Lincoln Recycling Facility Environmental Permit Application

BAT & Operating Techniques

GBCTR Limited

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Basis of Report

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Table of Contents

Basis of Report i
1.0 Introduction 1
1.1 Report Context 1
1.2 Site Setting 1
1.3 Summary of Site Operations 1
1.3.1 Treatment of waste solar panels 2
1.3.2 Treatment of waste batteries 3
1.3.3 Waste Storage 3
1.4 Regulated Activities 3
1.4.1 Installation activities 4
1.4.2 Directly Associated Activities to the Installation 4
1.5 Key Technical Standards 4
2.0 Management of the Activities 4
2.1 Management Systems 4
2.1.1 Staffing, Competence and Training 5
2.1.2 Communication and reporting of actual or potential non-compliances and complaints 5
2.1.3 Auditing 6
2.1.4 Reporting Non-Compliance and Taking Corrective Action 6
2.1.5 Reviewing and Reporting Environmental Performance 6
2.1.6 Managing Documentation and Records 6
2.2 Staff Competence 6
2.3 Accident Management Plan 7
2.4 Action Prevention & Management 7
2.4.1 Hazard Identification 8
2.4.2 Unauthorised waste receipt and processing 8
2.4.3 Vehicle Collision 8
2.4.4 Failure of Site Surfacing 9
2.4.5 Spillage of solid and liquid materials 9
2.4.6 Fire 9
2.4.7 Security and vandalism 10
2.4.8 Failure to contain firewater 10
2.4.9 Explosion 10
2.4.10 Flooding 10
2.4.11 Failure of Equipment 11
2.5 Contingency Plan & Procedures 11

2.6 Plant Decommissioning 12
3.0 Waste Inputs 12
3.1 Waste Types to be Accepted for Treatment 12
3.2 Waste Pre-acceptance 13
3.3 Waste Acceptance 13
3.4 Quarantine and Rejection Procedures 15
3.4.1 Rejection at the Weighbridge 15
3.4.2 Rejection at the Operational Area 15
3.4.3 Removal of non-conforming waste 15
3.5 Waste Tracking 15
4.0 Waste Storage, segregation and handling 16
4.1 General Waste storage 16
4.2 Combustible Wastes 19
4.3 Batteries 19
4.4 Liquid Waste 19
4.5 Solar Panels 19
4.6 Waste Outputs 20
5.0 Waste Treatment 20
5.1 General Waste Treatment 20
5.1.1 Waste Inputs & Capacity 20
5.1.2 Monitoring 20
5.2 Treatment of Photovoltaic Panels 21
5.2.1 Delivery & Inspection 21
5.2.2 Sorting & Segregation 21
5.2.3 Pre-Cleaning 21
5.2.4 Panel Recycling Line 22
5.2.5 Aluminium Frame Shredder 23
5.3 Treatment of Batteries 24
5.3.1 Delivery & Inspection 24
5.3.2 Battery Discharging 24
5.3.3 Battery Shredder 25
5.4 Treatment of WEEE containing POPs 27
6.0 Emissions Control 27
6.1 Point source emissions to air 27
6.2 Fugitive emissions to air (including odour, dust, pests, mud and litter) 28
6.2.1 Control of fugitive dust 28
6.2.2 Control of fugitive VOCs 29

6.2.3 Control of fugitive odour emissions 29
6.2.4 Control of Pests, Litter & Mud 30
6.3 Emissions of noise and vibration 31
6.4 Point source emissions to water and sewer 32
6.4.1 Process Effluent Characteristics 32
6.5 Fugitive emissions to land and water 33
7.0 Emission Limits & Monitoring 34
7.1 Point source emissions to air 34
7.1.1 Monitoring Schedule 34
7.1.2 Monitoring standards and techniques 35
7.1.3 Monitoring Action Plan 35
7.2 Point Source Emissions to Water or Sewer 36
7.2.1 Monitoring Schedule 36
8.0 Process Efficiency 36
8.1 Energy Efficiency 36
8.1.1 Energy Consumption 36
8.1.2 Energy Management Measures 36
8.2 Raw Materials 37
8.3 Water Use 37
8.4 Waste Minimisation, recovery and disposal 38
9.0 Best Available Techniques & Appropriate Measures 38
9.1 Waste Treatment Bref 38
9.2 Waste electrical and electronic equipment (WEEE) 39
9.3 Non-Hazardous Waste Treatment 39
9.4 Chemical Waste 39

Appendices

Appendix A Best Available Techniques: Waste Treatment Bref
Appendix B Waste Electrical and Electronic Equipment: appropriate measures
Appendix C Non-hazardous and Inert Waste: appropriate measures
Appendix D Chemical Waste: appropriate measures

1.0 Introduction

1.1 Report Context

A Great British Clean Tech Recycling Company Limited (GBCTR) has instructed SLR Consulting Limited (SLR) to prepare an application for an Environmental Permit for the proposed Lincoln Recycling Facility, located at Unit16, Electric Avenue, Witham St Hughs, Lincoln LN6 9BJ.

The proposed facility will be regulated as a multi-activity installation under the Environmental Permitting (England and Wales) Regulations 2016 (as amended) (EPR).

Activities defined as installations are required to conform to Best Available Techniques (BAT) requirements. The essence of BAT is that the selection of techniques to protect the environment should achieve an appropriate balance between the environmental benefits they bring, and the costs to implement them. In addition, it should be demonstrated that no significant pollution is caused by an assessment of the environmental impact of emissions from the activity as a whole.

This Best Available Techniques and Operating Techniques (BATOT) report is an integrated document which describes both the operating techniques that will be implemented at the facility to ensure compliance with the conditions of the EP and also demonstrates compliance with BAT and appropriate measures where applicable, including any emission standards which apply.

1.2 Site Setting

The site is centred on National Grid Reference (NGR) SK 8861 8294 within the Indurent Park Lincoln. The site location is illustrated on Drawing 001 Site Location Plan.

The Environmental Site Setting is illustrated on Drawing 003.

The site is located within a predominantly industrial area, with industrial facilities associated with Indurent Park Lincoln located to the north and west. Residential properties in Witham St Hughs are located to the east of the site.

The immediate land uses in the vicinity of the site are as follows:

Table 1-1 Immediate Land Uses Surrounding the Site

DIRECTION	LAND-USE
North	Industrial premises
East	Open land and residential properties
South	Open land and the CEMEX Swinderby Quarry
West	Industrial premises and former RAF Swinderby site

1.3 Summary of Site Operations

The proposed facility will carry out a number of waste recycling activities to treat the following waste streams:

- End-of-life solar panels; and

- End-of-life batteries from solar farms and electric vehicles.

Some pre-treatment activities will be carried out externally to the building, but all mechanical treatment will take place within a fully enclosed building. Emissions to air are abated using dust filters, wet scrubber and regenerative thermal oxidiser (RTO). Waste is stored externally and inside the building in containers or with weatherproof packaging. The site is a new-build and benefits from an impermeable surfacing and sealed drainage. Uncontaminated rainfall-derived surface water run-off will be discharged via an attenuation pond to the municipal sewer. Process effluent is collected and transferred off-site for treatment.

Phase 1 of the site operations will only carry out treatment of end of life solar panels and additional solar panel storage will be located within the building during this phase before the battery shredding system is installed. Phase 2 of the site operations will carry out treatment of batteries in addition to solar panels. Site layouts are shown in Drawing 002a for Phase 1 and Drawing 002b for Phase 2. This BATOT is based on the full operations that will take place as Phase 2.

1.3.1 Treatment of waste solar panels

Up to 40,000 tonnes per annum of end-of-life solar panels will be processed at the facility consisting of the following steps:

- Temporary storage of end-of-life panels pending treatment;
- Cleaning of solar panels to remove soil and any loose debris;
- Manual and mechanical dismantling of the aluminium metal frames from the panels;
- Shredding of the aluminium metal frames;
- Shredding of the panels;
- Separation of the panel shredding outputs into plastic and metal fractions; and
- Temporary storage of the outputs from both shredding activities pending transfer for recovery at an appropriately regulated facility.

Treatment of solar panels will be carried out using two lines with an approximate total capacity of 4.8 tonnes per hour. Figure 1-1 shows a schematic of the main steps carried out for the treatment of waste solar panels.

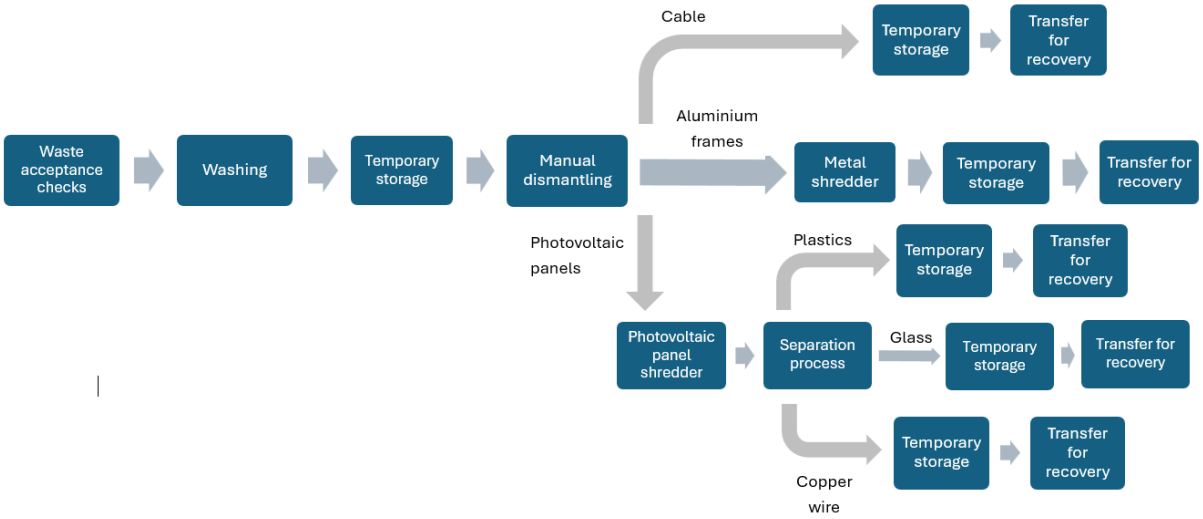


Figure 1-1 Schematic of Waste Solar Panel Treatment Steps

1.3.2 Treatment of waste batteries

Up to 17,000 tonnes of end-of-life batteries will be processed at the facility consisting of the following steps:

- Temporary storage of the end-of-life batteries pending treatment;
- Discharging of the end-of-life batteries;
- Shredding of the batteries;
- Collection of the liquid electrolyte fraction and temporary storage pending transfer off-site for recovery at an appropriately regulated facility;
- Separation of the solid battery shredding outputs into plastic, metal and 'black mass' fractions; and
- Temporary storage of the solid fractions pending transfer off-site for recovery at an appropriately regulated facility.

Treatment of batteries will be carried out in a single line of approximately 2 tonnes per hour. Figure 1-2 shows a schematic of the main steps carried out for the treatment of waste solar panels.

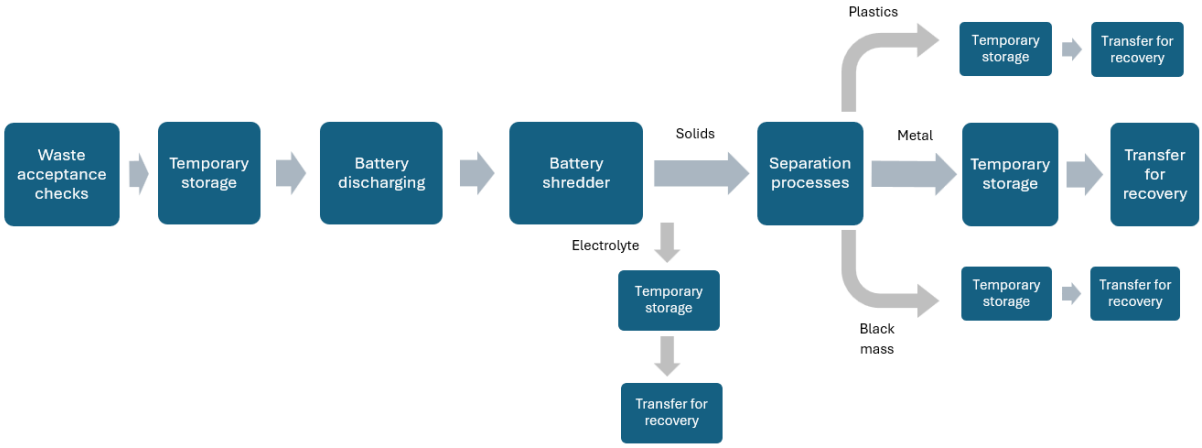


Figure 1-2 Schematic of Waste Battery Treatment Steps

1.3.3 Waste Storage

Waste will be stored externally to the building in designated areas as shown on Drawings 002a and 002b. Waste stored externally will be in fully enclosed containers or weatherproof packaging.

Waste stored inside the building will be in Flexible Intermediate Bulk Containers (FIBCs) on a racking system. During Phase 1, before the battery shredder is installed, the building will also include additional solar panel storage.

1.4 Regulated Activities

The proposed facility will undertake the following regulated activities:

1.4.1 Installation activities

- Treatment of lithium-ion batteries: *Section 5.3 Part A(1)(a)(ii): Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving physico-chemical treatment*;
- Treatment of solar panels: *Section 5.4 (b)(iv) – non-hazardous waste installation – treatment in shredders of metal waste, including WEEE and end of life vehicles and their components*;
- Treatment of metal frames: *Section 5.4 (b)(iv) – non-hazardous waste installation – treatment in shredders of metal waste, including WEEE and end of life vehicles and their components*; and
- Storage of hazardous waste (batteries) pending treatment: *Section 5.6 Part A(1) (a) Temporary storage of hazardous waste with a total capacity exceeding 50 tonnes pending any of the activities listed in Sections …5.3*.

1.4.2 Directly Associated Activities to the Installation

- Operation of the battery shredder regenerative thermal oxidiser;
- Storage of hazardous waste outputs prior to removal from site; and
- Raw material storage (e.g. Nitrogen, scrubber chemicals).

1.5 Key Technical Standards

The following technical standards apply to the proposed activities, as advised by the EA in its pre-application advice. An assessment of conformance with each set of standards is included in the Appendices of this BAT-OT document.

- Best Available Techniques Reference (Bref) Document for Waste Treatment, European IPPC Bureau JRC, published 2018;
- Waste electrical and electronic equipment (WEEE): appropriate measures for permitted facilities, gov.uk, 13 July 2022;
- Non-hazardous and Inert Waste: appropriate measures for permitted facilities, gov.uk, 01 August 2023; and
- Chemical waste: appropriate measures for permitted facilities, gov.uk, 18 November 2020.

2.0 Management of the Activities

2.1 Management Systems

The Site will be operated in accordance with an Environmental Management System (EMS) which includes a number of policies and procedures including Waste Acceptance Procedures (WAP) and an Emergency Action Plan (EAP). GBCTR intend to develop an EMS which is accredited to BS8555. The EMS will ensure that:

- The risks that the activities pose to the environment are identified;
- The measures that are required to minimise the risks are identified;
- Specific activities are managed in accordance with the working plan;
- Performance against the environment management system is audited at regular intervals; and

- The Environmental Permit is complied with.

The company's Environmental procedures will be documented, implemented, communicated and maintained, and include the monitoring of performance, applicable controls and conformity with its objectives and targets to monitor the effectiveness of the procedures within IMS on a regular basis.

2.1.1 Staffing, Competence and Training

The Site Manager will be responsible for day-to-day operations and compliance with the Environmental Permit, and to ensure the availability of resources required to establish, implement and maintain the competence management system. Roles, responsibilities, authorities and resources shall be defined, documented and communicated to ensure effective competence management.

Whenever the site is open to receive wastes, or will carry out any of the waste handling operations, it will be supervised by at least one member of staff who is suitably trained and fully conversant with the requirements of the permit regarding:

- Waste acceptance and control procedures;
- Operational controls;
- Maintenance;
- Record-keeping;
- Emergency action plans; and
- Notifications to the EA.

GBCTR shall ensure a systematic approach to identifying, demonstrating and maintaining competence that ensures compliance with requirements as detailed in the environmental permit and activities. Management shall communicate to all levels and functions of the organization the importance of the competence management system. A training matrix will be maintained within GBCTR's EMS including review of training requirements and training procedures.

2.1.2 Communication and reporting of actual or potential non-compliances and complaints

If actual or potential non-compliances occur on site, these will be recorded in the EHS (Environment, Health, and Safety) Management System Incident Record and communicated to the Site Manager. The Site Manager will investigate each event and identify a solution to remedy it and prevent it from reoccurring. If the non-compliance event is sustained, the operations may be stopped until a solution can be found, to minimise harm to the environment.

The remedial actions taken in response to the non-compliance may include:

- obtaining additional information on the nature and extent of the non-compliance;
- discussing and testing alternative solutions;
- modifying procedures and responsibilities;
- seeking approval for additional resources and training;
- contacting suppliers and contractors to seek alterations to the way they operate; and
- informing the Environment Agency (EA).

Members of the public can file complaints by contacting the Site. All complaints received by the Site Manager will be recorded in the EHS Management System Incident Record and

investigated promptly, with a follow up response communicated to the complainant within 10 working days.

2.1.3 Auditing

The Site will benefit from regular auditing to ensure that it is compliant with the conditions of its permit. The internal audit will be carried out by the Environment Manager in conjunction with the Site Manager (or assistant Site Manager), to ensure that all activities on site are in accordance with the conditions of the Environmental Permit. The outcome of the audit will be reviewed and tracked to identify any frequent non-compliances.

GBCTR will also benefit from regular external auditing as part of its intended ISO 14001:2015 accreditation.

2.1.4 Reporting Non-Compliance and Taking Corrective Action

The Site Manager will deal with all environmental complaints and other incidents of non-conformance. These include:

- System/plant failure discovered at internal audit;
- incidents, accidents, and emergencies; and
- any other site issues as raised by the EA or otherwise identified.

Environmental non-compliances, including remedial action taken and any changes to operation made to avoid re-occurrence will be recorded in the EHS Management System Incident Record. Complaints will be reported to and investigated by the Site Manager and remedial measures implemented as required. Changes to prevent future complaints will be proposed and implemented where appropriate. Written records of non-conformances, complaints and other incidents will be maintained in the EHS Management System Incident Record in which the date, time and nature of the event, together with the results of investigations and remedial action taken, will be recorded.

2.1.5 Reviewing and Reporting Environmental Performance

Senior management will review environmental performance annually and take actions to ensure that policy commitments are met and that policy remains relevant.

2.1.6 Managing Documentation and Records

Controls will be in place to ensure that all documents are issued, revised and maintained in a consistent fashion.

Records will be made and kept up to date on a daily basis to reflect all waste inputs and outputs, including waste residues and products. All records relating to waste acceptance will be recorded digitally and stored on GBCTR's electronic waste tracking system.

Waste transfer records will be kept for a minimum of 2 years after the waste has been removed off site for non-hazardous waste or a minimum of 3 years for hazardous waste.

2.2 Staff Competence

GBCTR will operate with a named Technically Competent Manager (TCM) on site with the appropriate qualification for the activities to be carried out.

GBCTR will ensure that the Site is managed by sufficient staff, competent to operate the site.

GBCTR will ensure that the person(s) performing tasks for it or on its behalf that can impact on the requirements of the environmental permit are competent with associated records retained.

An assessment of staff training needs will be carried out to identify the posts for which specific environmental awareness training is needed, and to determine the scope and level of such training. The assessment of training needs will be reviewed on a regular basis.

