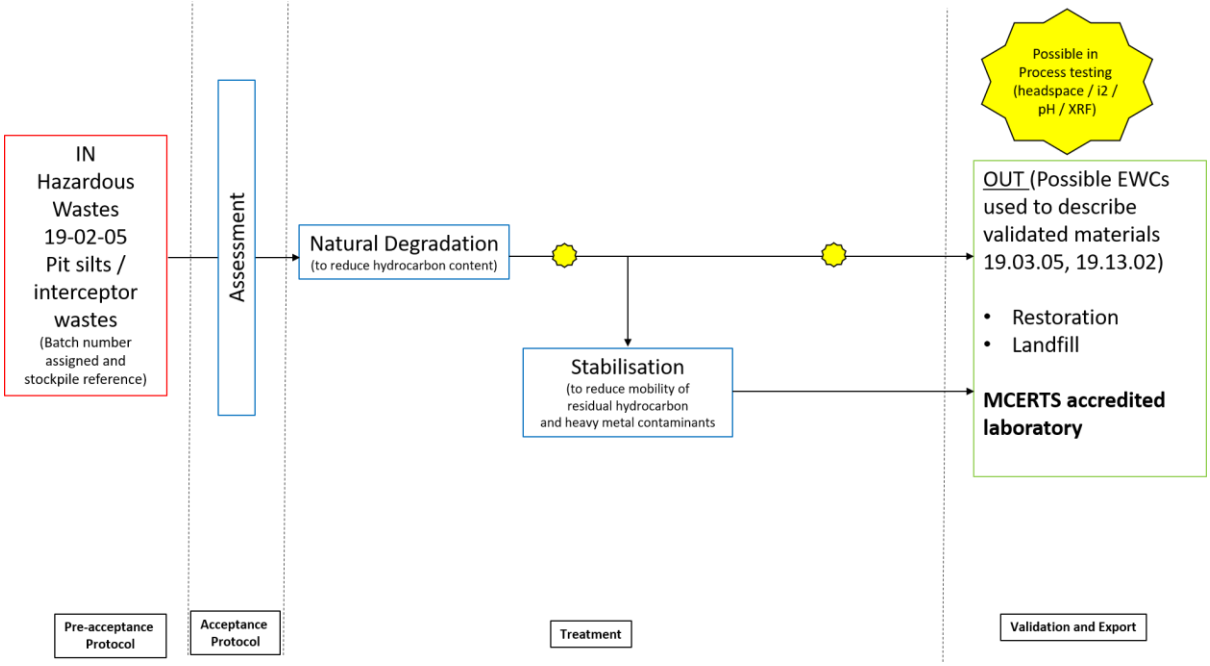


Figure 7 – Waste Processing / Treatment and Recycling (Hazardous Waste)



The flow charts do not show any potential pre-treatment on receipt of the waste soils (addition of drying aids, etc).

Any treatment required can take a number of routes and is dependent on [predominantly] the contamination profile (i.e. type and concentration of contaminants).

Some wastes may require longer periods of natural biological degradation due to more elevated concentration of hydrocarbons and therefore may be treated separately to those requiring shorter periods of natural biological degradation due to lower levels of hydrocarbons. Equally some wastes may require more complex stabilisation to achieve required outcomes than other waste streams and may be treated separately accordingly.

As indicated above we have been looking at a number of waste streams which we have identified as being beneficial to the overall treatment processes undertaken at the Treatment Hub. These relate to *inter alia*:

- where a particular waste stream is used as a raw material replacement i.e. where an identified waste has all or some of the properties of a key raw material utilised in the treatment of contaminated soils. These are used as part or total replacement of that raw material
- where a particular waste stream is used to complement the treatment process by impairing some of its natural properties to the treatment process, by example breaking up clayey soils, drying aids, etc.