GBCTR will establish, document, implement and maintain a procedure to make persons working for it or on its behalf aware of:

- the importance of conformity with the technical competence policy and procedures and with the requirements of the competence management system;
- their roles and responsibilities in achieving conformity with the requirements of the competence management system; and
- the potential consequences of departure from specified procedures.

GBCTR will determine the actions required to achieve conformance with the requirements of this standard and compliance with the Environmental Permit.

A copy of the Environmental Permit will be kept available for reference by all staff and contractors whose work may have an impact on the environment.

2.3 Accident Management Plan

GBCTR recognises the importance of the prevention of accidents that may have environmental consequences and that it is crucial to limit those consequences.

GBCTR will maintain an Accident Management Plan (AMP) to ensure site staff are fully prepared for any incidents, including the prevention of accidents.

The AMP will adopt a risk assessment approach and outline its primary environmental risk management provisions to each potential hazard and residual environmental risk management provision to prevent and minimise pollution. The AMP will describe the techniques that will be implemented to minimise the risks posed to the environment from existing site activities.

The AMP will be reviewed at least every four years or as soon as practicable after an incident, with changes made accordingly to minimise the risk of occurrence.

2.4 Action Prevention & Management

Action will be taken at the Site to minimise the existing potential causes and consequences of accidents. Mitigation measures will be considered and included in the AMP for the activities proposed to minimise the potential causes and consequences of accidents.

Actions will include:

- maintaining a list of substances that would harm the environment if they were to escape;
- a spillage response procedure which will continue to be implemented when required;
- raw materials and waste will continue to be checked for compatibility with other substances with which they may come into contact;
- vehicles will follow designated routes;
- where appropriate, barriers will be constructed to prevent vehicles from damaging equipment;
- primary and secondary containment will continue to be provided to prevent the escape of potentially polluting materials;

- tanks for the containment of products will be fitted with level measurements to prevent overfilling;
- CCTV will continue to be utilized to minimise the risk of unauthorised access;
- the EHS Management System Incident Record will continue to be maintained of all incidents and near misses;
- appropriate equipment will continue to be maintained to limit the consequences of an accident; and
- there will be minimal handling of wastes where appropriate.

Activities affecting the health and safety (H&S) of operatives, contractors and visitors will be separately managed in compliance with H&S regulation and company H&S Policy

2.4.1 Hazard Identification

The following potential hazards in relation to the proposed on-site activities have been identified:

- unauthorised waste receipt and processing;
- vehicle collision;
- failure of site surfacing resulting in ground contamination;
- spillage of solid waste materials;
- spillage of liquid wastes or raw materials;
- fire;
- security and vandalism;
- failure to contain fire water;
- explosion;
- flooding; and
- failure of equipment / machinery including abatement of emissions.

The following measures will be implemented to minimise the potential causes and consequences of accidents from the treatment and storage activities.

2.4.2 Unauthorised waste receipt and processing

Robust pre-acceptance procedures will be in place to ensure only waste allowed by the permit is accepted at the facility.

Waste loads will be inspected visually as they arrive on site. On the discovery of any non-permitted wastes once unloaded, the load will be segregated and stored in an area designed for this purpose. The materials will be removed from site as waste under the appropriate designation. Any unauthorised hazardous material found during inspection will be quarantined into a holding area and lawfully removed from site.

2.4.3 Vehicle Collision

A Traffic Management Plan will be implemented on site to ensure appropriate segregation of pedestrians, mobile plant and other vehicles. Banksmen are used to control the flow of traffic in operational areas. Vulnerable areas are space protected with appropriate bollards or fencing. There is a speed limit of 5mph across the Site.

2.4.4 Failure of Site Surfacing

The integrity of the impermeable paving will be inspected regularly on a weekly basis. Areas prone to particularly heavy wear, for example entrances and exits, may be monitored more frequently. A record of infrastructure inspections and a log of any remedial actions taken will be made on the relevant EMS/QMS inspection form and entered onto the maintenance tracking system.

2.4.5 Spillage of solid and liquid materials

Minor or insignificant leaks or spills will be covered by routine site measures and general housekeeping. The procedures for dealing with more significant spillages are included in the AMP.

Significant spillages or leaks of liquids which may be miscible with water will be contained and controlled via the use of suitable absorbent materials kept in spill kits positioned at strategic locations around the site. Staff will be trained in the proper use of the spill kits.

Immiscible spillages (such as oils) on to the impermeable surface will be controlled and prevented from leaving the site by oil water interceptors installed in the site's drainage system. The outlet from the site drainage system is fitted with a Penstock valve which will be used in the event of a significant spillage to isolate the site from the public sewer. Contamination will be contained on side until it has been addressed and discharges to sewer pose no further risk.

2.4.6 Fire

The Site will operate under a Fire Prevention Plan (FPP). The FPP follows EA guidance[1] for FPPs and will consider the mitigation and management methods to prevent a fire of combustible materials stored on Site.

The information contained within the FPP aims to meet the 3 main objectives of the EA's FPP Guidance:

- Minimise the likelihood of a fire happening;
- Aim for a fire to be extinguished within 4 hours; and
- Minimise the spread of fire within the Site and to neighbouring sites.

The FPP has provisions in place to ensure processing plant is managed as in accordance with the appropriate procedures and considers plant maintenance, fire detection and suppression, water supply and the management of fire water.

Provisions are in place to ensure the storage of waste is managed in accordance with the appropriate procedures and considers the managing of waste piles, preventing fire spreading and quarantine measures.

A fire detection and suppression system will be installed which meets the requirements of the FPP requirements. Details will be provided within the FPP once the system has been procured.

The FPP includes details of the amount of waste stored on site at any one time with specified storage amounts and durations.

[1] https://www.gov.uk/government/publications/fire-prevention-plans-environmental-permits

2.4.7 Security and vandalism

Security measures will be in place at the Site to limit the likelihood of arson or vandalism. These include:

- Total enclosure with fencing;
- Single access lockable entrance gate locked out of hours;
- External K9 security firm that patrols the Site from 11pm - 5am;
- 24-hour surveillance CCTV coverage available for viewing in Site managers office and security office. Senior management also have 24-hr access to the cameras via a mobile phone app; and
- An alarm system.

Site boundary checks will be completed on a daily basis to identify any weaknesses or defects. Any defects identified will be repaired with a temporary solution within 24 hours and with a permanent fix implemented within 7 days unless a timescale is otherwise agreed with the EA.

All inspections and any defects, damage or repairs will be recorded on the EHS management system incident record.

2.4.8 Failure to contain firewater

The site benefits from impermeable paving and has a sealed drainage system with a penstock valve to prevent water from entering the sewer in the case of a fire event. The maximum amount of firewater that is anticipated to need capturing is 168m^3. This volume can be contained within the site drainage system and bunded area for testing prior to release to sewer or pumped into tankers to be taken off site for treatment.

2.4.9 Explosion

None of the wastes proposed to be treated carry a risk of explosion. Strict waste acceptance procedures will be in place to minimise the risk of unauthorised wastes being received at the site. If any are identified, they would be segregated from other wastes in a dedicated quarantine area pending transfer off site to an appropriately regulated treatment or disposal facility.

The end-of-life batteries include an electrolyte which has combustible properties. This is not separated before batteries are introduced to the shredding process. To minimise risk of combustion or deflagration of vaporised electrolyte, the battery shredder and associated hopper and conveying equipment will be fully enclosed and nitrogen blanketed. The shredder and discharge hopper will be further protected with oxygen monitoring and fire extinguishing systems.

The electrolyte will be removed from the shredder outputs by vaporisation and condensation, and the liquid will be collected in a receiving vessel. The electrolyte tank and associated ADR (‘‘*Accord Dangereux Routier*’ known as Dangerous Goods Regulations in the UK) transport loading facility will be designed to meet the requirements of HSG176 (the Storage of Flammable Liquids in Tanks) in terms of separation distances, bunding, etc. The electrolyte storage tank is nitrogen blanketed and will vent to the Gas Clean-up plant. The electrolyte is transferred to ADR Transport and transported off-site to an approved recovery or incineration process.

2.4.10 Flooding

The site lies within a Flood Zone 1, which is defined as an area with low probability of flooding. In the event that the site operations are impacted by pluvial flooding requiring temporary evacuation of the site, all equipment and processing would cease operation via

controlled shutdown. Before re-commencement of site operations, checks would be carried to ensure that equipment can start safely and to ensure that any residues / contamination was addressed.

GBCTR maintains a business continuity plan which provides contingency measures should the Lincoln facility be made non-operational. This involves diverting incoming waste to other locations and notifying suppliers that the site is closed.

2.4.11 Failure of Equipment

All equipment will be subject to pre-planned preventative maintenance checks and maintained to the manufacturer's recommendations. Equipment will be inspected daily in line with site operating procedures for plant and machinery.

GBCTR utilises a Computerised Maintenance Management System (CMMS) to log findings of maintenance inspections. It also includes a preventive and reactive maintenance programme. All equipment will be subject to application of the CMMS.

In the event that there is a failure of abatement equipment or other control measures such that a breach of the permit conditions occurs or could occur, the relevant equipment will be safely shut down and only recommence once the failure is rectified.

GBCTR has contingency measures as part a Business Continuity Plan in the unlikely event that of plant and equipment failure significantly affects site operations. The Business Continuity Plan will ensure that GBCTR will comply with permit conditions and operating procedures during maintenance or shutdown at the Site due to unforeseen circumstances.

In events of planned or unplanned shutdown where waste cannot be stored on Site, in the short term, measures are in place so that waste can be diverted back to its source. The Site Manager or acting person of authority would ensure that the Site is closed and communicate with the holder of the waste so it could be diverted back to its source or to a suitable authorised alternative facility.

If the Site cannot accept waste for more than a week, then the Site Manager would ensure suppliers are notified.

2.5 Contingency Plan & Procedures

GBCTR will have and implement a contingency plan and management procedures to make certain all permit conditions and operating procedures are complied with, including during maintenance or shutdown at the site.

The contingency plan will include provisions and procedures to ensure that the site:

- does not exceed storage limits in the permit and that appropriate measures for storing and handling waste continue to be applied;
- stops accepting waste if there is insufficient permitted storage capacity at the site;
- as far as possible, checks in advance about any planned shutdowns at waste management facilities waste is sent for treatment or recovery; and
- includes plans and procedures for circumstances when wastes cannot be sent to other sites due to their planned or unplanned shutdown.

The contingency plan will include procedures to:

- identify known or predictable malfunctions associated with plant and equipment and the procedures, spare parts, tools and expertise needed to deal with them;
- keep a record of spare parts held, where they are sourced and how long it would take to source them;

- identify, review and prioritise items of plant which need a preventative maintenance regime;
- identify all equipment or plant whose failure could directly or indirectly lead to an impact on the environment or human health;
- identify 'non-productive' or redundant items such as tanks, pipework, retaining walls, bunds, reusable waste containers (for example wheeled carts), ducts, filters and security systems; and
- ensure that spare parts, tools, and competent staff are in place before maintenance commences.

2.6 Plant Decommissioning

A plant decommissioning plan will be in place to ensure that:

- The plant will be decommissioned without causing pollution; and
- The site will be returned to a satisfactory condition.

The plan will include details on:

- Removal/flushing out of pipelines and vessels and emptying of any potentially harmful contents;
- Site plans showing the location of all underground pipes and vessels;
- the clearing of deposited residues, waste and any contamination resulting from the waste treatment activities; and
- The decontamination and removal of any equipment taken out of use during the operational life of the Site.

To assist in eventual Environmental Permit surrender when operations cease, records will be maintained to demonstrate how the land beneath the site has been protected at all times between the date of issue of the permit and the end of operations.

Records to be maintained include:

- Maintenance of impermeable surfacing;
- Maintenance of drains and sumps; and
- Actions taken to clean up incidents and spillages.

A Site Condition Report (SCR) has been submitted with the variation application and will be updated over the operational period of the site as appropriate.

3.0 Waste Inputs

3.1 Waste Types to be Accepted for Treatment

Table 3-2 lists the wastes that will be accepted for treatment at the site.

Table 3-2 Wastes Accepted at the Site for Treatment

EWC Code	Description
16	WASTES NOT OTHERWISE SPECIFIED IN THE LIST
16 02	wastes from electrical and electronic equipment

EWC Code	Description
16 02 14	discarded equipment other than those mentioned in 16 02 09 to 16 02 13
16 06	batteries and accumulators
16 06 05	Other batteries and accumulators

3.2 Waste Pre-acceptance

The site will be authorised to treat both non-hazardous and hazardous wastes[2].

End-of-life solar panels and batteries will be sourced from solar farms or as damaged panels/batteries from original equipment manufacturers. Non-silicon based panels will not be accepted for processing at the site.

Pre-acceptance procedures will ensure that the Site only receives waste batteries in appropriate containers or packages that are secure, prevent damage and leakage of materials (for example liquid battery electrolyte) and are resistant to any corrosive chemicals contained in them.

GBCTR will have waste pre-acceptance checks and feedstock specifications in place with suppliers to ensure that the waste has been characterised and classified appropriately before consignment to the site. These will be risk-based and in accordance with appropriate measures guidance for the activities to be operated at the facility. The pre-acceptance checks will ensure that:

- only wastes that are suitable for the site are accepted;
- there is enough storage and treatment capacity to accept the consignments at the site; and
- waste is not unnecessarily accumulated.

A waste tracking system will be employed by GBCTR to track waste intended for receipt at the site. This will be linked with tracking of capacity at the processing facility to ensure that over-accumulation of waste does not occur.

Arrangements on site will ensure that a ‘first in first out’ (FIFO) approach will be adopted so that the storage of waste does not exceed the prescribed duration. Each incoming pallet is labelled with a batch ID, arrival date/time and operator initials. Storage locations are assigned in sequence to ensure the oldest material is removed first. The inventory system enforces FIFO by:

- Blocking movement requests of newer batches until older batches in the same category/area have been released; and
- Generating daily “next to move” pick lists for yard staff.

The Site manager is responsible for stock rotation on site and ensures that waste with the earliest storage dates is processed first and removed from site first.

3.3 Waste Acceptance

Only those wastes listed in Table 3-2 will be accepted at the Site.

[2] At the time of applying, Li-ion batteries are considered to be non-hazardous. However, it is anticipated that this classification will be changing to hazardous.

Waste acceptance procedures will be carried out in accordance with the appropriate measures for the activities operated at the facility.

The Plant Manager will ensure that the following procedures are carried out as part of waste acceptance procedures:

- Waste carriers are selected and checks carried out that they have a valid carrier's licence;
- All deliveries to the site are pre-booked;
- Consignment notes are completed;
- Checks are carried out to ensure that capacity is available for storage at the facility;
- Loads are weighed; and
- Records are kept of loads accepted and of any rejected (ie non-conforming) loads.

End-of life solar panels and batteries will be secured on pallets and appropriately packaged according to transport requirements and appropriate measures guidance. Authorised vehicles delivering solar panels and battery waste to the site will be received at the gatehouse/weighbridge, where they will be required to provide waste transfer documentation for checking at the site office. Only vehicles that are accompanied by the correct documentation will be accepted onto site. The weight of all deliveries of waste will be checked and recorded on the Site tracking system.

From the gatehouse, vehicles will be directed to the appropriate unloading area or to designated parking area prior to off-loading at unloading area.

Designated personnel will be responsible for liaising with both the driver of the waste delivery vehicle and the plant operatives to ensure the waste is identified as hazardous or non-hazardous waste.

Each load of waste will be visually inspected by trained personnel before moving it to the designated storage location in accordance with its waste classification. If non-conforming waste is identified, it will be returned on the delivery vehicle.

A second inspection will take place as the wastes are taken from the storage locations to the treatment lines. If unsuitable material is identified at this point, the item will be placed in the waste quarantine area pending transfer to a suitable treatment or disposal facility. In addition, other items from the same origin will be thoroughly inspected and if necessary, the material rejected back to the supplier.

Operational Procedures will be in place to prevent risk of contamination between different types of waste and segregation of hazardous and non-hazardous materials. Waste will be segregated appropriately following acceptance on site and Fire Prevention Plan (FPP) measures will be followed. To prevent the risk of contamination between hazardous waste and non-hazardous waste:

- Hazardous material will be stored separately from non-hazardous material at all times; and
- Non-hazardous output fractions (for example metal) will be stored separately from hazardous fractions.

The locations of different types of waste are shown on Drawing 002a / 002b – Site Layout and Drawing 004 Fire Prevention Plan.

3.4 Quarantine and Rejection Procedures

Quarantine and rejection procedures will be in place to ensure that all non-conforming waste is removed from site and that the waste producer and carrier are informed so that appropriate action can be taken to prevent recurrence.

Non-conforming waste will be identified by either the Site Manager/Weighbridge operator at the Site Office, or by site operatives at the operational areas. Non-conforming waste will be identified by visual inspection or upon failure of verification of documentation.

3.4.1 Rejection at the Weighbridge

Waste will be rejected from site by the Site Manager/Weighbridge operator in the following circumstances:

- if the waste does not conform to the description on the accompanying paperwork, the waste transfer note or on the sites waste tracking system; or
- if the waste is delivered by an unauthorised carrier; or
- if the visual inspection reveals the presence of unauthorised waste.

In these circumstances the details of the rejected load will be recorded and added to the EHS Management System Incident Record. The Site Office will send an email to the consignor of the waste to inform them of the reason the load was rejected.

3.4.2 Rejection at the Operational Area

If unauthorised waste is observed by a Site Operative during transfer to storage or the operational area, it will be dealt with in the following manner:

- The rejected waste will be removed to the appropriate quarantine area pending transfer off site to an appropriately regulated facility;
- The Site Operative will update the EHS Management System Incident Record;
- The waste tracking system will be updated by the Site Operative with details including the type of nonconforming waste; and
- GBCTR will contact the supplier to advise them of the non-conformance and will arrange a Duty of Care Audit with the supplier of the waste if deemed appropriate.

3.4.3 Removal of non-conforming waste

Non-conforming waste will be stored temporarily in the quarantine area and will be removed within 14 days, unless agreed otherwise with the EA.

3.5 Waste Tracking

GBCTR will use a waste tracking system to store information on all waste received at the site and to maintain up to date information on the capacity of storage and quarantine areas, including wastes pre- and post-treatment. This will include information gained through characterisation and verification of wastes undertaken at the pre-acceptance and acceptance stages and includes:

- pre-acceptance;
- acceptance;
- non-conformance or rejection;
- storage;

- treatment; and
- removal off Site.

The tracking system will record:

- the date the waste arrived on site;
- the producer's details (or unique identifier);
- a unique reference number;
- waste pre-acceptance and acceptance information;
- the quantity delivered;
- the intended treatment route;
- accurate records of the nature and quantity of wastes held on site, including all hazards – and identifying the primary hazards and presence of any regulated chemicals such as POPs; and
- where the waste is physically located on site.

The tracking system will be capable of reporting:

- the total quantity of waste present on site at any one time;
- a breakdown by type of the waste quantities stored pending treatment or transfer;
- the quantity of waste on site compared with the limits authorised by the permit;
- the length of time the waste has been on site;
- the quantity of any end-of-waste product materials on site at any one time; and
- where applicable, details of any non-conformances and rejections of waste.

Back-up copies of electronic records are stored off site and the records will be readily accessible in an emergency.

GBCTR will retain pre-acceptance and acceptance records for a minimum of two years after waste is received or removed off Site. Some records are stored for longer if they are required for other purposes, for example, hazardous waste consignment notes.

4.0 Waste Storage, segregation and handling

4.1 General Waste storage

Waste accepted and treated at the site will be stored in a number of locations as shown in Drawing 002b – Site Layout. The storage arrangements, locations and quantities are summarised in Table 4-1. Waste stored in each location will be monitored on the Site's tracking system to ensure that safe volumes are not exceeded.