Table 2 below outlines those currently utilised / being considered:

Table 2 – Summary of Historical / Current Waste Streams and Application / Beneficial Use

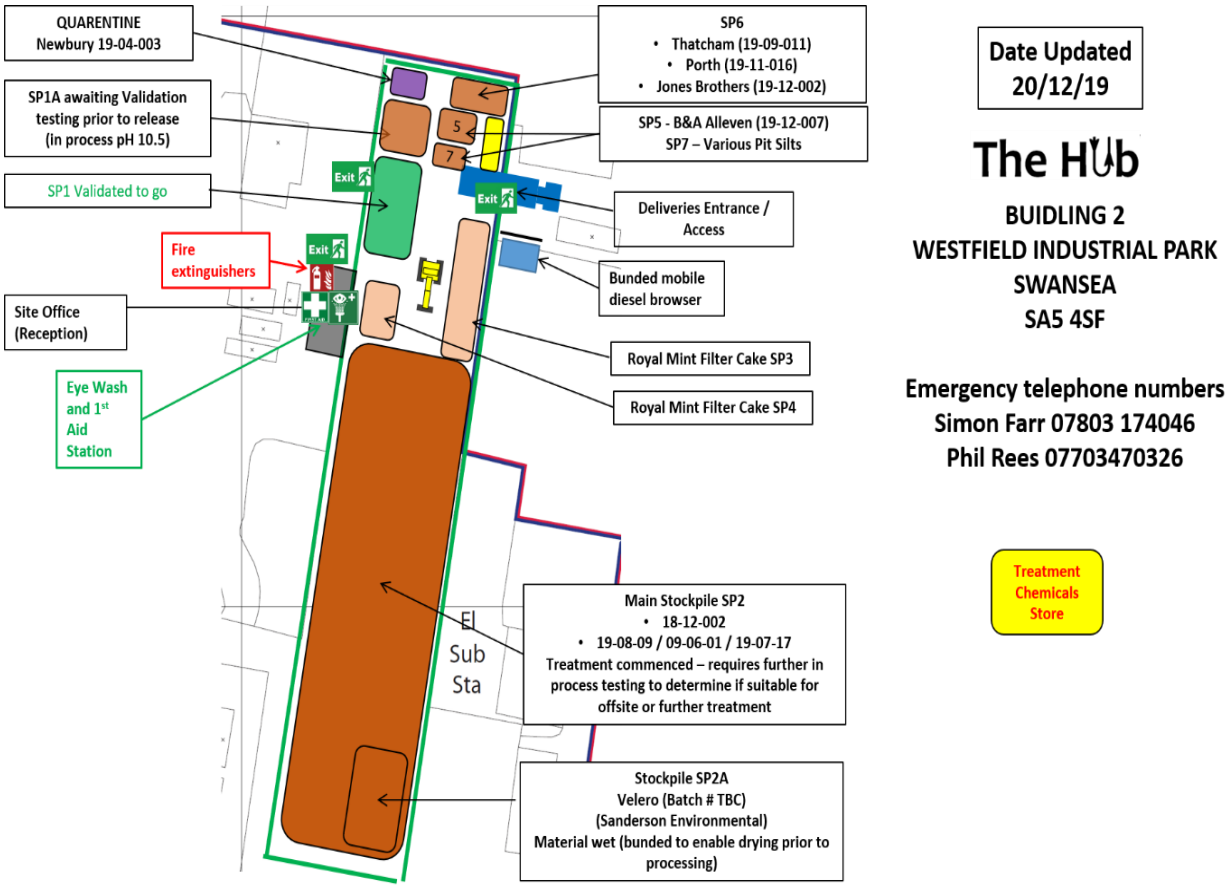
Waste Stream	EWC Code	Beneficial Properties	Application
Filter Cake	11.01.09	Presence of High Levels of Aluminium	Treatment of Soils - Provides effective substitute for aluminium additive in treatment materials (thereby saving on raw materials)
Filter Cake	19.02.06	Presence of High Levels of Aluminium	Treatment of Soils - Provides effective substitute for aluminium additive in treatment materials (thereby saving on raw materials)
Mine Water Sludge	19.02.06	Presence of High Levels of Iron (Ferric)	Treatment of PAH Contaminated Soils - Provides effective substitute for ferric additive in treatment materials (thereby saving on raw materials)
Wood Burner Waste - Bottom Ash	19.01.11	Pozzolanic Properties	Treatment of Soils - Provides effective substitute for cementitious materials (thereby saving on raw materials)
Wood Burner Waste - Fly Ash	19.01.11	Pozzolanic Properties	Treatment of Soils - Provides effective substitute for cementitious materials (thereby saving on raw materials)
High Lime Filter Cake	19.02.05	Alkaline - Controlled Addition	Treatment of Soils - Provides suitable alkalinity for the precipitation of heavy metal pollutants (thereby saving on raw materials)
Non-Hazardous Filter Cake	19.02.06	Alkaline - Controlled Addition	Treatment of Soils - Provides suitable alkalinity for the precipitation of heavy metal pollutants (thereby saving on raw materials)
Trommel Fines	17.05.04	Bioremediation Enhancement	Treatment of Soils - Provides a suitable additive for enhancement of bioremediation (analogous to the use of mushroom compost)
Cement	16.03.03	Pozzolanic Properties	Treatment of Soils - Provides effective substitute for cementitious materials (thereby saving on raw materials)