All wastes will be segregated into discrete storage areas as listed in Table 4-1 to minimise any contamination.

All wastes will be stored for no longer than 6 months.

The FPP submitted with this application includes further details on storage arrangements (including layouts and inventories for Phase 1 and Phase 2 operations).

Wastes stored outdoors will be enclosed within weatherproof packaging or containers. These will be located in areas of the site with impermeable surfacing and sealed drainage.

Table 4-1 Waste Storage Arrangements

Material	Location	How is it stored?	Length (m)	Width (m)	Height (m)	Volume (m^3)	Tonnage
Solar Panels	External Solar panel storage area	6 x blocks of 6 x 3 pallets stacked 2-high. Blocks are separated with 6m gaps Wrapped in Shrink Wrap (Polyethylene)	15	3	3	135	**129.6**
		3 x blocks of 5 x 3 pallets stacked 2-high. Blocks are separated with 6m gaps Wrapped in Shrink Wrap (Polyethylene)	12.5	3	3	112.5	**54**
Charged Batteries	External Battery Storage Area	In fire-resistant and weatherproof metal or plastic containers or steel containers containing non-conductive absorbent material. Containers are stored on pallets to facilitate access, maximum of 2 pallets in height. Each row of pallets separated by 0.5 – 1m to enable access for inspection and removal.	12.2	4.9	2.35	140.5	**170**
Discharged Batteries	External Battery Storage Area	Within two bunded shipping containers	12.2	4.9	2.35	140.5	**170**
Dismantled cable / junction boxes	Internal Racking	Within 1 ton bulk bags placed on pallets within racking bays	6.5	1	4	6.5	**5.4**
Shredded Frames	Internal Racking	Within 1 ton bulk bags placed on pallets within racking bays	36	1	4	36	**60.75**
Course Glass from shredded panels	Internal Racking	Within 1 ton bulk bags placed on pallets within racking bays	260	1	4	260	**371.25**
Fine Glass from shredded panels	Internal Racking	Within 1 ton bulk bags placed on pallets within racking bays	51	1	4	51	**101.25**
Copper from shredded panels	Internal Racking	Within 1 ton bulk bags placed on pallets within racking bays	1.69	1	4	1.69	**6.75**
Plastics from shredded panels	Internal Racking	Within 1 ton bulk bags placed on pallets within racking bays	5	1	4	20	**16**

Plastics from shredded batteries	Internal Racking	Within 1 ton bulk bags placed on pallets within racking bays	80	1	4	80	**47.25**
Steel from shredded batteries	Internal Racking	Within 1 ton bulk bags placed on pallets within racking bays	60	1	4	60	**67.5**
Alloy from shredded batteries	Internal Racking	Within 1 ton bulk bags placed on pallets within racking bays	121	1	4	121	**202.5**
Copper from shredded batteries	Internal Racking	Within 1 ton bulk bags placed on pallets within racking bays	17	1	4	17	**67.5**
Black Mass from shredded batteries	Internal Racking	Within 1 ton bulk bags placed on pallets within racking bays	168	1	4	168	**337.5**
Electrolyte from shredded batteries	Externally stored within bunded and vented storage container, contained within a fire wall protection	500-litre palletised N_2 blanketed IBC containers	1.2	1	0.75	0.9	**~ 1**
General Waste (plastic packaging and wood)	External waste storage area.	Large metal wheeled bins with lid	6.3	2.4	2.75	42	**variable**

4.2 Combustible Wastes

Combustible wastes will be stored in designated areas with a minimum of 6m separation between each area as well as the building walls. This will allow for easy and effective inspection and if required, effective fire management. Stockpiles of combustible wastes will be monitored throughout the day by staff who are trained and vigilant to look out for any early signs or detection of hot spots or emissions from material.

4.3 Batteries

Lithium batteries will be stored within a dedicated, enclosed, and fire-rated area of the site as shown in Drawing 002b. This storage zone is physically separated from other waste types and combustible materials.

Batteries will be placed in fire-resistant containers such as metal boxes, rigid plastic boxes, or steel containers containing non-conductive absorbent media (vermiculite or sand) to prevent short circuits and isolate heat. Each container and palletised load bears a durable label reading: *Waste Lithium Batteries – Handle with Care – UN 3480* in compliance with ADR ('*Accord Dangereux Routier*' known as Dangerous Goods Regulations in the UK) and the Classification and Labelling of Chemicals (CLP) marking requirements.

All terminals will be taped or capped to prevent contact.

Containers will be positioned on pallets to ensure airflow beneath and to facilitate safe forklift access.

A minimum one-metre clear space will be maintained between all storage rows and building walls to permit inspection and fire-fighting access.

Batteries will be inspected upon arrival at the site and are segregated according to the following:

- Intact batteries are grouped by type and stored in labelled, lidded containers;
- Damaged, defective, or recalled batteries are stored individually within sealed metal boxes filled with non-flammable absorbent material such as sand or vermiculite; and
- Mixed small batteries are consolidated into UN-approved plastic boxes with absorbent filler and covered terminals.

The storage area will be inspected daily for evidence of damage, overheating, or swelling. Any compromised batteries are immediately isolated in a separate containment box with inert filler material. Inspection results are logged and retained on site for audit.

4.4 Liquid Waste

Liquid waste electrolyte will be stored in a nitrogen blanketed 500-litre palletised IBCs stored within a secure, access-controlled zone away from any other combustible waste, as shown on drawing 002b. The electrolyte is transported off site to an approved recovery or incineration process. The storage tank and off-take equipment will be located in a leakage containment bund capable of containing at least 110% of the volume of the tank (550-litres).

4.5 Solar Panels

Photovoltaic panels will be off-loaded, handled and stored carefully to prevent breakage. They will be stored glass side down to minimise the residual risk of generating electricity which could cause electrocution or fire.

4.6 Waste Outputs

The waste fractions produced by the processing will be sampled and tested to ensure that they meet the required specification for recovery or treatment elsewhere.

5.0 Waste Treatment

5.1 General Waste Treatment

5.1.1 Waste Inputs & Capacity

The following main treatment processes will be carried out at the Site:

- Shredding of photovoltaic panels;
- Shredding of aluminium frames removed from solar panels; and
- Shredding of Li-ion batteries.

Each of the above activities will also incorporate pre-shredding and post-shredding activities.

The maximum throughput for each of the three main waste treatment processes is summarised in Table 5-1 below.

Table 5-1 Waste Throughputs

Activity	Waste Type	Throughput	
		Tonnes/day	Tonnes/year
Photovoltaic Panel Shredder	Non-Hazardous	103.5	37,777.5
Aluminium Frame Shredder	Non-hazardous	11.5	4,197.5
Battery Shredder	Non hazardous[1]	48	17,520

[1] At the time of preparing this permit application Li-ion batteries are classified as non-hazardous; however it is anticipated that this will be changed to hazardous.

Each treatment process is carried out in separate equipment and in-feed and outputs are segregated and stored separately at all times.

5.1.2 Monitoring

The Site will be subject to a comprehensive programme of monitoring to ensure it operates to the specified design standards, desired operational performance and does not give rise to unacceptable environmental impact.

Monitoring comprises the following:

- general observations;
- monitoring of infrastructure and equipment;
- monitoring of process variables; and
- emissions monitoring.

Emissions monitoring is described in section 7 of this report; the other aspects are described below.

5.1.2.1 General observations

Routine observations and monitoring will be undertaken daily by site personnel to ensure that the Site operates correctly and without giving rise to unacceptable levels of emissions.

Routine regular observations will include qualitative assessment of noise, dust, litter, mud on the road and odour at the installation, the results of which will be entered in the Site diary.

5.1.2.2 Infrastructure & Equipment

Infrastructure and equipment will be subject to regular visual inspection. In the event of deterioration or damage, appropriate remedial action will be taken to restore the infrastructure and equipment to a satisfactory condition.

5.1.2.3 Process Variables and Performance

The shredding and separation processes will benefit from several process control features which will ensure robust control of the processes and prevent the development of abnormal operating conditions. Specific measures are detailed for each treatment process in the following sections; however, additional information is provided below.

The plant will be controlled from a central control system. All control functions are accessed from the system and status of the plant is displayed graphically.

Monitoring and recording of conditions within the plant will be carried out on a continuous basis by the comprehensive network of sensors and instrumentation as discussed above and displayed via the process control system. This will enable continuous mapping of the process in order to ensure efficiency of the process.

Safety alarms will be displayed and acknowledged from the control system. The system will retain historical alarm and instrumentation data for the purposes of analysis and trending. The information gathered from the process will be visible remotely by authorised personnel from the control system via a web-based application.

Regular testing of the output fractions will be carried out to check that the quality meets the specifications required for onward recovery. This will be used to:

- advise the operational teams of any process setting adjustment required; and
- ensure that the waste fractions are correctly characterised and classified for onward transfer or consignment to recovery and disposal sites.

5.2 Treatment of Photovoltaic Panels

5.2.1 Delivery & Inspection

Incoming solar panels will be delivered by covered vehicle, packaged on pallets. The pallets will be unloaded by forklift truck, visually inspected and recorded before storage within the external storage area shown on Drawing 002.

5.2.2 Sorting & Segregation

Panels will be manually sorted by type and condition. Any damaged panels, which could present additional risks of electricity generation and fire, will be removed to a segregated area for separate treatment. Any non-conforming materials will be removed and stored in the quarantine area prior to characterisation and transfer off site to an appropriately regulated facility for treatment or disposal.

5.2.3 Pre-Cleaning

Where necessary, solar panels will be cleaned with a pressure washer to remove soil and any other loose debris. This activity will be carried out in the external wash bay as shown on Drawing 002. The washing area is covered, and wash water is collected in the site drainage system and discharged to sewer via an oil interceptor to remove grit/mud.

5.2.4 Panel Recycling Line

The cleaned panels will be treated in twin-line 'Ecoprogretti' photovoltaic panel recycling plant, each capable of treating 60 – 120 panels /hour, approximately 1.5 to 3 tonnes / hour. The plant comprises a number of sequential automated and semi-automated steps as illustrated in Figure 5-1 which are summarised below, with reference to each process stage shown in the figure.

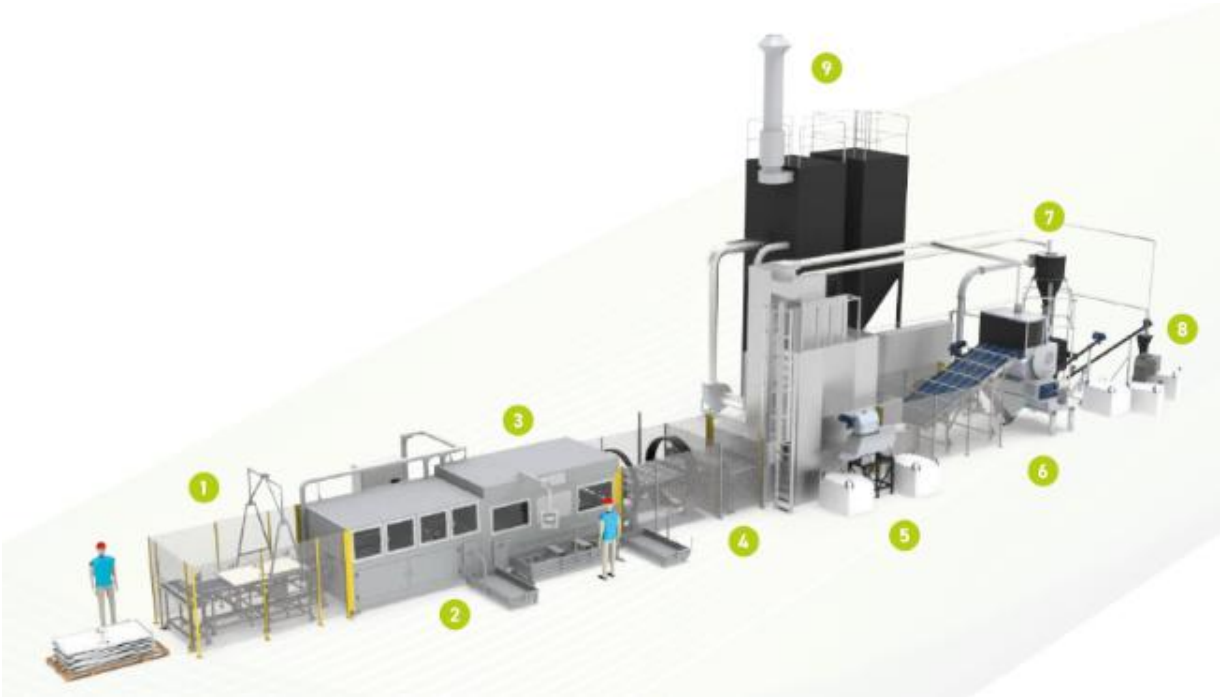


Figure 5-1 Schematic of the Photovoltaic Panel Treatment Process

5.2.4.1 Dismantling

Panels are manually loaded on the feed conveyor (1). A camera detects the position of junction boxes and the dimension of the panel, and these are removed by precision blades (2). Junction boxes and associated cabling is collected and temporarily stored in designated bays pending transfer off-site for recovery at an appropriately regulated WEEE treatment facility.

The aluminium frames are then dismantled, short sides followed by long sides, and collected for further treatment (3).

5.2.4.2 Glass Removal

The modules are flipped (4) and then proceed to the glass removal stage (5) which separates most of the front glass from the photovoltaic laminate. A high-power pneumatic system detaches the glass layer without damaging the encapsulant silicone plastic foil or cells and avoiding any contamination of the glass with silicon. The glass is collected as pieces approximately 3mm in size and stored temporarily pending transfer off-site for recovery.

5.2.4.3 Photovoltaic Panel Shredder & Grinder

The shredder unit (6) grinds the remaining laminate, separating the plastic from the metal layers, resulting in pieces of about 1cm in size. This is then fed to a grinding machine which grinds it to a fine powder. This unit 'balls' most of the copper into small pellets (rather than a powder) and provides the initial pre-separation of materials before fine sorting.

5.2.4.4 Multi-Stage Material Separation (7)

A cyclone is used to remove coarse dust and particles which is fed to a specific gravity screen which separates coarse and fine plastic, copper and silicon. This is followed by a densimetric table which separates copper from plastic. The outputs from the material separation stage include:

- Glass;
- Copper wiring; and
- Silicon-based materials.

5.2.4.5 Dust Filtration

Fine particles from the cyclone system are captured by a double stage dust filtration system (8) on each process line and the cleaned gas is exhausted through 16.5m stacks at release points A1 and A2.

Solar panels produced before 2010- 2015 may contain fluoropolymers (such as PVF or PVDF) in the backsheet and therefore the dust collected may contain traces of these substances. Accordingly, dust which may be contaminated will be collected and disposed of by incineration at an appropriately regulated facility. Storage of Separate Waste Fractions

The separated waste fractions (8) will be stored in FIBCs within designated, labelled spaces in the internal racking system as shown on Drawing 002b and as summarised in Table 4-1 pending transfer off-site for recovery. Storage durations and fire prevention measures are described in the FPP submitted with this application.

The glass, alloy and copper fractions are likely to be classed as absolute non-hazardous waste. Silicon is likely to be classed as non-hazardous subject to testing. Dust collected from the abatement unit may contain POPs and will be stored in a designated area as marked on Drawing 002a/b.

5.2.5 Aluminium Frame Shredder

The aluminium frames removed from the PV panels are treated in an ‘Untha’ shredder designed to produce 400kg of shredded aluminium per hour. The outputs are transported off site for recycling. Shredding the components improves ease of transportation and onward recovery. A schematic of the aluminium shredder unit is shown in Figure 5-2.

The frames are manually loaded onto an in-feed conveyor which transfers them to the shredder feed hopper. The shredder operates at low rotational speed to minimise dust generation and discharges the shredded aluminium onto a conveyor.

The material then passes beneath an overband magnet to remove ferrous contaminants such as nuts, bolts and clips. The ferrous components are collected for recovery off-site at an appropriately regulated facility.

The cleaned aluminium is collected into 1 tonne bulk bags on pallets which are stored in racking prior to transfer for recovery off site at an appropriately regulated facility.

Dust from the shredding process is collected in an overhead extraction hood and passes to a standalone filtration unit which is located, and vents, inside the building.

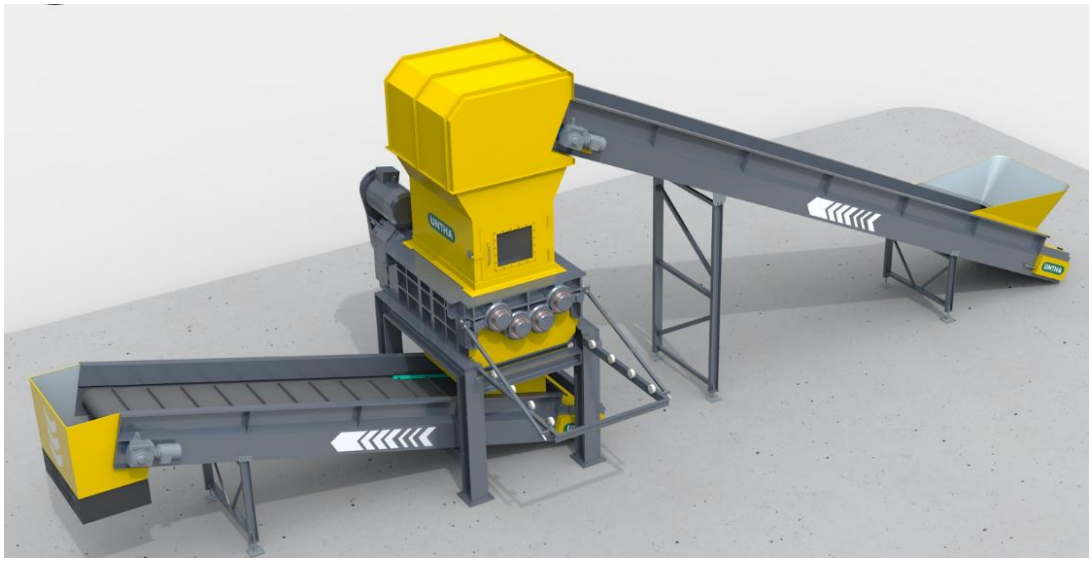


Figure 5-2 Schematic of the Aluminium Frame Shredder

5.3 Treatment of Batteries

5.3.1 Delivery & Inspection

This is described in Section 4.3 of this BATOT.

5.3.2 Battery Discharging

Batteries will be discharged using a proprietary discharging system located in a covered area of the yard as shown in Drawing 002. The system consists of a cabin within which multiple batteries can be tested and discharged simultaneously, with a control station nearby. The system can be configured for different battery types and also includes a regenerative function whereby power from battery discharge can be returned to the grid. This is a 'dry' discharging system which does not result in any waste or emissions to the environment. An example of a typical system is shown in Figure 5-3 below.

Figure 5-3 Example of Battery Discharge System

5.3.3 Battery Shredder

Batteries are treated in an MTB shredder unit which includes shredding, drying, heavy sorting, densifying and fine sorting steps.

A schematic of the equipment is shown in Figure 5-4 and each stage is described in more detail below.

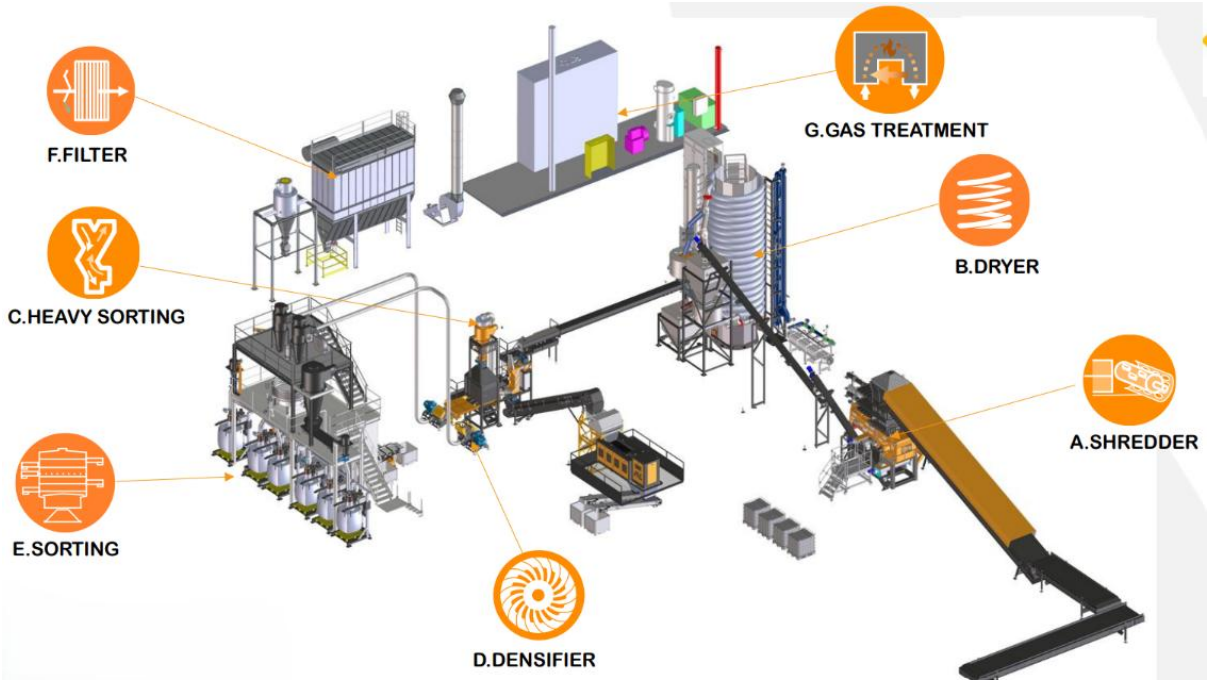


Figure 5-4 Schematic of the Battery Shredding Process

5.3.3.1 Shredding

Batteries are loaded onto the conveyor which includes a weighing system to control feed rate into the shredding unit. The shredder operates with three sequential chambers for loading, shredding and unloading in order that air can be purged from the system by nitrogen injection. The shredder itself is an electrically driven knife mill.

5.3.3.2 Drying

The crushed product is transported by screw conveyor into the dryer unit to remove electrolyte. The material is injected into a the bottom of a vibrating, heated spiral tube to evaporate the electrolyte and the dried product is collected in a sealed hopper system. A bypass line is included to divert solids back into the dryer system in case the required control parameters (temperature, inertisation) are not achieved. Nitrogen, pre-heated by an in-line electric heater, is injected into the unit to protect against deflagration and the vaporised gas and electrolyte pass to the gas treatment stage.

5.3.3.3 Heavy Sorting

The solid material from the dryer passes through a vibrating zig-zag system to separate the lighter material from the heavier components. The heavy component is then conveyed to magnetic separator to remove ferrous material followed by an Eddy Current Separator (ECS) which sorts the non-ferrous material from plastic.

5.3.3.4 Densifier

The remaining product is screw-fed into two turbo mills consisting of high-speed rotating blades which separate black mass from anode and cathode foils. The operation of the mills projects the material against the walls which forms the aluminium and copper material into balls to facilitate subsequent sorting steps. The material is conveyed pneumatically to the final sorting stage.

5.3.3.5 Final Sorting

In this stage, the material is sieved to remove the smaller fraction of black mass, which is collected in bulk bags. The system is fully enclosed to minimise dust emissions. The non metallic materials pass through a set of three densimetric tables which remove residual ferrous metal and oversize and separate aluminium and copper, all of which are collected in bulk bags. Again, this system is fully enclosed to minimise fugitive emissions.

5.3.3.6 Gas Cleaning – Dryer Unit

The gas from the dryer unit is collected in the exhaust manifold and passes through a two-stage condenser to separate the electrolyte. The electrolyte is collected in 1m^3 IBCs.

The remaining gas is then treated in a closed loop caustic scrubber to remove acid gases. The scrubber unit produces approximately 0.6 m^3/day of process effluent which is collected in 1m^3 IBCs pending transfer off-site for treatment at an appropriately regulated facility. There is no direct release of process effluent to sewer from the site.

The scrubbed gas is then treated within a regenerative natural gas fired 200kWth input thermal oxidiser (RTO) to destroy VOCs and the cleaned exhaust gas is released via an 16.5 m stack at release point A3.

Figure 5-5 below shows a schematic of the gas treatment and electrolyte collection stages.

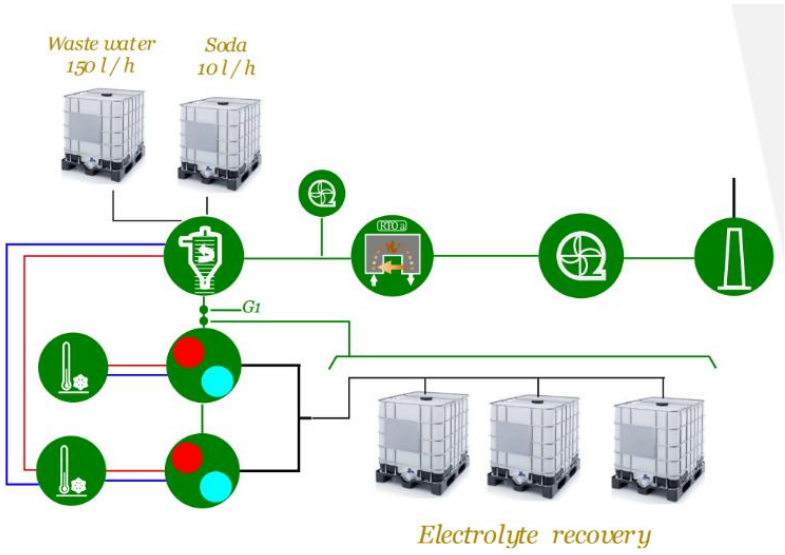


Figure 5-5 Gas Treatment and Electrolyte Recovery

5.3.3.7 Gas Cleaning – Dust Extraction

A common bag filter is used for all of the dust aspiration lines associated with the battery shredder and downstream separation processes and the clean air is exhausted via a 16.5m stack at release point A4.

5.4 Treatment of WEEE containing POPs

The following wastes treated at the facility may contain POPs:

- Plastic components of photovoltaic panels; and
- Cables removed from solar panels.

Cables removed from solar panels will not be treated on site but transferred to an appropriately regulated facility for treatment and recovery.

Plastic components of photovoltaic panels will be separated from the shredder residues and collected as a discrete fraction. This waste fraction will not be further treated at the site but transferred to an appropriately regulated facility for treatment and recovery.

6.0 Emissions Control

6.1 Point source emissions to air

Point source emissions to air from the activities carried out the facility are summarised in Table 6-1.

Table 6-1 Point Source Emissions to Air

Reference	Source	Abatement	Pollutants	Emission Limits
A1	PV Panel Shredder Line 1	Bag filter	Dust	5mg/m^3
A2	PV Panel Shredder Line 2	Bag filter	Dust	5mg/m^3
A3	Battery Shredder	Gas scrubber and RTO	Dust, metals, acid gases, VOCs, NOx, CO	Dust: 5mg/m^3 VOC: 15mg/m^3
A4	Battery Shredder	Bag filter	Dust	5mg/m^3

Abatement equipment has been designed to meet the relevant Best Available Techniques Associated Emissions Limits (BAT-AELs) as set out in the relevant BAT Reference (BRef) documents, or emission limits in EA's Appropriate Measures Guidance, as relevant. These limits are summarised in Section 7 of this document.

An Air Emissions Risk Assessment (AERA) has been carried out on the emissions from all point source emissions to air for the pollutants identified in Table 6-1, following abatement, to confirm that these do not cause a significant impact on receptors. Detailed information on the assumed emissions is provided within the AERA.

The EA's pre-application advice suggested that PFAS compounds should be included in the assessment of point source emissions to air. This is because solar panels produced before 2010- 2015 may contain fluoropolymers (such as PVF or PVDF) in the backsheet, which fall under the broad PFAS definition. However, the recycling process does not involve any thermal treatment, heating, or gas generation. The materials are processed exclusively through mechanical operations and are not thermally degraded at any stage. Therefore, there is no mechanism that could lead to the volatilization or gaseous emission of PFAS. If PFAS are present in older backsheets, they would remain bound within the solid particles generated during the mechanical processing phase. These particulates are captured by the filtration system which is the 'best available technique' for dust abatement and will operate to the BAT-AEL.

There are no emission limit values for PFAS published in the Waste Treatment Bref or in the EA's guidance on appropriate measures for WEEE treatment. Neither is there any agreed ambient air environmental standards or an established methodology for this assessment. Therefore, we consider that such an assessment would require a research study and real emissions data, which will not be available until the plant is operational. It is therefore proposed that sampling of the dust can be carried out once the plant is operational and a risk assessment carried out once an established methodology is available.

6.2 Fugitive emissions to air (including odour, dust, pests, mud and litter)

Potential sources of dust and other fugitive emissions such as VOCs are associated with the shredding of PV panels, aluminium frames and battery material as well as subsequent handling, conveying, screening and separation processes. However, all treatment will take place within the processing building within enclosed equipment fitted with abatement systems. The wastes to be treated are not odorous in nature. The nature of the activities means that the risk of pests, mud and litter are unlikely to be present.

6.2.1 Control of fugitive dust

The site will be operated in accordance with an approved Dust & Emissions Management Plan (DEMP). The following mitigation measures will be in place at the site to minimise the risk of fugitive dust emissions:

- The waste types to be treated are not dusty;
- All treatment of waste batteries and solar panels is undertaken within enclosed buildings;
- Shredding will take place in enclosed systems;
- Dust extraction and filtration systems will be is used to control any dusty emissions from the mechanical separation stage; and
- All waste incoming is in large form and all outgoing waste (following size reduction) will be stored in enclosed containers; there are no open stockpiles of waste at the site.

In addition, a number of operational measures will be in place:

- No dusty wastes will be received at the Site. Waste acceptance checks will be undertaken prior to acceptance of any waste on to the Site;
- The building is fitted with fast acting doors which will be kept closed at all times except for when in use for vehicle access;
- Care will be taken during the unloading and loading of wastes into the feed points and from the bagging stations, for example, drop heights will be kept to a minimum;
- Traffic calming measures are implemented to enforce speed limits and reduce emissions of dust. Speed limits will be implemented for vehicles on Site. Site surfacing will be maintained and repaired to minimise the mobilisation of dust particles;
- The Site will be kept clean and tidy by way of a regularised housekeeping regime. Regular checks will be undertaken by the Plant Manager or designated individual of dust on site and at the Site boundary;
- In the event that dust is detected, investigations will be undertaken to determine the cause and appropriate remedial action;

- In the event that non-conforming wastes are delivered to the Site, they will be returned on the delivery vehicle; and
- The Plant Manager will be responsible for implementing risk management measures in accordance with this environment risk assessment.

Given the high degree of designed-in mitigation in the form of containment of potential sources of dust from the proposed operations, there are limited sources of dust exposed to the ambient atmosphere. It is therefore considered that the risk of fugitive dust emissions will be very low.

6.2.2 Control of fugitive VOCs

There will not be significant fugitive emissions of VOCs because:

- all exhaust gases will be condensed and scrubbed using a sodium hydroxide (NaOH) solution alongside charcoal filtration to filter and remaining VOCs;
- The battery recycling plant stores the condensed electrolyte in palletised 500-litre IBC containers for storage and collection;
- The electrolyte storage tank will be fitted with pressure vacuum valves and a nitrogen blanket, with the vent routed to the gas cleaning unit, surrounded by a leakage containment bund capable of containing at least 110% of the volume of the tank;
- inspection and maintenance programmes will ensure continued integrity of equipment; and
- a spillage action plan will require clean up as soon as possible.

6.2.3 Control of fugitive odour emissions

Waste solar panels and batteries are not inherently odorous waste and the site will have waste acceptance procedures in place including checks for any non-conforming materials. Checks are made upon arrival and unloading of waste as well as when material from the storage locations is taken for processing within the process building. In the event that non-conforming wastes are delivered to the Site, they will be returned to the delivery vehicle or quarantined.

The storage and treatment of waste materials will take place in enclosed buildings and equipment which will reduce the potential for any exposure to odour at off-site receptors.

The removal and condensing of electrolyte from battery shredding will take place in controlled, enclosed, safety-engineered system, nitrogen blanketed due to the flammability of the electrolyte. Measures to limit fugitive emissions are incorporated into the design of the equipment. Capturing, scrubbing, and filtering (Carbon, and HEPA H14) all gasses and VOC’s. The electrolyte is anticipated to mainly consist of the following components as described below:

- Dimethyl carbonate (flash point 18°C, boiling point 90°C) – mild non-offensive odour;
- Ethyl methyl carbonate (FP 24°C, BP 101°C) – ether odour;
- Ethyl carbonate - (FP 25°C, BP 126°C) - fruity odour;
- Diethyl carbonate (FP 25°C, BP 126°C) – mild pleasant odour; and
- Propylene carbonate – odourless.

None of these components have a significant odour and therefore the risk of odour impacts from any fugitive emissions of electrolyte are considered not to be significant.

The proposed facility will employ HEPA14 and charcoal filtration where all non-condensable combustible gas from the shredding, drying and separation processes as well as the vent from the nitrogen-blanketed electrolyte storage tank would be directed. Combustion of the gases in this unit will effectively remove any odorous compounds contained in the feed gas before the emissions are exhausted to the atmosphere.

All finished products including recovered black mass, metals and plastics will be stored within sealed containers and industrial bulk bags.

The Site will be kept clean and tidy by way of a regularised housekeeping regime and regular checks will be undertaken by the Plant Manager or designated individual of odour at the Site boundary.

Taking all of the above into account, it is considered that the potential risk of fugitive odour emissions is very low.

6.2.4 Control of Pests, Litter & Mud

6.2.4.1 Pests

The risk of pests at the site is expected to be very low as the site does not process any biological wastes. However, in order to prevent pests, the following measures will be in place:

- Waste acceptance checks will ensure that no non-conforming material, including biological waste with the potential to attract pests, will be accepted on to the Site;
- Operators will be required to only eat in the dedicated canteen area and food waste will be kept in enclosed waste bins;
- The Site will be inspected daily for signs of pests. If pests are encountered, appropriate remedial action will be undertaken; and
- A nominated sub-contractor for the control and monitoring of pests will be appointed as required.

The Plant Manager will be responsible for monitoring the Site. Records will be maintained of monitoring, complaints and remedial actions taken.

6.2.4.2 Litter

The risk of litter is expected to be very low as the wastes to be treated do not generally include any loose material. However, in order to maintain the Site in a tidy condition and prevent the escape of any litter arising onto surrounding land the following measures will be in place:

- The Site will be kept clean and tidy by way of a daily housekeeping regime;
- All processing of waste will take place in enclosed buildings;
- Wastes produced as part of the process will be stored within dedicated containers or bags prior to removal off-site. As such, it is unlikely to generate litter;
- Regular monitoring will be carried out by the Plant Manager or a designated individual. Litter picking will be undertaken as necessary in response;
- Fences surrounding the Site will reduce the chance of litter blowing off Site. If necessary, additional netting will be erected to reduce the escape of wind-blown litter;
- Litter arising from the activities will be cleared from affected areas outside the Site as soon as practicable; and

- The Plant Manager will be responsible for monitoring the Site and maintain it free of litter. Records will be maintained of monitoring, complaints and remedial actions taken.

6.2.4.3 Mud & Debris

The risk of mud and debris is expected to be very low given the types of waste to be treated and the site infrastructure. Nonetheless, the following measures will be in place to prevent nuisance from mud and debris on local receptors:

- Operational and vehicle delivery areas of the Site are surfaced such that there will be no areas with the potential to generate mud on site. This removes the possibility of vehicles tracking dirt or mud off Site;
- Regular monitoring will be conducted by the Plant Manager or a designated individual;
- The Site will be kept clean and tidy by way of a regularised housekeeping regime;
- Areas of hard standing will be maintained free of significant quantities of mud & debris; and
- The Plant Manager will be responsible for monitoring the Site. Records will be maintained of monitoring, complaints and remedial actions taken.

6.3 Emissions of noise and vibration

The facility will be operated in a manner which minimises or prevents nuisance caused by noise and/or vibration to local receptors. An assessment of potential noise impact has been carried out for the proposed activities and is presented in the Noise Impact Assessment (NIA) submitted with this application.

Details of the locations, sources, frequency and estimated noise levels that will be associated with operations at the Site have been addressed as part of the NIA. The NIA concluded that no additional noise mitigation would be necessary given the relatively low level of emissions and in consideration of the site setting and background noise levels. Nonetheless, the site will be operated in accordance with an approved Noise Management Plan (NMP). A number of general mitigation measures will be employed in order to ensure that the risk of impact to receptors that may be affected is minimised as summarised below.

- Whilst the process may operate 24 hours per day and seven days a week, under normal circumstances deliveries of waste materials will only be accepted during the hours of 06.00 to 22:00 Monday to Friday and 06:00 to 18:00 on Saturday, with no delivery or dispatch of waste taking place on Sundays or bank holidays;
- Noisy activities are only carried out in the enclosed building;
- Opening of doors will be kept to a minimum and fast acting roller shutter doors will be installed where appropriate;
- Buildings have been designed to attenuate noise;
- Plant and equipment options with lower noise levels will be used wherever possible to ensure noise is kept to a minimum;and
- Plant and equipment will be maintained regularly to minimise noise resulting from deterioration and inefficient operation. If any items of plant are found to give rise to unacceptable noise levels, consideration will be given to their replacement with quieter designs. If equipment continues to generate unacceptable noise levels, consideration will be given to modification to incorporate noise suppression equipment or replacement components.

The Plant Manager will be responsible for ensuring that nuisances arising from the Site noise are minimised. All site personnel will be trained in the need to minimise site noise and will be responsible for monitoring and reporting excessive noise when carrying out their everyday duties.

In the event that noise is found to be causing a problem, action will be taken to determine the source and to take remedial actions as follows:

- shut down, replace, service or repair equipment to reduce noise levels; and
- modify plant to incorporate noise suppression equipment.

Records relating to the management and monitoring of noise will be maintained and include:

- inspections undertaken;
- noise problems (including date, time, duration, prevailing weather conditions and cause of the problem);
- complaints received; and
- corrective action taken and changes to operational procedures to prevent future occurrences.

6.4 Point source emissions to water and sewer

There will be no point source emissions to groundwater or surface water bodies.

Uncontaminated run-off from rainfall and process effluent will be discharged to sewer at release point W1 and W2, via the attenuation basins. The Site benefits from impermeable surfacing and a sealed drainage system. Any potentially contaminated water from the site, such as oil from vehicles and water from wash down of buildings will be passed through local interceptors before discharge to sewer. The on-site drainage system also has provision for containment and isolation from discharge to sewer in the event of a potential pollution incident such as fire or spillage.

The site drainage is connected to the existing combined surface water and sewer system for the wider industrial estate within which the facility is located.

Wash water from the cleaning of dirt from panels is highly unlikely to be contaminated with polluting substances and it is intended that in the long term the water will be released via the site's drainage system to sewer. However, as the EA's pre-application advice states that it must be proven that there is no contamination, the effluent will initially be collected and will only be released directly to sewer when sampling and testing data demonstrates that there is no contamination.