Waste Stream	EWC Code	Beneficial Properties	Application
Bag dust	10.03.20	Pozzolanic Properties	Treatment of Soils - Provides effective substitute for cementitious materials (thereby saving on raw materials)
Hazardous Soil	17.05.03	Suitable for local restoration purposes post treatment	Restoration
Non-Hazardous Soil	17.05.04	Suitable for local restoration purposes post assessment / treatment	Restoration
Hazardous treatment sludge	19.02.05	Suitable for local restoration purposes post treatment	Restoration

Stockpile Management:

Due to the nature of the treatment operations undertaken at the Treatment Hub, many (smaller) batches lose their identity and respective stockpiles assume generic names. To best manage this process a schematic outline of stockpiles within the Treatment Hub is produced. A printed copy of this plan is kept in the site cabin and can be updated manually, or a new digital plan produced (updated) to reflect the location and status of the various stockpiles, a typical example is shown in Figure 8 below.

Figure 8 – Schematic of Stockpile Location/ Status Within the Treatment Hub



These processes are as defined by EMS (Procedure TH-1.2 Waste and Materials Storage and TH-1.5 Process Control).

Validation Process:

All treated stockpiles are assessed prior to release. The frequency and suite of analysis required may be determined by the receiver site A typical minimum of one sample per 250 tonnes will be adopted based on total concentrations of likely hazardous components (metals and TPH).

Validation testing involving composite sampling of stockpiles from the surface and core to achieve the required sampling frequency. Samples are submitted to an MCERTS accredited laboratory for testing if accordance with the receiver sites requirements.

In the event that a stockpile is shown not to meet the receiver sites requirements then the stockpile is quarantined pending further testing / treatment.

In process testing of stockpiles is undertaken to assess the remediation process - this may consist of in-house testing (pH, headspace analysis, visual / olfactory) or samples submitted to an MCERTS Laboratory for testing.

If screening of the waste is undertaken prior to release, then the sampling / testing is always carried out on the material leaving the facility (i.e. sampled post screening).

Generally sampling / testing is undertaken directly prior to shipping to avoid possible / accidental cross contamination.

This process is as defined by EMS (Procedure TH-1.6 Validation Process).

3. Proposed Permit:

Type of Permit:

The Treatment Hub Ltd proposes to vary the existing Environmental Permit EPR/ZP3933NJ – the existing permit covers the installation of a Waste Recovery Process that uses predominantly physical and chemical immobilisation techniques.

The Treatment Hub seeks to process hazardous and non-hazardous materials (contaminated soils and other waste streams as detailed by the list of EWC proposed) sourced from the local area to fully recycle and a capacity of up to 12,000 tonnes of processed / unprocessed materials.

The site is designed to accept both hazardous and non-hazardous soils and materials in accordance with site waste acceptance procedures.

The anticipated throughput of the plant is not expected to exceed 50,000 tonnes per annum. The processes are all generally static, in-situ treatment that requires plant / machinery use on a daily basis.

All aspects of the activity will be carried out internally with no processing of wastes / soils will be carried out externally.

The technical guidance note used in the preparation of this application document is *'EPR5.06 - The storage and treatment of hazardous and non-hazardous wastes.'*

See Table 3 below for a summary.

Table 3 – Annex to Table 1a – Schedule 1 Listed Activities – Part C3 – Variation

Installation	Schedule ref.	Description of activity	Activity capacity (tonnes)	Installation Annex 1 & 2	Hazardous waste treatment capacity	Non-hazardous waste treatment capacity
Treatment Hub TTH/SSF/01-20/001	5.3 part A (1) a) ii	Physico-chemical treatment	Up to 200			
	5.3 part A (1) a) iii	Blending or mixing prior to submission to any other activities listed in this section	Up to 200			
	5.3 part A (1) a) vi	Recycling or reclamation of inorganic materials other than metals or metal compounds	Up to 200			
	5.4 part A (1) a) ii	Physico-chemical treatment	Up to 200			
	5.6 part A (1) a)	Temporary storage of hazardous waste	12000			
	R.05	The recovery of waste via physico-chemical treatment	Up to 200	R.05	100	100

Environmental Management System & Quality Plan:

The Treatment Hub has developed an Environmental and Quality Management System covering all operations within the Treatment Hub. This is regularly reviewed / audited by Senior Management and a Technically Competent Person

All aspects of the operation will be managed in accordance within the formal Environmental Management and Quality Plan. The plan defines all activities throughout the lifecycle of the treatment process (i.e. pre-acceptance, acceptance, treatment, validation and final off-site transfer).