6.4.1 Process Effluent Characteristics

The only process effluent produced by the site is from the caustic scrubber. The effluent has a maximum release rate of 600 litres per day and is collected in IBCs prior to transfer off-site for treatment at an appropriately regulated facility. No process effluent is released to sewer.

The site will also produce wash water from the pre-cleaning of solar panels to remove any incidental soil or mud. However, no cleaning agents will be used and the wash water will not be contaminated with any hazardous pollutants. It is therefore considered to be uncontaminated and will be released into the site drainage system prior to discharge to sewer under a Trade Effluent Consent.

6.5 Fugitive emissions to land and water

The Site has been designed to prevent and minimise the risks of emissions to the surrounding land, groundwater and water bodies.

The Site benefits from impermeable surfacing and a sealed drainage system in all operational, storage, delivery and dispatch areas of the site to capture and prevent percolation of potentially contaminated water into the ground.

Only uncontaminated surface water from building roofs and non-processing areas, as well as uncontaminated wash water from the cleaning of dirt from incoming solar panels, will be discharged to sewer.

The discharge points to sewer, W1 and W2, are illustrated on Drawing 02.

The following measures will be in place to minimise the risk of fugitive emissions to land and water:

- The site boundary is kerbed around areas where there is a risk from spillage or fire and the drainage system incorporates provision for full containment and isolation in the event of a spillage or incident requiring use of firewater. The drainage and containment systems are shown on Drawing 004 Fire Prevention Plan;
- In the event of contamination of drainage by spillage or firewater, the system can be isolated by a Penstock valve to prevent discharge to sewer. If the effluent is too contaminated to release to sewer, it would be tankered off-site to an appropriately regulate site for treatment;
- The precise locations of subsurface drains, pipework and interceptors will be established and recorded, and relevant documentation maintained in the Site office. An inspection and maintenance programme for all subsurface structures will be followed and records will be maintained by the Plant Manager;
- Bunds and or double skinned walls will be provided for all tanks containing liquids whose spillage could be harmful to the environment. Containment bunds or double skinned walls will be provided to make sure that any leaks/spillages will be contained in the event of a leak of the primary containment. The containment measures will be:
    - capable of containing at least 110% of the volume of the largest tank within the bund;
    - constructed of materials which are impermeable and resistant to the stored materials in accordance with relevant material safety data sheets (MSDS);
    - constructed to *CIRIA guidance C736 Containment systems for the prevention of pollution,* the appropriate British Standard and Health and Safety Executive (HSE) guidance;
    - of a type suitable for the containment of the materials in the event of leak or spill;
    - pipework will be routed within bunded areas so that no penetration of walls or base of the bund takes place; and
    - connection points will be located within the bund.
- Containment engineering will prevent the release of potentially polluting liquids to surface water and groundwater;
- Plant operatives will undergo awareness training to ensure a full understanding of the containment engineering which will minimise the environmental impact of the Site;
- The engineered containment system will be subject to routine visual inspection. Identified breaches in the engineered containment will be remedied to ensure

continued integrity of the facility, and to prevent pollution of surface or groundwater; and

- Records of inspection and maintenance will be maintained by the Plant Manager.

7.0 Emission Limits & Monitoring

Emission limits and monitoring schedules will be in line with the requirements of the relevant Bref and EA appropriate measures guidance, as set out in the following sections.

7.1 Point source emissions to air

7.1.1 Monitoring Schedule

Point source emissions to air will be subject to the monitoring programme and compliance limits set out in Table 7-1, in line with those set out in the Waste Treatment Bref and EA appropriate measures guidance.

Table 7-1 Limits and Monitoring Programme for Emissions to Air

Release Point	Source	Pollutant	Emission Limit (mg/m^3)	Frequency[(c)]	Standard[(c)]
A1	PV panel shredder	Total suspended particulates	5[(a)]	Hourly average	EN 13284-1
A2	Aluminium frame shredder	Total suspended particulates	5[(a)]	Hourly average	EN 13284-1
A3	Battery Shredder	Dust	5[(a)]	6 monthly	EN 13284-1
		TVOC	15[(b)]	6 monthly	EN 12619
		Brominated flame retardants	None	Annually	No EN standard available
		Dioxin-like PCBs	None	Annually	EN 1948-1, -2, and -4
		Metals including: • Arsenic • Cadmium • Cobalt • Copper • Chromium • Magnesium • Lead • Antimony • Selenium • Thallium • Vanadium	None	Annually	EN 14385
		PCDD/F (Polychlorinated	None	Annually	EN 1948-1, -2, and -3

Release Point	Source	Pollutant	Emission Limit (mg/m^3)	Frequency[c]	Standard[c]
		dibenzo-p-dioxin/furan(s))			

Notes:
[a] Waste Treatment Bref BATc 25 Table 6.3
[b] Waste Treatment Bref BATc 29 Table 6.4
[c] Waste Treatment Bref BATc 8

7.1.2 Monitoring standards and techniques

Monitoring of point source releases to air will be undertaken in compliance with recognised techniques or using 'standard methods'. This will be in compliance with MCERTS as a minimum standard. Monitoring equipment will be calibrated, serviced and maintained in line with manufacturer recommendations.

Emissions monitoring will be undertaken in accordance with the requirements of the following EA technical guidance:

- 'Monitoring stack emissions: measurement locations' (formerly Technical Guidance Note M1); and
- 'Monitoring stack emissions: environmental permits' (formerly part of Technical Guidance Note M2).

This will include provision of suitable access routes and platforms as required and the siting of sample ports in accordance with the requirements of the guidance.

Prior to undertaking stack emissions monitoring a Site-Specific Protocol (SSP) will be prepared to ensure the monitoring is carried out in accordance with the requirements of the EA Technical Guidance Notes mentioned previously. Specifically, the SSP will consider the following aspects:

- Selection of the sampling position, sampling plan and sampling points;
- Access, facilities and services required; and
- Safety considerations.

The SSP will ensure that a representative sample is obtained from the stack.

The sampling approach, technique, method and equipment that are chosen will ensure:

- A safe means of access to the sampling position;
- A means of entry for sampling equipment into the stack;
- Adequate space for the equipment and personnel; and
- Provision of essential services such as electricity.

7.1.3 Monitoring Action Plan

In the event that the monitoring programme identifies a potentially significant release the following actions will be undertaken:

- The Plant Manager will be informed immediately;
- Actions to isolate and contain the source of release will be undertaken; and

- The causes of the release will be evaluated, and where possible, procedures put in place to prevent a re-occurrence.

In the event that abnormal monitoring results are identified, site personnel will inform the Plant Manager and appropriate action will be taken to return the process to normal operating conditions. An inspection of the facility will be undertaken to identify the cause and necessary remedial action will be taken.

7.2 Point Source Emissions to Water or Sewer

7.2.1 Monitoring Schedule

No process effluent is released to sewer. Only uncontaminated run-off and washwater from the cleaning of dirt from panels will be released to sewer. Accordingly, it is not proposed to apply a monitoring schedule for these releases.

8.0 Process Efficiency

8.1 Energy Efficiency

8.1.1 Energy Consumption

The estimated energy consumption for the activities at the site is summarised in table 8-1 below.

Table 8-1 Energy Consumption

Activity	Energy source	Power rating / thermal rating	Annual Consumption
2 x PV plants	Grid electricity	600kW	5.26GWh
Battery plant	Grid electricity	633kW	5.55GWh
	Natural Gas	0.2MWth	1.75GWh
Alloy frame shredder	Grid electricity	40kW	350MWh

The Site will not be part of a climate change agreement.

8.1.2 Energy Management Measures

To optimise energy efficiency, equipment will be maintained and serviced as required. Plant and equipment will be subject to regular maintenance to ensure it continues to operate at optimum energy efficiency and that energy consumption does not increase due to inefficient performance.

Energy use will be monitored and recorded and periodically reviewed to identify areas of improvement and to ensure that any inefficiency is investigated, and appropriate actions taken.

Energy use and energy minimisation will be included within the management system for the control of resources. Within the management system the review process will identify energy use by source for the different site operations. The results will be used to identify potential measures for improving energy efficiency.

Staff will undergo awareness training in energy efficient practices.

In addition, a number of features have been incorporated within the design of the Site in order to minimise energy use:

- Solar panels providing electricity for the offices;
- Power from the discharging of batteries will be fed back to the grid;
- efficient LED lighting, smart building controls, and careful insulation;
- BREEAM (The unit is rated “Excellent” under BREEAM);
- The building energy-performance certificate is A+; and
- The warehouse benefits from efficient insulation, tight air-sealing, and design principles that reduce energy waste.

8.2 Raw Materials

The raw materials (other than the waste inputs) that will be used on Site are detailed in Table 8-2.

A Control of Substances Hazardous to Health (COSHH) assessment will be undertaken prior to the use of chemicals, and if the chemical is found to present a hazard to health, it will be added to the COSHH inventory and appropriate safeguards implemented.

Material Safety Data Sheets (MSDS) for any potentially hazardous materials or chemicals will be kept on site together with the COSHH register. The MSDS will give information on how chemicals should be handled, stored and disposed of, and what to do in the event of an accident.

Table 8-2 Principal Raw Materials

Material	Estimated Consumption (tonnes per annum)	Storage Location	Storage Arrangement
Sodium Hydroxide 32% (NaOH)	43	External 3.1m x 2.5m shipping container	2-4 tons in bunded shipping container with passive ventilation – stored in IBC pallets

Wherever possible, raw materials will be selected that minimise environmental impact. Consideration will be given to such factors as degradability, bioaccumulation potential, product contamination and toxicity. Reviews will be frequently undertaken to ensure that all raw materials are appropriate for use, that consumption is optimised and that opportunities for reduction and improvements are implemented through an action plan.

Alternative raw materials will be evaluated for their environmental impact on an on-going basis and, where there is no overriding quality requirement substitution will be given appropriate consideration. The on-going programme of professional and technical development for all site personnel will ensure awareness of new developments in product availability and their implication.

8.3 Water Use

The main use of water at the facility is for pressure washing any dirty solar panels.

Other uses of mains water on site are in the welfare facilities and for fire-fighting.

The scrubber system incorporates recirculation of the aqueous solution to minimise water use.

Low usage pressure washers will be used for the cleaning of dirt from solar panels before treatment.

The use of water will be regularly reviewed to ensure maximum efficiency and ensure that any further potential for reduction in consumption and recycling opportunities are identified in accordance with the appropriate measures guidance. The predicted average total usage is expected to be <0.5m3/hr or less.

Given the low water usage, opportunities for further efficiency are limited.

8.4 Waste Minimisation, recovery and disposal

The overall objective of the Site is to maximise the recovery of useful products from the waste feedstocks, thereby moving waste up the hierarchy and minimising the volume sent to landfill or Energy from Waste facilities for disposal. Notwithstanding this, there will be waste produced by the processes undertaken at the Site.

Waste generation at the Site will be reviewed annually and where necessary an appropriate improvement programme will be implemented.

9.0 Best Available Techniques & Appropriate Measures

Activities defined as installations are required to conform to Best Available Techniques (BAT) requirements. The essence of BAT is that the selection of techniques to protect the environment should achieve an appropriate balance between the environmental benefits they bring, and the costs to implement them. In addition, it should be demonstrated that no significant pollution is caused by an assessment of the environmental impact of emissions from the activity as a whole.

The waste operations carried out at the site are required to meet appropriate measures, as set out in the EA's guidance notes for the relevant waste activities.

Assessments of the proposed activities and environmental control techniques have been made against the relevant Best Available Techniques (BAT) and appropriate measures guidance relevant to the activities, as advised in the EA's pre-application advice. This includes:

- Best Available Techniques Reference (Bref) Document for Waste Treatment, European IPPC Bureau JRC, published 2018;
- Waste electrical and electronic equipment (WEEE): appropriate measures for permitted facilities, gov.uk, 13 July 2022;
- Non-hazardous and Inert Waste: appropriate measures for permitted facilities, gov.uk, 01 August 2023; and
- Chemical waste: appropriate measures for permitted facilities, gov.uk, 18 November 2020.

9.1 Waste Treatment Bref

The revised Waste Treatment BREF (the BREF) published in August 2018 sets out a number of BAT conclusions (BATc) which must be complied with. The following BATc are considered to apply to the metal shredding, hazardous waste treatment and storage activities carried out at the site:

- General requirements BATc 1 – BATc 24 inclusive;
- Mechanical Treatment of Waste (BAT 25 – BAT 32); and
- Physical treatment of solid waste BATc 40 and 41.

Appendix A provides a summary table describing how the techniques proposed for the site meet the requirements of each of the Waste Treatment BATc listed above.

The Table confirms that all BATc are complied with.

9.2 Waste electrical and electronic equipment (WEEE)

The EA has published appropriate measures for permitted activities that are relevant to regulated facilities with an environmental permit to treat or transfer all types of WEEE. The EA uses the term 'appropriate measures' to cover best available techniques (BAT) for waste installations facilities, best available treatment recovery and recycling techniques (BATRRT) for the treatment of WEEE and 'proper treatment' as referred to by the WEEE Directive.

Appendix B demonstrates how pollution prevention and control techniques proposed for the facility will meet the above relevant appropriate measures in the technical guidance document.

9.3 Non-Hazardous Waste Treatment

The EA published appropriate measures for permitted activities that are relevant to regulated facilities with an environmental permit to treat or transfer non-hazardous and inert waste.

There is a large degree of overlap between the appropriate measures for WEEE treatment and those relevant to treat or transfer non-hazardous waste. Therefore, this section assesses the techniques against the relevant appropriate measures within the non-hazardous and inert technical guidance document that are additional to those already assessed for the treatment of WEEE, as follows:

- Section 3. Waste Pre-acceptance, Acceptance and Tracking appropriate measures 3.3 Quarantine;
- Section 4. Waste Storage, Segregation and Handling appropriate measures 4.0 General waste storage and 4.1 Segregation;
- Section 5. Waste Treatment appropriate measures 5.2 Waste treatment outputs, including fines;
- Section 6. Emissions Control appropriate measures 6.1 Enclosure within buildings and 6.6 Pests; and
- Section 9. Waste Minimisation, Recovery and Disposal appropriate measures.

Appendix C demonstrates how pollution prevention and control techniques proposed for the facility will meet the above relevant appropriate measures in the technical guidance document.

9.4 Chemical Waste

The EA has published guidance on *Chemical waste: appropriate measures for permitted facilities* that is relevant to regulated facilities with an environmental permit to treat or transfer chemical waste. Some of the outputs of the battery shredder are considered to be chemical waste (electrolyte, black mass).

There is a large degree of overlap between both the appropriate measures for facilities to treat or transfer all types of WEEE (Appendix B) and for facilities to store, treat or transfer non-hazardous and inert waste (Appendix C) with the appropriate measures to treat or transfer chemical waste. This section assesses the techniques proposed for the Site against the relevant appropriate measures that are in addition to those listed in Appendix B and C, and which include the following:

- Waste storage, segregation and handling (4.0);
- Waste treatment (only 5.1 general waste treatment); and

- Emissions control (6.2 fugitive emissions to air (including odour)).

Appendix D demonstrates how pollution prevention and control techniques proposed for the facility will meet the above relevant appropriate measures in the technical guidance document.

Appendix A

BAT Conclusions for Waste Treatment

No.	BAT Conclusion	Specific Measures
GENERAL CONSIDERATIONS		
BAT 1	*In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS)*[3]	The Site will be operated in accordance with a bespoke site-specific Environmental Management System.
BAT 2	*In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below:* *Set up and implement waste characterisation and pre-acceptance procedures* *Set up and implement waste acceptance procedures* *Set up and implement a waste tracking system and inventory* *Set up and implement an output quality management system* *Ensure waste segregation* *Ensure waste compatibility prior to mixing or blending of waste* *Sort incoming solid waste*	The Site will operate in accordance with strict waste acceptance and pre-acceptance procedures as detailed in Section 3 of the BAT-OT document to ensure that no non-conforming waste types are accepted on Site. **Waste Characterisation and Pre-acceptance Procedures** End-of-life solar panels and batteries will be sourced from solar farms or as damaged panels/batteries from original equipment manufacturers. Pre-acceptance procedures will ensure that the Site only receives waste batteries in appropriate containers or packages that are secure, prevent damage and leakage of materials (for example liquid battery electrolyte) and are resistant to any corrosive chemicals contained in them. GBCTR will have waste pre-acceptance checks and feedstock specifications in place with suppliers to ensure that the waste has been characterised and classified appropriately before consignment to the site. These will be risk-based and in accordance with appropriate measures guidance for the activities to be operated at the facility. The pre-acceptance checks will ensure that:

[3] Refer to the BAT Reference document for features to be incorporated in the EMS.

		• only wastes that are suitable for the site are accepted; • there is enough storage and treatment capacity to accept the consignments at the site; and • waste is not unnecessarily accumulated. **Waste Acceptance Procedure** The Site's pre-acceptance procedures ensure that the characteristics of the waste are established before delivery to Site. GBCTR carry out strict acceptance procedures to ensure non-conforming wastes are segregated prior to acceptance and removed for transfer to a suitably authorised downstream treatment facility. Incoming loads will be inspected visually as they arrive on Site. Loads will be compared visually with the waste types included on transfer documentation. Checks and inspections will be undertaken by a member of staff who is suitably qualified and trained. **Waste Tracking and Inventory System** GBCTR employs a waste tracking system which stores all the information on each batch throughout the waste stream's lifecycle on Site. **Output Quality Management System** The Site is operated in accordance with a bespoke Environmental Management System. This includes procedures to ensure that the separation processes are monitored and adjusted to ensure that optimum separation of plastics is affected. **Waste Segregation**

		All wastes are segregated into discrete storage areas as listed in Table 4-1 of the BAT-OT to minimise any contamination. **Waste Compatibility** The Site handles non-hazardous and hazardous battery waste. Different waste types will be stored separately in clearly designated areas. There are no compatibility issues relating to the waste types which would present an increased risk to the environment. **Sorting of incoming solid waste** Only waste that conforms to the permitted waste types will be accepted for processing. Visual inspections will be carried out of waste loads accepted at the Site to ensure no gross contamination is evident. Any non-confirming waste will be placed in the quarantine area pending removal to an appropriately regulated facility.
BAT 3	*In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the following features:* *(i) information about the characteristics of the waste to be treated and the waste treatment processes, including:* *(a) (a) simplified process flow sheets that show the origin of the emissions;* *(b) (b) descriptions of process-integrated techniques and waste water/waste gas treatment at source including their performances;* *(ii) information about the characteristics of the waste water streams, such as:* *(c) (a) average values and variability of flow, pH, temperature, and conductivity;* *(d) (b) average concentration and load values of relevant substances and their variability (e.g. COD/TOC, nitrogen species, phosphorus, metals, priority substances/micropollutants);*	The site's EMS will incorporate an inventory of wastewater and gas streams: (i) Descriptions of the process are included in Section 3 of this BAT-OT including simplified process flow diagrams, emissions and treatment. (ii) Process effluent produced at the site will be collected in IBCs and transported off-site for treatment. Uncontaminated surface water run-off from roofs and external areas will be discharged to sewer under a Trade Effluent Discharge Consent (TEDC) administered by the local sewage undertaker. The permit does not specify any emission limits or monitoring requirements for discharge to sewer from discharge points W1 and W2..