The Environmental and Quality Management system is designed to meet the requirements of the Environmental Permitting Regulations and associated pollution prevention guidance.

The Environmental and Quality Management system is designed to ensure:

- The identification of all foreseeable environmental impacts and risks that The Treatment Hub activities pose to the environment
- Prevention or minimisation of any identified risks to a practical minimum
- Compliance assurance
- Activities at the site will be managed in accordance with the management system, which will be subject to continuous review, audit and improvement. Specific detailed management system reviews will take place if there is a significant change to the activities, following an accident or if a non-compliance is found
- Furthermore, the whole management system will be subject to annual external audit by competent third parties

The key aspects of the Environmental and Quality Management system for the site include:

- Preventative maintenance
- Operator requirements
- Training and competence
- Emergency response and incident management; and
- Monitoring, measurement and reporting

The environmental and quality management system and procedures are written to ensure that the environmental risks and impact of the normal running of the site activities are documented and minimised.

The system is fully developed, implemented and operational.

Table 4 shows the structure of the proposed Environmental Management Plan.

Table 4 – Structure of Proposed Environmental and Quality Management System

Reference No.	Title	Purpose
TH 1.0	Waste Pre-Acceptance	This procedure defines the screening, checking and pre-acceptance of all incoming waste prior to its arrival onsite.
TH 1.1	Waste Acceptance	This procedure outlines the onsite controls and considerations that need to be applied when waste material arrives onsite for processing. Acceptance of non-conforming wastes will be a direct breach of the permitted conditions of the sites Environmental Permit.
TH 1.2	Waste and Material Storage	This procedure outlines the waste storage requirements for all wastes that are processed onsite.
TH 1.3	Document and Data Control	This procedure defines the necessary documentation such as the Batch Reference Note that is required to ensure compliance.
TH 1.4	Purchasing	Purchasing controls are designed to ensure that all material processed on site is within defined parameters so as to ensure that the products and services provided aby the company conform to customer requirements.
TH 1.5	Process Control	To outline the control activities for the safe and managed treatment of wastes/ soils.
TH 1.6	Validation Process	This procedure is to ensure that the product is validated for compliance with product and environmental criteria
TH 1.7	Control of Records	This procedure describes the way in which the company maintains records in a manner that prevents loss or damage. Records retained to provides objective evidence that the Documented Management System is being operated within the company and that customer and permit requirements are being complied with. The system used to retain records will ensure that all traceability requirements are met.
TH 1.8	Training	To ensure that all training needs are identified for all relevant personnel. In addition, educational and training qualifications and records are maintained.
TH 1.9	Security	To ensure that all site and driver security controls are implemented and maintained to minimise security risks at The Treatment Hub.
TH 1.10	Emergency Procedures	To ensure the safe evacuation of the site and protection of the environment in the event of a site emergency.

Site Maintenance:

All maintenance activities on site will be carried out in accordance to the manufacturers' recommendations and will be integrated within the company's Environmental Management System.

The key aspects of the maintenance management programme will include:

- Infrastructure inspection: A programme of inspection of all bunded areas and concrete storage pads
- A programme of Planned Preventative Maintenance (PPM) on key plant and this programme also will ensure critical components of plant such as belts and motors are replaced early rather than waiting for equipment to fail
- The inspection and maintenance schedules that the manufacturer recommends are adhered to, including any period of recommended shut-down
- Maintenance and calibration of all company laboratory and testing equipment to ensure compliance with Quality Control/UKAS requirements

The sites maintenance programme will ensure that all equipment or infrastructure that is deemed essential in the prevention of pollution to the environment (e.g. hard-standing, bunds etc.) or the prevention of local nuisance impacts is maintained and kept in good operating condition.