	(e) (c) data on bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of activated sludge)) (see BAT 52); *(iii) information about the characteristics of the waste gas streams*	(iii) The shredder waste gas composition is described in Section 6 of the BAT-OT.
BAT 4	*In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below.* *a) Optimised storage locations* *b) Adequate storage capacity* *c) Safe storage operation* *d) Separate area for storage and handling of packaged hazardous waste*	Waste storage and handling procedures will operate in line with procedures within the Site's FPP and as set out in this BAT-OT document. **(f) a) Optimised storage locations** Storage arrangements are optimised to minimise transport distances on Site. **b) Adequate storage capacity** Storage provisions have been sized in line with capacity of the treatment processes and include for buffer storage for seasonal arisings of solar panels predominantly in the winter months. Waste inventory is tracked to ensure that there is not overcapacity. **c) Safe Storage Operation** All waste acceptance, storage, treatment and processing will take place on impermeable surfacing. All infrastructure on Site is resistant to materials used and stored on Site. Raw materials will be stored within IBC's that benefit from a bund with the capacity to store at least 110% of the capacity of each container. Section 3 of this BAT-OT document outlines measures to minimise the potential causes and consequences of accidents from potential incidents. The Site and all of its components will continue to benefit from ongoing daily inspections to ensure that all equipment is in good working order. Any defects will be repaired as soon as practicable (within a maximum of 7 days) taking into account the severity of the problem.

		All combustible stockpiles have access on at least three sides for safe handling, temperature monitoring and firefighting (if necessary). **d) Separate Area for Storage and Handling of Packaged Hazardous Waste** There is no packaged hazardous waste received on site.
BAT 5	*In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures.*	Handling and transfer procedures will be incorporated into the standard operating procedures for the Site. GBCTR will only accept waste at the Site if the description in the accompanying documentation is in accordance with the EP and that on-Site inspection confirms the waste is consistent with the description provided. GBCTR employ a waste tracking system which stores all the information on each batch throughout the waste stream's lifecycle on Site. GBCTR will minimise the environmental risks associated with handling and transfer of waste and will adhere to existing procedures in the Site's EMS including: • All Site operatives will receive training associated with on Site handling and transfer procedures, with periodic refreshments; and • All training records will be maintained within the company training matrix
BAT 6	*For relevant emissions to water as identified by the inventory of waste water streams (see BAT 3), BAT is to monitor key process parameters (e.g. waste water flow, pH, temperature, conductivity, BOD) at key locations (e.g. at the inlet and/or outlet of the pre-treatment, at the inlet to the final treatment, at the point where the emission leaves the installation).*	There is no process effluent released from the site. Only uncontaminated surface water run off and wash water from cleaning of panels is discharged to sewer. Wash water will not be discharged to sewer until sampling and testing confirms that it does not contain pollutants.

<table>
<tr><td>BAT 7</td><td>BAT is to monitor emissions to water with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.</td><td>Monitoring of the discharge of surface water run-off to sewer will be carried out in accordance with the TEDC.</td></tr>
<tr><td>BAT 8</td><td>BAT is to monitor channelled emissions to air with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

Table 6.3

BAT-associated emission level (BAT-AEL) for channelled dust emissions to air from the mechanical treatment of waste

<table><tr><th>Parameter</th><th>Unit</th><th>BAT-AEL
(Average over the sampling period)</th></tr><tr><td>Dust</td><td>mg/Nm³</td><td>2-5 (1)</td></tr></table>(1) When a fabric filter is not applicable, the upper end of the range is 10 mg/Nm³.

Table 6.4

BAT-associated emission levels (BAT-AELs) for channelled TVOC and CFC emissions to air from the treatment of WEEE containing VFCs and/or VHCs

<table><tr><th>Parameter</th><th>Unit</th><th>BAT-AEL
(Average over the sampling period)</th></tr><tr><td>TVOC</td><td>mg/Nm³</td><td>3-15</td></tr><tr><td>CFCs</td><td>mg/Nm³</td><td>0,5-10</td></tr></table></td><td>Emissions to air will be monitored in accordance with the monitoring standards and methods detailed in Section 9.1 of this BATOT document and in compliance with the corresponding BAT-AELs.</td></tr>
<tr><td>BAT 9</td><td>BAT is to monitor diffuse emissions of organic compounds to air from the regeneration of spent solvents, the decontamination of equipment containing POPs with solvents, and the physico-chemical treatment of solvents for the recovery of their calorific value, at least once per year using one or a combination of the techniques given.</td><td>Not relevant: these activities are not carried out at the site.</td></tr>
<tr><td>BAT 10</td><td>BAT is to periodically monitor odour emissions.</td><td>Not applicable. The site will not produce any significant odour emissions.

The applicability of BAT 10 is restricted to cases where an odour nuisance at sensitive receptors is expected</td></tr>
</table>

		and/or has been substantiated. If significant odours were to be detected, GBCTR would instigate investigations to determine the cause and appropriate remedial action taken.
BAT 11	*BAT is to monitor the annual consumption of water, energy and raw materials as well as the annual generation of residues and waste water, with a frequency of at least once per year.*	GBCTR will conduct monitoring of the annual consumption of water, energy and raw materials by recording all inputs into the process. Monitoring will also be conducted for the annual generation of residues via the recording of all output. To aid this, an inventory and tracking system will be kept of all input and output. Monitoring will consider any significant changes relating to the process. Furthermore, monitoring of the energy consumption of any new equipment will also be maintained.
BAT 12	*In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:* *a protocol containing actions and timelines;* *a protocol for conducting odour monitoring as set out in BAT 10;* *a protocol for response to identified odour incidents, e.g. complaints;* *an odour prevention and reduction programme designed to identify the source(s); to characterise the contributions of the sources; and to implement prevention and/or reduction measures.*	Not applicable. The site will not produce any significant odour emissions. The applicability of BAT12 is restricted to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated. If significant odours were to be detected, GBCTR would instigate investigations to determine the cause and appropriate remedial action taken.
BAT 13	*In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques given below.* *a) Minimising residence times* *b) Using chemical treatment* *c) Optimising aerobic treatment*	Not applicable. The site will not produce any significant odour emissions. The applicability of BAT 13 is restricted to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated. If significant odours were to be detected, GBCTR would instigate

		investigations to determine the cause and appropriate remedial action taken.
BAT 14	*In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below* *a) Minimising the number of potential diffuse emission sources* *b) Selection and use of high-integrity equipment* *c) Corrosion prevention* *d) Containment, collection and treatment of diffuse emissions* *e) Dampening* *f) Maintenance* *g) Cleaning of waste treatment and storage areas* *h) Leak detection and repair (LDAR) programme*	Incoming waste is delivered in enclosed vehicles in loose or bagged form. Dusty waste is not accepted at the Site. Dusty waste fractions are only stored within the building in enclosed FIBCs. Mechanical sorting and shredding equipment is fitted with dust extraction and abatement filters. The battery shredder unit and electrolyte collection system consists of high integrity equipment to ensure good containment and to minimise the release of volatile emissions. GBCTR will have a robust preventive and reactive maintenance and repair programme in place, including corrosion prevention. The site's EMS will log findings of maintenance inspections. The battery shredder and electrolyte dryer is fitted with a gas scrubber and RTO to minimise emissions. Mechanical treatment lines are fitted with dust extraction and bag filter systems. Dampening is not required as dusty post-treatment fractions are collected and stored in FIBCs. GBCTR will have a robust preventive and reactive maintenance and repair programme in place. The site's EMS will log findings of maintenance inspections. Daily visual inspection of the Site and Site boundary will be carried out by Site personnel. Storage areas benefit from regular cleaning, on a daily basis as a minimum. Not applicable. The process uses high integrity equipment to minimise the risk of leaks and emissions.
BAT 15	*BAT is to use flaring only for safety reasons or for non-routine operating conditions (e.g. start-ups, shutdowns) by using both of the techniques given below:*	Not applicable: the process does not include flaring.

	a. Correct plant design *b. Plant management*	
BAT 16	*In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use both of the techniques given below:* *a. Correct design of flaring devices* *b. Monitoring and recording as part of flare management*	Not applicable: the process does not include flaring.
BAT 17	*In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:* *I. a protocol containing appropriate actions and timelines;* *II. a protocol for conducting noise and vibration monitoring;* *III. a protocol for response to identified noise and vibration events, e.g. complaints;* *IV. a noise and vibration reduction programme designed to identify the source(s), to measure/estimate noise and vibration exposure, to characterise the contributions of the sources and to implement prevention and/or reduction measures*	A noise impact assessment has concluded that all measures described in Section 6.3 of the BAT-OT should provide satisfactory noise management. A Noise Management Plan is also in place for the Site.
BAT 18	*In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below:* • *Appropriate location of equipment and buildings* • *Operational measures* • *Low-noise equipment* • *Noise and vibration control equipment* • *Noise attenuation*	Specific noise mitigation measures include those embedded in the design as well as operational measures and are summarised below: • Noisy activities are only carried out within the building. • Whilst the process may operate 24 hours per day and seven days a week, under normal circumstances deliveries of waste materials will only be accepted during the hours of 06.00 to 22:00 Monday to Friday and 06:00 to 18:00 on Saturday, with no delivery or dispatch of waste taking place on Sundays or bank holidays.

		• Plant and equipment options with lower noise levels will be used wherever possible to ensure noise is kept to a minimum. • Buildings have been designed to attenuate noise. • Plant and equipment will be maintained regularly to minimise noise resulting from deterioration and inefficient operation. If any items of plant are found to give rise to unacceptable noise levels, consideration will be given to their replacement with quieter designs. If equipment continues to generate unacceptable noise levels, consideration will be given to modification to incorporate noise suppression equipment or replacement components.
BAT 19	*In order to optimise water consumption, to reduce the volume of waste water generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given below.* *a. Water Management* *b. Water Recirculation* *c. Impermeable Surface* *d. Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels* *e. Roofing of waste storage and treatment areas* *f. Segregation of water streams* *g. Adequate drainage infrastructure* *h. Design and maintenance provisions to allow detection and repair of leaks* *i. Appropriate buffer storage capacity*	a. Water is only used for cleaning solar panels where required and to top up the gas scrubber system. Procedures are in place to manage the use of water for these operations. b. Scrubber water is recirculated. c. The site benefits from an impermeable surface and sealed drainage. d. Process effluent is collected in IBCs which are contained in a bunded area within the site which has impermeable surfacing and sealed drainage. Procedures are in place to monitor tank levels. e. Waste storage and treatment areas are roofed as far as practicable. f. No contaminated effluent is released to sewer so there are no requirements to segregated surface water run-off.

		g. The Site surface is impermeable, and the perimeter is kerbed to prevent overflow and discharge to surface water drainage. h. GBCTR has maintenance procedures in place which includes a preventive and reactive maintenance programme. i. The Site includes attenuation ponds to manage surface water run-off in the event of sustained rainfall. In the event of an incident, contaminated water can be contained on site by use of isolation valves.

BAT 20	*In order to reduce emissions to water, BAT is to treat waste water using an appropriate combination of the techniques given below:* *a. Equalisation* *b. Neutralisation* *c. Physical separation* *d. Adsorption* *e. Distillation/rectification* *f. Precipitation* *g. Chemical oxidation* *h. Chemical reduction* *i. Evaporation* *j. Ion exchange* *k. Stripping* *l. Activated sludge process* *m. Membrane bioreactor* *n. Nitrification/denitrification when the treatment includes biological treatment* *o. Coagulation and flocculation* *p. Sedimentation* *q. Filtration* *r. Flotation*	The Site does not produce process effluent. Surface water run-off is discharged to sewer via interceptors.

Table 6.2: BAT-associated emission levels (BAT-AELs) for indirect discharges to a receiving water body

Substance/Parameter		BAT-AEL (1) (2)	Waste treatment process to which the BAT-AEL applies
Hydrocarbon oil index (HOI)		0.5–10 mg/l	• Mechanical treatment in shredders of metal waste • Treatment of WEEE containing VFCs and/or VHCs • Re-refining of waste oil • Physico-chemical treatment of waste with calorific value • Water washing of excavated contaminated soil • Treatment of water-based liquid waste
Free cyanide (CN⁻) (3)		0.02– 0.1 mg/l	• Treatment of water-based liquid waste
Adsorbable organically bound halogens (AOX) (3)		0.2–1 mg/l	• Treatment of water-based liquid waste
Metals and metalloids (3)	Arsenic (expressed as As)	0.01–0.05 mg/l	• Mechanical treatment in shredders of metal waste • Treatment of WEEE containing VFCs and/or VHCs • Mechanical biological treatment of waste • Re-refining of waste oil • Physico-chemical treatment of waste with calorific value • Physico-chemical treatment of solid and/or pasty waste • Regeneration of spent solvents • Water washing of excavated contaminated soil
	Cadmium (expressed as Cd)	0.01–0.05 mg/l	
	Chromium (expressed as Cr)	0.01–0.15 mg/l	
	Copper (expressed as Cu)	0.05–0.5 mg/l	
	Lead (expressed as Pb)	0.05–0.1 mg/l (4)	
	Nickel (expressed as Ni)	0.05–0.5 mg/l	
	Mercury (expressed as Hg)	0.5–5 µg/l	
	Zinc (expressed as Zn)	0.1–1 mg/l (5)	
	Arsenic (expressed as As)	0.01–0.1 mg/l	• Treatment of water-based liquid waste
	Cadmium (expressed as Cd)	0.01–0.1 mg/l	
	Chromium (expressed as Cr)	0.01–0.3 mg/l	
	Hexavalent chromium (expressed as Cr(VI))	0.01–0.1 mg/l	
	Copper (expressed as Cu)	0.05–0.5 mg/l	
	Lead (expressed as Pb)	0.05–0.3 mg/l	
	Nickel (expressed as Ni)	0.05–1 mg/l	
	Mercury (expressed as Hg)	1–10 µg/l	
	Zinc (expressed as Zn)	0.1–2 mg/l	

(1) The averaging periods are defined in the General considerations.
(2) The BAT-AELs may not apply if the downstream waste water treatment plant abates the pollutants concerned, provided this does not lead to a higher level of pollution in the environment.
(3) The BAT-AELs only apply when the substance concerned is identified as relevant in the waste water inventory mentioned in BAT 3.
(4) The upper end of the range is 0.3 mg/l for mechanical treatment in shredders of metal waste.
(5) The upper end of the range is 2 mg/l for mechanical treatment in shredders of metal waste.

Bat 21	*In order to prevent or limit the environmental consequences of accidents and incidents, BAT is to use all of the techniques given below as part of the accident management plan:* *a. Protection measures* *b. Management of incidental/accidental emissions* *c. Incident/Accident registration and assessment system*	(g) Bunds and or double skinned walls will be provided for all tanks containing liquids whose spillage could be harmful to the environment. Containment bunds or double skinned walls will be provided to make sure that any leaks/spillages will be contained in the event of a leak of the primary containment. The containment measures will be: capable of containing at least 110% of the volume of the largest tank within the bund; constructed of materials which are impermeable and resistant to the stored materials in accordance with relevant material safety data sheets (MSDS); constructed to the appropriate British Standard and Health and Safety Executive (HSE) guidance; of a type suitable for the containment of the materials in the event of leak or spill; pipework will be routed within bunded areas so that no penetration of walls or base of the bund takes place; and connection points will be located within the bund. GBCTR also has maintenance procedures in place which includes a preventive and reactive maintenance programme. Minor or insignificant leaks or spills will be covered by routine site measures and general housekeeping. The procedures for dealing with more significant spillages are included in the Accident Management Plan. • Significant spillages or leaks of liquids which may be miscible with water will be contained and controlled via the use of suitable absorbent materials kept in spill kits positioned at strategic

		locations around the site. Staff will be trained in the proper use of the spill kits. (h) GBCTR will maintain an Accident Management Plan (AMP) to ensure site staff are fully prepared for any incidents, including the prevention of accidents. • The AMP will adopt a risk assessment approach and outline its primary environmental risk management provisions to each potential hazard and residual environmental risk management provision to prevent and minimise pollution. The AMP will describe the techniques that will be implemented to minimise the risks posed to the environment from existing site activities. • The AMP will be reviewed at least every four years or as soon as practicable after an incident, with changes made accordingly to minimise the risk of occurrence
BAT 22	*In order to use materials efficiently, BAT is to substitute materials with waste.*	The site only processes waste. Other raw materials are limited to reagents such as caustic dosing for the scrubber system that are used in modest quantities.
BAT 23	*In order to use energy efficiently, BAT is to use both of the techniques given below.* *a. Energy Efficiency Plan* *b. Energy Balance Record*	GBCTR monitor records of energy consumption for the Site including monitoring of electricity, gas and fuel usage.
BAT 24	*In order to reduce the quantity of waste sent for disposal, BAT is to maximise the reuse of packaging, as part of the Residues Management Plan.*	Where possible, packaging (such as storage bags, containers and pallets) will continue to be re-used.

<table>
<tr>
<td>BAT 25</td>
<td>In order to reduce emissions to air of dust, and of particulate-bound metals, PCDD/F and dioxin-like PCBs, BAT is to apply BAT 14d and to use one or a combination of the techniques given below.
a. Cyclone
b. Fabric filter
c. Wet scrubbing
d. Water injection into the shredder
Table 6.3
BAT-associated emission level (BAT-AEL) for channelled dust emissions to air from the mechanical treatment of waste
<table>
<tr><th>Parameter</th><th>Unit</th><th>BAT-AEL
(Average over the sampling period)</th></tr>
<tr><td>Dust</td><td>mg/Nm³</td><td>2-5 (¹)</td></tr>
</table>
(¹) When a fabric filter is not applicable, the upper end of the range is 10 mg/Nm³.
The associated monitoring is given in BAT 8.</td>
<td>The panel and frame shredder and separation systems are all fitted with dust abatement collection and bag filters. The battery shredder incorporates a wet scrubber.
Bag filters are designed to meet the BAT-AEL.</td>
</tr>
<tr>
<td>BAT 26</td>
<td>In order to improve the overall environmental performance, and to prevent emissions due to accidents and incidents, BAT is to use BAT 14g and all of the techniques given below:
a. implementation of a detailed inspection procedure for baled waste before shredding;
b. removal of dangerous items from the waste input stream and their safe disposal (e.g. gas cylinders, nondepolluted EoLVs, non-depolluted WEEE, items contaminated with PCBs or mercury, radioactive items);
c. treatment of containers only when accompanied by a declaration of cleanliness;</td>
<td>a) There is no acceptance of baled waste on Site.
b) GBCTR accept only two types of waste from specific sources and contamination with dangerous items is unlikely. Nonetheless, GBCTR will carry out visual inspection as part of waste acceptance checks.
c) The Site will not accept containerised waste.
(i)</td>
</tr>
<tr>
<td>BAT 27</td>
<td>In order to prevent deflagrations and to reduce emissions when deflagrations occur, BAT is to use technique a. and one or both of the techniques b. and c. given below.
a. Deflagration management plan;
b. Pressure relief dampers</td>
<td>The battery shredder system is nitrogen blanketed to minimise the risk of deflagration events.</td>
</tr>
</table>

<table>
<tr><td></td><td>c. Pre-shredding</td><td></td></tr>
<tr><td>BAT 28</td><td>In order to use energy efficiently, BAT is to keep the shredder feed stable.</td><td>Operational measures are in place to ensure that the in-feed is well mixed and stable.</td></tr>
<tr><td>BAT 29</td><td>In order to prevent or, where that is not practicable, to reduce emissions of organic compounds to air, BAT is to apply BAT 14d, BAT 14h and to use technique a. and one or both of the techniques b. and c. given below.
a. Optimised removal and capture of refrigerants and oils
b. Cryogenic condensation
c. Adsorption
(j)
Table 6.4
BAT-associated emission levels (BAT-AELs) for channelled TVOC and CFC emissions to air from the treatment of WEEE containing VFCs and/or VHCs
<table><tr><th>Parameter</th><th>Unit</th><th>BAT-AEL (Average over the sampling period)</th></tr><tr><td>TVOC</td><td>mg/Nm³</td><td>3-15</td></tr><tr><td>CFCs</td><td>mg/Nm³</td><td>0,5-10</td></tr></table>The associated monitoring is given in BAT 8.</td><td>A dryer system is in place to collect electrolyte from the battery shredder. This consists of heating followed by condensation. Exhaust gases are treated in a RTO which is designed to meet the BAT-AEL.</td></tr>
<tr><td>BAT 30</td><td>In order to prevent emissions due to explosions when treating WEEE containing VFCs and/or VHCs, BAT is to use either of the techniques given below.
a. Inert atmosphere
b. Forced ventilation</td><td>The battery shredder is nitrogen blanketed to minimise the risk of explosion.</td></tr>
<tr><td>BAT 31</td><td>In order to reduce emissions to air of organic compounds, BAT is to apply BAT 14d and to use one or a combination of the techniques given below.
a. Adsorption
b. Biofilter</td><td>Exhaust gases from the battery shredder are treated in a RTO to minimise emissions of organic compounds to air.</td></tr>
</table>

	c. Thermal oxidation *d. Wet scrubbing*	
BAT 32	*In order to reduce mercury emissions to air, BAT is to collect mercury emissions at source, to send them to abatement and to carry out adequate monitoring.*	Not applicable as no waste containing mercury is treated at the site.
PHYSICO-CHEMICAL TREATMENT OF SOLID AND/OR PASTY WASTE		
BAT 40	*In order to improve the overall environmental performance, BAT is to monitor the waste input as part of the waste pre-acceptance and acceptance procedures (see BAT 2).* *Monitoring the waste input, e.g. in terms of:* - *content of organics, oxidising agents, metals (e.g. mercury), salts, odorous compounds;* - *H2 formation potential upon mixing of flue-gas treatment residues, e.g. fly ashes, with water.*	The site only accepts two waste streams which are well characterised and unlikely to vary in composition. GBCTR will implement waste pre-acceptance checks and feedstock specifications are in place with suppliers to ensure that the waste has been characterised and classified appropriately before consignment to the Site.
BAT 41	In order to reduce emissions of dust, organic compounds and NH3 to air, BAT is to apply BAT 14d and to use one or a combination of the techniques given below. *a. Adsorption* *b. Biofilter* *c. Thermal oxidation* *d. Wet scrubbing*	Emissions to air are abated with bag filters, a scrubbing system and a RTO to minimise emissions of dust, acid gases and organic compounds respectively.

Appendix B

Appropriate Measures for WEEE Treatment

Appropriate Measure	Compliance
2.1 Management System *You must have and follow an up-to-date written management system. It must incorporate the following features:* *Management commitment, including from senior lawyers* *Environmental policy that is approved by senior managers and includes the continuous improvement of the facility's environmental performance* *You plan and establish the resources, procedures, objectives and targets needed for environmental performance alongside your financial planning and investment.* *You implement your environmental performance procedures inc:* *staff structure and relevant responsibilities* *staff recruitment, training, awareness and competence* *communication (for example, of performance measures and targets)* *employee involvement* *documentation and records* *effective process control* *maintenance programmes* *the management of change (including legislative changes and waste classification changes)* *emergency preparedness and response* *making sure you comply with environmental legislation* *You check environmental performance and take corrective action paying particular attention to:* *monitoring and measurement* *learning from incidents, near misses and mistakes, including those of other organisations* *records maintenance* *independent (where practicable) internal or external auditing of the management system and operations to confirm it has been properly implemented and maintained* Senior managers review the management system at least annually to check it is still suitable, adequate and effective. *You review the development of cleaner and more efficient technologies and their applicability to site operations.*	The Site will be operated in accordance with a bespoke site-specific Environmental Management System which includes all of the aspects identified.

Appropriate Measure	Compliance
When designing new plant, you make sure that you assess the environmental impacts from the plant's operating life and eventual decommissioning. *You consider the risks a changing climate poses to your operations. You have appropriate plans in place to assess and manage future risks.* *You compare your site's performance against relevant sector guidance and standards on a regular basis, known as sectoral benchmarking.* *You have and maintain the following documentation:* *inventory of emissions to air and water* *residues management plan* *accident management plan* *site infrastructure plan* *site condition report* *fire prevention plan* *If required, you have and maintain the following documentation: odour management plan* *noise and vibration management plan* *dust management plan* *pest management plan* *climate change risk assessment*	
2.2 Staff Competence *Your site must be operated at all times by an adequate number of staff with appropriate qualifications and competence.* *The design, installation and maintenance of infrastructure, plant and equipment must be carried out by competent people.* *You must have appropriately qualified managers for your waste activity who are either:* • *qualified under a technical competence scheme* • *operating under a Competence Management System approved under a technical competence scheme* *Non-supervisory staff must be reliable and technically skilled in the activities they are responsible for and in emergency response procedures. Their skills may be based on experience and relevant training.*	GBCTR will operate the site with staff trained to the appropriate qualifications and technical competency requirements. The design of the site will be carried out by competent people.
2.3 Accident management plan *As part of your management system you must have a plan for dealing with any incidents or accidents that could result in pollution.* *The accident management plan must identify and assess the risks the facility poses to human health and the environment.*	GBCTR will maintain an Accident Management Plan (AMP) to ensure site staff are fully prepared for any incidents, including the prevention of accidents.

Appropriate Measure	Compliance
Areas to consider may include: • *waste types and the risks they pose* • *robust waste acceptance procedures to avoid receiving unwanted items, such as gas cylinders* • *failure of abatement systems* • *failure of plant and equipment (for example over-pressure of vessels and pipework, blocked drains)* • *failure of containment (for example, bund failure, or drainage sumps overfilling)* • *damaged lithium-ion batteries* • *failure to contain firefighting water* • *making the wrong connections in drains or other systems* • *checking the composition of an effluent before emission* • *vandalism and arson* • *extreme weather conditions for example flooding or very high winds* *You must assess the risk of accidents and their possible consequences. Risk is the combination of the likelihood that a hazard will occur and the severity of the impact resulting from that hazard. Having identified the hazards, you can assess the risks by addressing:* • *how likely is it that the accident will happen?* • *what may be emitted and how much?* • *where will the emission go – what are the pathways and receptors?* • *what are the consequences?* • *what is the overall significance of the risk?* • *what can you do to prevent or reduce the risk?* *In particular, you must identify any fire risks that may be caused, for example by:* • *arson or vandalism* • *self-combustion, for example the finer fractions of shredder residue* • *plant or equipment failure and electrical faults* • *naked lights and discarded smoking materials* • *hot works (for example welding or cutting), industrial heaters and hot exhausts* • *neighbouring site activities* • *sparks from loading buckets* • *hot loads deposited at the site*	The AMP will adopt a risk assessment approach and outline its primary environmental risk management provisions to each potential hazard and residual environmental risk management provision to prevent and minimise pollution. The AMP will describe the techniques that will be implemented to minimise the risks posed to the environment from existing site activities. It will consider the risks identified where appropriate to the operations at the site. The AMP will be reviewed at least every four years or as soon as practicable after an incident, with changes made accordingly to minimise the risk of occurrence.

Appropriate Measure	Compliance
• *damaged Li-ion batteries in waste electronic and electrical equipment (WEEE) and light iron, heavy melting steel piles and waste from household waste recycling centres* • *batteries left connected in ELVs which can short circuit* • *batteries (storage, processing and handling)* • *ELV depollution activities (if carried out on your site)* • *deflagrations within the shredder and pre-shredders* *You must have a fire prevention plan that identifies the risks at your site and meets the requirements of our fire prevention plan guidance.* *The depth and type of accident risk assessment you carry out will depend on the characteristics of the plant and its location.* *The main factors to consider are the:* • *scale and nature of the accident hazard presented by the plant and its activities* • *risks to areas of population and the environment (the receptors)* • *nature of the plant and complexity of the activities and how difficult it is to decide and justify adequate risk control techniques* *Through your accident management plan, you must also identify the roles and responsibilities of the staff involved in managing accidents. You must provide them with clear guidance on how to manage each accident scenario.* *You must appoint one facility employee as an emergency co-ordinator who will take lead responsibility for implementing the plan. You must train your employees so they can perform their duties effectively and safely and know how to respond to an emergency.* *You must also:* • *establish how you will communicate with relevant authorities, emergency services and neighbours (as appropriate) both before, during and after an accident* • *have appropriate emergency procedures, including for safe plant shutdown and site evacuation* • *have post-accident procedures that include assessing the harm that may have been caused by an accident and the remediation actions you will take* • *test the plan by carrying out emergency drills and exercises*	
2.4 Accident prevention measures *You must take the following measures, where appropriate, to prevent events that may lead to an accident.* ***Waste acceptance and pre acceptance procedures***	The Site will have appropriate pre-acceptance and waste acceptance procedures as detailed in section 3 of the BAT-OT.

Appropriate Measure	Compliance
1. You must have clear and detailed procedures for pre-acceptance and acceptance of waste and for rejected and quarantined wastes. *2. These should be produced and maintained as set out in the waste pre-acceptance, acceptance and tracking appropriate measures section.*	
Segregating waste *3. You must keep apart incompatible wastes. Examples could include but are not limited to:* • *storing lead acid batteries separately to nickel metal hydride batteries* • *segregating flammable gas cylinders in cages away from oxygen cylinders*	Hazardous waste and non-hazardous waste will be stored in separate, segregated locations. If it is suspected that waste which does not conform to that authorised by the permit has been received at the Site, it would be placed in a designated quarantine area and labelled accordingly. This waste would be removed within 14 days of receipt with arrangements made to return the material to the customer.
Preventing accidental emissions *4. You must make sure you contain the following for off-site disposal or route to the effluent system (where necessary):* • *process waters* • *site drainage waters* • *emergency firefighting water* • *oil or chemical contaminated waters* • *spillages of oils and chemicals* *5. You must be able to contain surges and storm water flows. You must provide enough buffer storage capacity to make sure you can achieve this. You can define this capacity using a risk-based approach, for example, by considering the:* • *nature of the pollutants* • *effects of downstream waste-water treatment* • *sensitivity of the receiving environment* *6. You can only discharge waste-water from this buffer storage after you have taken appropriate measures, for example, to control, treat or reuse the water.* *7. You must have spill contingency procedures to minimise the risk of an accidental emission of raw materials, products and waste materials, and to prevent their entry into water.* *8. Your emergency firefighting water collection system must take account of additional firefighting water flows or firefighting foams. You may need emergency storage lagoons to prevent contaminated firefighting water reaching a receiving water body. This should be considered as part of your fire prevention plan.*	4. The Site benefits from impermeable surfacing and a sealed drainage system which can be isolated in the event of a spillage or incident. Process effluent is collected in IBCs and transferred off-site for treatment. Only uncontaminated surface water and water used for cleaning dirt from panels is discharged to sewer. 5. The Site has capacity to contain contaminated water in the event of a fire incident as described in the FPP. The site includes attenuation ponds to manage surface water in the event of heavy rainfall. All external storage and treatment areas are under cover or include weatherproof containment/wrapping such that contamination will not occur. 6. Water contained on site in the event of an incident will be tested to either ensure it is suitable for discharge to sewer, or if not, it will be tankered to an appropriately regulated facility for treatment. 7. The site has a spillage response plan. 8. The FPP provides details of firewater management. 9. The battery shredder design incorporates safety features including nitrogen blanketing and an emergency bypass for use in over-pressure situations.

Appropriate Measure	Compliance
9. You must consider and, if appropriate, plan for the possibility that you need to contain or abate accidental emissions from: • *Overflows* • *Vents* • *safety relief valves* • *bursting discs* *If this is not advisable on safety grounds, you must focus on reducing the probability of the emission.*	
Security measures *10. You must have security measures (and staff) in place to prevent:* • *Entry by intruders* • *Damage to equipment* • *Theft* • *Fly-tipping* • *Arson* *11. Facilities must use an appropriate combination of the following measures:* • *security guards* • *total enclosure (usually with fences)* • *controlled entry points* • *adequate lighting* • *warning signs* • *24-hour surveillance, such as CCTV*	Security measures will be in place at the Site to limit the likelihood of arson or vandalism. These include: • Total enclosure with fencing; • Single access lockable entrance gate locked out of hours; • External K9 security firm that patrols the Site from 11pm - 5am; • 24-hour surveillance CCTV coverage available for viewing in Site managers office and security office. Senior management also have 24-hr access to the cameras via a mobile phone app; and • An alarm system. • Site boundary checks will be completed on a daily basis to identify any weaknesses or defects. Any defects identified will be repaired with a temporary solution within 24 hours and with a permanent fix implemented within 7 days unless a timescale is otherwise agreed with the EA. • All inspections and any defects, damage or repairs will be recorded on the EHS management system incident record.

Appropriate Measure	Compliance
Fire prevention *12. There are 3 fire prevention objectives. You must:* • *Minimise the likelihood of a fire happening* • *Aim for a fire to be extinguished within 4 hours* • *Minimise the spread of fire within the site and to neighbouring sites* *13. You must have appropriate systems for fire prevention, detection and suppression or extinction.*	12. & 13. The FPP provides details of the approach for the site.
Other accident prevention measures *14. You must maintain plant control in an emergency using one or a combination of:* • *alarms* • *process trips and interlocks* • *automatic systems* • *manual interventions* *15. You must:* • *make sure all the measurement and control devices you would need in an emergency are easy to access and operate in an emergency situation* • *maintain the plant so it is in a good state through a preventive maintenance programme and a control and testing programme* • *use techniques such as suitable barriers to prevent moving vehicles damaging equipment* • *have procedures in place to avoid incidents due to poor communication between operating staff during shift changes and following maintenance or other engineering work* • *where relevant, use equipment and protective systems designed for use in potentially explosive atmospheres*	14 & 15. Sections 2.3 and 2.4 detail the measures in place to prevent accidents.
Record keeping and procedures *16. You must:* • *keep an up-to-date record of all accidents, incidents, near misses, changes to procedures, abnormal events, and the findings of maintenance inspections* • *carry out investigations into accidents, incidents, near misses and abnormal events and record the steps taken to prevent their reoccurrence* • *maintain an inventory of substances, which are present (or likely to be) and which could have environmental consequences if they escape – many apparently innocuous substances can damage the environment if they escape*	These aspects will be included in GBCTR's AMP and site procedures.

Appropriate Measure	Compliance
• *have procedures for checking raw materials and wastes to make sure they are compatible with other substances they may accidentally come into contact with* • *make sure that any documents that may be needed in the event of an incident are accessible*	
2.5 Contingency plan and procedures *1. You must have and implement a contingency plan and management procedures to make certain you comply with all your permit conditions and operating procedures during maintenance or shutdown at your Site.* *2. Your contingency plan must also contain provisions and procedures to make sure that you:* • *do not exceed storage limits in your permit and you continue to apply appropriate measures for storing and handling waste* • *stop accepting waste unless you have a clearly defined method of recovery or disposal and enough permitted storage capacity* • *as far as possible, know in advance about any planned shutdowns at waste management facilities where you send waste* *Your contingency plan must include plans and procedures for circumstances where you cannot send your wastes to other Sites due to their planned or unplanned shutdown.* *3. If you produce an end-of-waste material at your facility, your contingency planning must consider issues with storage capacity for end-of-waste products.* *4. You must make your customers aware of your contingency plan, and of the circumstances in which you would stop accepting waste from them.* *5. You must consider whether the Sites or companies you rely on in your contingency plan:* • *can take the waste at short notice* • *are authorised to do so in the quantities and types likely to be needed – in addition to carrying out their existing activities* *6. Where circumstances mean you could exceed your permitted storage limits or compromise your storage procedures, you must look for alternative disposal or recovery options. You must not discount alternative disposal or recovery options based on extra cost or geographical distance.* *7. You must not include unauthorised capacity in your contingency plan. If your contingency plan includes using temporary storage for additional waste on your Site, then you must make sure your Site is authorised for this storage and you have the appropriate infrastructure in place.* *8. Your management procedures and contingency plan must:*	1. GBCTR will have a Business Continuity Plan as part of the Site procedures, as well as procedures for maintenance and planned or unplanned shutdowns. 2. GBCTR has procedures in place to track inventory and storage capacity at all times and has sufficient storage on site to manage planned shutdowns off-site. 3. Not applicable. 4. GBCTR has procedures to advise suppliers of the circumstances where waste would not be accepted. 5. This will be part of the Business Continuity Plan. 6. This will be part of the Business Continuity Plan. 7. The Business Continuity Plan will only make use of waste storage as authorised in the permit. 8. All aspects are included in the facility's operational procedures and AMP. Measures to minimise the potential causes and consequences of accidents, including techniques to manage the likelihood of potential hazards are detailed in Section 2 of this BAT-OT document. 9. The Site's EMS will include the appropriate auditing procedures.

Appropriate Measure	Compliance
• *identify known or predictable malfunctions associated with your technology and the procedures, spare parts, tools and expertise needed to deal with them* • *include a record of spare parts held, especially critical spares – or state where you can get them from and how long it would take to receive them* • *have a defined procedure to identify, review and prioritise items of plant which need a preventative regime* • *include all equipment or plant whose failure could directly or indirectly lead to an impact on the environment or human health* • *identify 'non-productive' or redundant items such as tanks, pipework, retaining walls, bunds, reusable waste containers (for example wheeled carts), ducts, filters and security systems* • *make sure you have the spare parts, tools, and competent staff needed before you start maintenance* *9. Your management system must include procedures for auditing your performance against all these contingency measures and for reporting the audit results to the Site manager.*	
2.6 Plant decommissioning *1. You must consider the decommissioning of the plant at the design stage and make suitable plans to minimise risks during later decommissioning.* *2. For existing plant, identify potential decommissioning risks and take steps to address these. Make changes and design improvements as and when plant is upgraded, or when construction and development works are carried out at your Site. Examples of design improvements could include avoiding using underground tanks and pipework. If it is not economically possible to replace them, you must protect them by secondary containment or a suitable monitoring programme.* *3. You must have and maintain a decommissioning plan to demonstrate that:* • *plant will be decommissioned without causing pollution* • *the Site will be returned to a satisfactory condition* *4. Your decommissioning plan should include details on:* • *whether you will remove or flush out pipelines and vessels (where appropriate) and how you will empty them of any potentially harmful contents* • *Site plans showing the location of all underground pipes and vessels* • *how asbestos or other potentially harmful materials will be removed, unless we have agreed it is reasonable to leave such liabilities to future owners* • *methods for dismantling buildings and other structures, and for protecting surface water and groundwater during construction or demolition at your Site*	The Site benefits from impermeable surfacing and sealed drainage. Storage and layout of activities at the site is designed to minimise the risk from potentially polluting substances. Not applicable as the activities are new. See SCR and section 2.6 of the BAT-OT. See section 2.6 of the BAT-OT for details.