It is proposed that all maintenance activities will be carried out under contract by a suitably qualified and competent third-party organisation.

A third-party road sweep is employed once a week (more depending on site activity) to clean up external areas associated with lorries arriving and leaving the unit. This will be continued.

Operator Competence:

There will be up to 3 operatives required to operate the facility. These operatives will work on a dayshift basis. All site operatives will be assessed as competent and appropriately trained in accordance with the site Environmental Permit.

The Treatment Hub will operate the site using qualified and competent personnel. The company has a WAMITAB qualified personnel under contract who will be available as required in possession of the qualifications considered suitable for Ex-Situ treatment of contaminated land and materials.

All staff working for and on the behalf of the site will be suitably trained and competent. (e.g. professional maintenance engineers, electricians, equipment operators etc).

Operation:

The site will be operated with deliveries, loading and unloading, treatment, etc. being carried out in accordance with the schedule below:

- Monday - Friday 7.00 - 18.00
- Saturday 7.00 - 18.00
- Sunday No deliveries or collections (except under specific circumstances);
- Bank Holidays No deliveries or collections (except under specific circumstances).

Additional activities will include general site housekeeping and administration activities. The site will maintain written operation instructions all for the plant and monitoring equipment present onsite.

All personnel working at the facility will be trained in the necessary sections of the Environmental Management Plan and associated Procedures.

Site Security:

The Westfield Industrial Site is a secure site and is provided with 24-hour security personnel who man the main gatehouse on a 24/7 basis.

As such, all personnel and vehicles entering the site are strictly controlled and managed; no vehicles or personnel will be allowed access to the facility without prior authorisation.

The Treatment Hub facility will be manned on a daytime only basis. At all times when the facility is not manned or occupied, it will be securely locked and protected.

The entire Westfield Industrial Estate is equipped with CCTV monitoring of all external areas.

Accidents and Emergencies:

The site has developed an Accident Management Plan based around the specific risks associated with the site operations.

The key aspects of the Site Accident Management Plan are:

- Reviewed by Site Management annually and as soon as practicable after an accident
- Considers hazards presented by emergency shut-down procedures
    - actions in case of fire/explosion
    - contaminated firewater
    - failure of any equipment
    - spillages and uncontrolled releases
    - plant or equipment failure
    - vandalism
    - flooding
- Identify events or failures that could damage the environment
- Assesses the likelihood and the potential environmental consequences from accidents at the site
- Proposes action to minimise the potential causes and consequences of accidents

The Accident Management Plan has been appended and specific emergency response procedures will be developed.

These procedures are complete and fully developed and implemented.

Incident Reporting:

The reporting of Incidents and non-conformities will form a key component of the company's Management System. Identified non-conformities under the system include, but are not limited to the following:

- Uncontrolled leaks and spillages of any materials with the potential to cause pollution to the environment (chemicals, hydraulic fluid, oils)

- Non-compliance to any permitted condition or consent limit (missing of reporting deadlines, breach of any permitted consent limits
- Internal Audit findings (legal non compliances, EMS procedural breaches, system non-compliances)
- External and Internal Complaints; and
- Whenever a plant malfunction, breakdown or failure, or any near miss occurs

The company's EMS will undergo periodic external audit and review to ensure that both compliance and continuous improvement is achieved. The EMS requires that all identified incidents and non-conformities will be investigated and closed out.

Furthermore, the site management system will have documented procedures and registers to:

- ensure that any members of the public / residents are alerted and informed if a significant plant issue arises (fire, explosion etc.)
- record, report and investigate any internal or external complaints to ensure that any necessary measures are taken to prevent, or where that is not possible to minimise, the causes; and
- inform any members of the public about the nature of the site, key contacts and sources of further information.

4. Emissions and Their Abatement:

Emissions to Air:

The proposed installation will not have any emissions to air.

Emissions to Water:

The proposed Installation will not have any emissions or effluents that will be discharged to controlled waters.

Emissions to Sewer:

The proposed Installation will not have any emissions or effluents that will be discharged to sewer.

Emissions to Land:

There will be no direct emissions to land arising from the installation.

Odour:

The nature of the materials processed at the site will not be malodourous or likely to have the potential for offsite odour impact. The proposed operation is not considered to have a potential for offsite odour impact

Noise Impacts:

The proposed Installation will not give rise to any adverse noise impacts.

With the exception of the fixed and mobile plant the process is largely static and unable to give rise to noise impacts.

All fixed and mobile plant will be operated internally and restricted to permitted use only.

The site does not have any external discharge points or external roof mounted plant and equipment that has the potential to give rise to offsite noise impacts.

The physical plant mixing and processing will be undertaken in campaigns.

Furthermore, the location of the plant in the approximate centre of the site ensures that any noise created by the 'delivery and collections will be fully screened by the buildings fabric.

Fugitive Emissions:

There are no new fugitive emissions arising from the proposed new plant. The site has strict acceptance criteria that prohibit materials with concentrations of VOC (Benzene) greater than 1ppm. All materials transported to site will have previously been tested and certified to meet Facility Acceptance Specification prior to delivery.

No malodorous materials will be accepted onto site.

Waste Generation and Management:

Types and Amounts of Waste:

The sole purpose of the facility is to act as a regional specialist soils and materials treatment hub. The process will therefore receive waste materials that would otherwise be destined for disposal but can otherwise be treated and re-used (following the Waste Hierarchy).

The very nature of the site means that most materials received will be imported as wastes, which will be subsequently processed as outlined above and brought back into beneficial use.

All materials treated by the site will be suitable for:

- reuse on construction sites requiring fill material (using the principles of the CL:AIRE Code of Practice – Definition of Waste)
- produce a material suitable for restoration purposes at sites with an appropriate exemption or restoration plan
- reuse as a raw material in product manufacture (in accordance with 'End-of-Waste' requirements)
- waste declassification to enable disposal at an inert / non-hazardous landfill (in accordance with landfill acceptance criteria). We have included this option for the provision of daily cover. Maintenance material which may be subject to Landfill Tax

The operation will be designed to operate in accordance with Waste Hierarchy principles as far as practically possible.

Table 5 below shows a tabular summary of typical site wastes and as per the Variation application forms.

Table 5 – Summary of Site Wastes

Waste	EWC	Approx. Quantities	Source	R/D Code	Fate
Imported wastes / contaminated land	As per Table 1	50,000 tonne per annum	Contaminated land, industrial wastes or similar wastes	R05	Treatment
Exported treated material	Product or 19.03.05 Or 19.13.01	50,000 tonne per annum	Treated contaminated land, industrial wastes or similar wastes	R05	Construction fill / Landscaping / Restoration / Raw materials

Throughput of Waste:

The facility principally produces a product or restoration material which can then be reused. The facility can typically process approximately up to 1,000 tonnes per week of hazardous and non-hazardous waste.

Typically, the treatment process will decrease the volume due to the loss of moisture from the waste during storage / processing.

Waste Storage:

All waste materials are stored internally in stockpiles in accordance with best practice as determined by the Technical Team to achieve the remediation requirements. A plan showing the location of each stockpile will be available onsite at all times. This will be updated to reflect changes within the facility.

The materials are all located on dedicated concrete pads.

No more than 12,000 tonnes of material will be stored at any time.

Resource Efficacy and Climate Change:

The energy use of the proposed operation is very low so there is no need for improvements involving energy efficiency (also see Section 6 below).

5. Environmental Monitoring:

Emissions to Air:

There are no point source emissions to air. Therefore, no monitoring is required.

Emissions to Water:

There are no point source emissions to water from within the process. Therefore, no monitoring is required.

Emissions to Sewer:

There are no point source emissions to sewer arising from the process. Therefore, no monitoring is required.

Emission to Land:

There are no point source emissions to land arising from the process. Therefore, no monitoring is required

Incoming Waste Monitoring:

All waste materials accepted onto site will be monitored for the following:

- Origin
- Weight
- Visual Inspection
- Physical Properties
- Chemical Properties

Monitoring Frequency:

Due to the nature of the process no formal environmental monitoring is proposed.

6. Resource Efficiency and Climate Change:

The Treatment Hub takes measures to reduce the impact on the environment from activities undertaken.

These measures have included *inter alia*:

- Use of modern / efficient plant
- Switching lighting to low energy LED up on replacement
- Reduced water consumption, through rationing of treatment activities and utilisation of moisture within filter cakes and other waste streams
- Reduction in use of high CO_2 raw materials, such as Bentonite and Cement – both which have a high CO_2 footprint associated with their production. Cement is responsible for 8% of all man-made CO_2 production
- Use of local wastes to replace certain key raw materials
- Diverting soils / waste away from landfill through recycling