Appropriate Measure	Compliance
• *any soil testing needed to check for any pollution caused by the Site activities, and information on any remediation needed to return the Site to a satisfactory state when you cease activities, as defined by the initial Site condition report* • *the measures proposed, once activities have definitively stopped, to avoid any pollution risk and to return the Site of operation to a satisfactory state (including, where appropriate, measures relating to the design and construction of the plant)* • *the clearing of deposited residues, waste and any contamination resulting from the waste treatment activities* *5. You should make sure that equipment taken out of use is decontaminated and removed from the site.*	
3.1 Waste pre-acceptance *1. Except in the case of small one-off deliveries of WEEE, for example from tradespeople, you must implement waste pre-acceptance procedures so that you know enough about a waste before it arrives at your facility. You need to do this to assess and confirm the waste is technically and legally suitable for your facility.* *Your procedures must follow a risk-based approach, considering:* *the source and nature of the waste* *any hazardous properties and persistent organic pollutant (POPs) content* *potential risks to process safety, occupational safety and the environment (for example, from the presence of hazardous substances that could be dispersed during treatment)* *knowledge about the previous waste holder* *the type of containment used for the waste* *2. You must get the following information in writing when you receive a customer query:* *details of the waste producer (who you are receiving the waste from) including organisation name, address and contact details* *where the waste is coming from* *full description of the waste including the quantity* *the List of Waste code (European Waste Classification, EWC, code)* *any hazardous properties or presence of any regulated chemicals, for example, POPs* *if WEEE identified as POPs waste on the classify WEEE pages is described as not being a POPs waste, you should request evidence of the assessment demonstrating this* *with reference to Annex VII of the WEEE Directive, details of any treatment already undertaken*	1 – 2. The Site will only accept the waste types permitted in the permit. The material feedstock will be sourced either from GBCTR or through partnerships with third parties. Only two waste streams are accepted and the composition is well-defined and unlikely to vary significantly. The Site will be operated under appropriate pre-acceptance procedures. See Section of this BAT-OT for a summary of the Site's procedures. 3. There is no acceptance of waste for the purposes of reuse. 4. Not applicable to the waste types to be accepted. 5. Only two waste streams are accepted and the composition is well-defined and unlikely to vary significantly. GBCTR will carry out visual inspections of the waste loads accepted at the Site to ensure no gross contamination is evident. Checks and inspections will be undertaken by a member of staff who is suitably qualified and trained. Any wastes found to be incompatible are immediately taken to a quarantine area on Site. 6. Pre-acceptance records following receipt of the waste will to be kept. 7 – 8. These aspects are included in GBCTR's pre-acceptance procedures. See Section 3 of this BAT-OT document for a summary of the Site's procedures.

Appropriate Measure	Compliance
3. You should consider with your customer whether the WEEE is suitable for preparing for reuse. Where that remains a possibility, you should ensure the WEEE is handled and transported with care to avoid any damage or loss that could affect reuse. *4. You must also obtain confirmation that the WEEE does not contain a radioactive source other than domestic smoke detectors and specialist lamps such as xenon lamps. If there is a risk of radioactive contamination, for example, in certain types of medical equipment, you must obtain confirmation that the waste is not radioactive, unless your facility is permitted to accept such waste.* *5. You must consider whether specific wastes, from among those you are permitted to receive, have properties that can pose unacceptable risks to the Site or process. For example, due to:* a risk of explosion (for example, from gas or aerosol canisters that may be present) a risk of fire (for example, from WEEE containing lithium-ion batteries) *You should establish a list of such wastes and procedures for managing the risks from them.* *6. You must keep pre-acceptance records following receipt of the waste. If an enquiry from a waste producer does not lead to the receipt of waste, you do not need to keep records.* *7. You must reassess the information required at pre-acceptance if the:* *waste changes* *process giving rise to the waste changes* *waste received does not conform to the pre-acceptance information* *8. In all cases you must reassess the information required at pre-acceptance on an annual basis.*	

3.2 Waste acceptance *1. You must implement waste acceptance procedures to check that the characteristics of the waste received matches the information you obtained during waste pre-acceptance. This is to confirm that the waste is as expected, and you can accept it. If it is not, you must confirm that you can accept it as a non-conforming waste, or you must reject it. If you are rejecting hazardous waste you must follow the guidance on the procedure for rejecting hazardous waste. Procedures should be documented and auditable.* *2. Your procedures must follow a risk-based approach, considering:* the source, nature, condition and age of the waste any hazardous properties of the waste any persistent organic pollutant content in the waste potential risks to process safety, occupational safety and the environment (for example, the presence of lithium-ion batteries) knowledge about the previous waste holders *3. If, in the case of small one-off deliveries of WEEE (for example those from tradespeople) you have not received any pre-acceptance information, you must fully assess the load to make sure it is technically and legally suitable for your process.* ***Storage areas*** *4. All relevant storage areas (quarantine, reception and general) and treatment processes in your facility must have the physical capacity needed for the waste you receive. You must not receive wastes if this capacity is not available. The amount of waste you receive must also comply with storage limits in your permit.* *5. The waste offloading, reception and quarantine areas must have impermeable surfaces with a sealed drainage system. This system must collect all surface water run-off and channel it to a blind sump unless you can lawfully discharge it.* *6. You must clearly designate a materials reception area (or areas). Staff controlling the inspection, reception and validation of materials at the facility, must be trained in their respective roles.* ***Waste acceptance*** *7. You must weigh each load of waste on arrival to confirm the quantities against the accompanying paperwork, unless alternative reliable systems are available (for example, based upon volume). You must record the weight in the waste tracking system.* *8. You must visually check wastes and verify them against pre-acceptance information and transfer documentation before you accept them on Site.* *9. You must check and validate all transfer documentation and resolve discrepancies before you accept the waste. If you believe the incoming waste classification and description is incorrect or incomplete, then you must address this with the customer during waste*	1 – 3. GBCTR will have appropriate waste acceptance procedures in place in accordance with these requirements, as detailed in Section 3 of this BAT-OT document. 4. GBCTR will employ an electronic waste tracking system to record all waste inputs and outputs and track capacity at the processing facility to ensure that waste is not accepted if there is no capacity available. 5. All offloading, storage and treatment is carried out on impermeable surfacing with sealed drainage. 6. Inspections take place in the off-loading area of the yard. 7.- 12. These will form part of GBCTR's waste acceptance criteria. See section 3 of the BAT-OT for details. 13 – 16. Section 3.4 of the BAT-OT sets out the quarantine procedures that will be followed at the site.

acceptance. You must record any non-conformances. If you have assessed the waste as acceptable for on-site storage or treatment, you must document this. *10. You must have clear criteria that you use to reject non-conforming wastes. You must also have a written procedure for recording, reporting and tracking non-conforming wastes, including notifying the relevant customer or waste producer to prevent reoccurrence.* *11. The person carrying out waste acceptance checks must be trained to effectively identify and manage any non-conformances in the loads received, complying with this guidance and your permit conditions.* *12. If there is a known risk of radioactive contamination other than the presence of smoke detectors and certain specialist lamps such as xenon lamps, you must check the waste to determine that it does not include radioactive material unless your Site is permitted to accept that type of radioactive waste.* ***Quarantine storage*** *13. You must establish quarantine areas for WEEE and materials that are prohibited, awaiting full inspection, or awaiting assessment or removal.* *14. Quarantine storage must be for a maximum of fourteen working days.* *15. You must have written procedures in place for dealing with wastes held in quarantine, and a maximum storage volume. For some limited and specific cases (for example, the detection of radioactivity), you can extend quarantine storage time if the Environment Agency agrees.* *16 Quarantine storage must be separate from all other storage and clearly marked as a quarantine area.*	

Appropriate Measure	Compliance
3.3 Waste tracking *1. You must use a waste tracking system to hold up-to-date information about the available capacity of the waste quarantine, reception, general and bulk storage areas of your facility including treatment residues and end of waste product materials.* *2. Your waste tracking system must hold all the information generated during:* pre-acceptance acceptance non-conformance or rejection storage treatment removal off Site *This information must be readily accessible.* *3. You must create records and update them to reflect deliveries, on-site treatment and despatches. This can be done on a 'loads received' basis. Your tracking system will also operate as a waste inventory and stock control system. It must include this information as a minimum:* *the date the waste arrived on-Site* *the* producer's *details (or unique identifier)* *a unique* reference *number* *waste pre-acceptance and acceptance information* *the* quantity *delivered* *the* intended *treatment route* *accurate* records *of the nature and quantity of wastes held on Site, including all hazards – and identifying the primary hazards and presence of any regulated chemicals such as POPs* *where* the *waste is physically located on Site* *4. The tracking system must be able to report:* *the total quantity of waste present on Site at any one time* *a breakdown by type of the waste quantities you are storing pending treatment or transfer* *the quantity of waste on Site compared with the limits authorised by your permit* *the length of time the waste has been on Site* *the quantity of end-of-waste product materials on Site at any one time, and, where applicable details of any non-conformances and rejections* *5. You must store back-up copies of electronic records off Site. Records must be readily accessible in an emergency.*	1 – 6. GBCTR will employ an electronic waste tracking system, which stores all the information on each batch throughout the waste stream's lifecycle on Site. This will include all the listed requirements.

Appropriate Measure	Compliance
6. You must hold pre-acceptance and acceptance records for a minimum of 2 years after you have treated the waste or removed it off Site. You may have to keep some records for longer if they are required for other purposes, for example, hazardous waste consignment notes.	
4.1 General waste storage *1. You should design and operate your facility in a way that minimises the handling of waste. Waste handling must be carried out by competent staff using appropriate equipment.* *2. Where possible, you should locate storage areas away from watercourses and sensitive perimeters (for example, those close to public rights of way, housing or schools).* *3. You must store all waste within the security protected area of your facility to prevent unauthorised access and vandalism*	1. The site is designed and operated to minimise handling of waste, using competent staff and appropriate equipment. 2. Storage areas are located appropriately at the site. 3. All waste is stored within the security protected area of the facility.
Storage duration and capacity *4. You must clearly establish the maximum storage capacity of the Site and designated storage areas and you must not exceed these maximum capacities.* *5. You must define capacity in pile sizes as well as tonnage. You must regularly monitor the quantity of waste stored on the Site and within the designated areas to check against the allowed maximum capacity. You must also monitor the quantities and pile sizes against those set out in your fire prevention plan.* *6. Where relevant, you must conform to Health and Safety Executive (HSE) guidance and standards.* *7. You must not accumulate waste unnecessarily. You must treat wastes, or remove them from the Site, as soon as possible.* *8. You must store all waste in a way that allows easy inspection. You must maintain safe access between piles of wastes. There must always be pedestrian and vehicular access (for example, forklift) to the whole of the storage area.* *9. You must store and handle waste in a way that prevents pests and vermin. You must have specific measures and procedures in place to identify and manage any wastes that are causing pests or vermin at your Site.* *10. Waste storage areas and stored equipment must be subject to frequent inspection to make sure that any leaks, spillages of liquids, dust or loose material are identified and managed appropriately, and fire breaks are maintained. You must keep written records of the inspections. You must rectify and log any spillages of waste.* *11. You must not carry out activities that represent a clear fire risk within any storage area. Examples include:* *Grinding* *welding or brazing of metalwork*	4. Storage capacity is defined in Table 4-1 of the BAT-OT and in the FPP. 5. Section 4 of the BAT-OT and he FPP provide details of capacity and tracking. 6. HSE guidance and standards are followed where relevant (NOTE: this is not considered to be a relevant consideration for EPR). 7. GBCTR's waste tracking system will be used to ensure waste does not accumulate or exceed duration periods. 8. Waste storage is clearly defined on the site layout drawing 02 and described in the FPP and BAT-OT and allows for easy inspection. 9. The type of waste accepted at the facility will not attract pests and vermin. 10. Routine daily visual inspections of the Site will be undertaken by Site personnel to ensure that the Site operates correctly and any leaks or spillages are identified. 11. These aspects are covered in the FPP. 12. The battery shredding system has been assessed for DSEAR zoning. 13 & 14. Both areas benefit from impermeable surfacing and sealed drainage. 15. There will be no acceptance of waste for the purposes of reuse.

Appropriate Measure	Compliance
smoking *parking of normal road vehicles except while unloading or loading* *recharging forklift truck or power tool batteries* *12. You should assess areas of the Site where explosive atmospheres could occur. Where appropriate these must be classified into hazardous zones in accordance with the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR).* *13. Outdoor waste storage areas must have an impermeable surface with a sealed drainage system. It must collect all surface water run-off and channel it to a blind sump unless it may be lawfully discharged.* *14. Indoor waste storage areas must have an impermeable surface and you must provide spillage collection facilities.* *15. You must use weatherproof covering to store any items that may be reused as whole appliances or may have components recovered from them for reuse. The type of covering will depend on the types and quantities of waste but must ensure the WEEE is protected from the weather.* *16. You must also use weatherproof covering in areas used for storage of waste containing hazardous material or fluids where this is necessary to avoid contamination of surface water. This includes, but is not necessarily limited to, the storage of* *lamps and processed fractions* *flat panel display equipment which may contain cold-cathode fluorescent lamp (CCFL) backlights and where these are processed by shredding, the shredded fractions* *broken cathode ray tubes (CRTs) and CRT glass* *shredded WEEE or plastic containing fractions that may be POPs waste* *17. Covering may still be required even if you have a consent to discharge surface water to sewer or if water is tankered away. For example, to avoid leached chemicals such as persistent organic pollutants from WEEE plastic entering the water environment.* *18. Any spillage or leakage resulting from the storage of WEEE or processed materials must be collected without delay using equipment and procedures appropriate to the type of spillage. The collected residues must be stored in a lidded, leakproof container. Any containers or surfaces affected by the spillage must be cleaned.* *19. You must train forklift drivers in the handling of waste, to minimise forklift truck damage to the integrity of containers or individual appliances.*	16 & 17. Weatherproof covering or containers will be used for storage of waste containing hazardous materials or fluids. 18. The spillage response plan within the Site's AMP will address this risk. 19. All employees, including forklift truck drivers, will be given training on appropriate handling of waste. Records of training will be retained. 20. Electrolyte removed from batteries will be stored in 1m3 IBCs in a bunded area of the site. 21. - 23. All batteries are stored in designated areas of the site as shown in in Drawing 002, in clearly labelled containers and with appropriate fire prevention measures in place as detailed in the FPP.

Appropriate Measure	Compliance
20. Any liquids removed from WEEE must be collected and stored in lidded, leakproof containers. Containers must be kept closed when not being filled and must be stored within a bunded area to contain any leakage or spillage. *21. You must store the following separately and securely from other WEEE in leakproof containers to prevent leakage and spillage. Containers must be closed or stored under cover to prevent the accumulation of rainwater* *batteries, capacitors and other similar components which could leak* *any components which may contain residual liquids* *22. You must clearly label containers to identify their contents.* *23. Where lithium-ion batteries are stored (either separately or as mixed batteries) these must be recognised as a fire hazard and marked and stored accordingly.*	
4.2 Additional storage requirements for specific categories of WEEE *The following appropriate measures apply to specific WEEE categories in addition to those in the general waste storage section.* *Gas discharge lamps* *Flat panel display (FPD) equipment* *Cathode ray tube (CRT) equipment* *Small mixed WEEE (SMW)* *Photovoltaic panels*	Gas discharge lamps, FPD equipment, CRT equipment and SMW are not accepted at the Site. Photovoltaic panels will be off-loaded, handled and stored carefully to prevent breakage. They will be stored glass side down to minimise the residual risk of generating electricity which could cause electrocution or fire.
5.1 Preparing WEEE for reuse *1. You should give priority to preparing WEEE so it can be reused either as a whole or in part. If it cannot be reused, you must make sure it is recycled or recovered at a suitable permitted or exempt WEEE treatment facility.* *2. You should identify and segregate all WEEE that could be reused as soon as possible to prevent damage to it and to maximise the opportunities for reuse.* *3. You must store WEEE designated for reuse under weatherproof covering and separate from other WEEE. You must transport it securely to an appropriately permitted or exempt Site for preparing for reuse.* *4. WEEE that is POPs waste must not be prepared for reuse – follow the guidance on how to identify and destroy waste that contains POPs.* *5. You must demonstrate that any WEEE that is being prepared for reuse is fully functional and electrically safe. You should treat WEEE (both whole appliances and recovered parts) that is being prepared for reuse under a suitable standard such as BS EN 50614:2020.* *6. If you are preparing WEEE for reuse you must take precautions to make sure there is no pollution of the environment. The standards specified elsewhere in this guidance for storage*	1 – 7. Not relevant. There will be no acceptance of waste for the purposes of reuse.

Appropriate Measure	Compliance
of components, liquids and other materials apply equally when WEEE is being prepared for reuse. *7. If you are removing or re-charging refrigerants that are F-gas in temperature exchange equipment you must be suitably qualified to work with F-gas.*	
5.2 General waste treatment *1. Where WEEE cannot be prepared for reuse it must be treated to maximise the recycling and recovery of materials whether that is at the same facility or by further downstream processing.* *2. You must fully understand, monitor and optimise your waste treatment process to make sure you treat waste effectively and efficiently. You must not treat waste to deliberately dilute it or mix any hazardous outputs with any non-hazardous outputs.* *3. The treated output material must meet your expectations and you must fully classify and characterise them to ensure they are suitable for their intended disposal or recovery route.* *4. You must identify and characterise emissions from the process and take appropriate measures to control them at source.* *5. You must have up-to-date written details of your treatment activities, and the abatement and control equipment you are using. This should include information about the characteristics of the waste you will treat, and the waste treatment processes, including:* *simplified process flowsheets that show the origin of any emissions* *details of emission control and abatement techniques for emissions to air and water, including details of their performance* *diagrams of the main plant items where they have environmental relevance – for example, storage, tanks, treatment and abatement plant design* *details of manual dismantling processes, for example removal of cables and plugs, removal of batteries, capacitors and printer cartridges, draining of oil from radiators* *details of physical treatment processes, for example shredding, separation, compaction, filtration, heating, cooling or washing* *details of any chemical treatment processes* *details of any biological treatment processes* *details of any effluent treatment, including a description of any flocculants or coagulants used* *an equipment inventory, detailing plant type and design parameters – for example, time, temperature, pressure* *waste types to be subjected to the process*	1. WEEE is not prepared for re-use at the site. The purpose of the facility is to treat WEEE by shredding and separation techniques to maximise the recycling and recovery of materials. 2. GBCTR monitors and optimises waste treatment processes carried out at the site to maximise the volume of materials that are recovered. 3. Material quality is monitored to ensure that it meets the specification required by recovery processes off-site. 4. See BAT-OT Section 6 5. See BAT-OT Section 5. 6. GBCTR will have procedures in place for abnormal operating conditions. The shredding and separation processes will benefit from several process control features which will ensure robust control of the processes and prevent the development of abnormal operating conditions. The plant will be controlled from a central control system. All control functions are accessed from the system and status of the plant is displayed graphically. 7, 8, 9, 10 & 11. Physical separation processes used to separate the components of the waste into fractions containing low levels of contaminants in order to maximise recovery. Emissions of dust, acid gases and VOCs are minimised by use of bag filters, a caustic scrubber and an RTO respectively. The types of waste processed have relatively uniform and well-defined composition and characteristics and process parameters are controlled to address any known variability between batches of waste. 12. The properties of the in-feed are well-known and strict waste acceptance and quarantine procedures minimise the

Appropriate Measure	Compliance
the control system philosophy and how the control system incorporates environmental monitoring information *process flow diagrams (schematics)* *venting and emergency relief provisions* *a summary of operating and maintenance procedures* *process instrumentation diagrams* *6. You must have up to date written details of the measures you will take during abnormal operating conditions to make sure you continue to comply with permit conditions.* *Abnormal operating conditions may include:* *unexpected releases* *start up* *momentary stoppages* *shut down* *7. You should use material flow analysis for relevant contaminants in the waste to help identify their flow and fate. You should use the analysis to determine the appropriate treatment for the waste either directly at the Site or at any subsequent treatment Site.* *8. Material flow analysis considers the contaminant quantity in the:* *waste input* *different waste treatment outputs* *waste treatment emissions* *9. You should use the analysis and your knowledge of the fate of the contaminants to make sure you correctly treat and either destroy or remove them.* *10. The use of material flow analysis is risk-based considering:* *the hazardous properties of the waste* *the restricted chemicals in the waste* *the risks posed by the waste in terms of process safety* *occupational safety and environmental impact* *knowledge of the previous waste holders* *11. A treatment process may destroy certain substances in the waste. It could also put substances into the air, water or the ground, or produce residues which are sent for disposal. You should minimise the weight of these outputs. The treatment process may produce residues for recovery or reuse and you should maximise the weight of these outputs.* *12. You must not proceed with the treatment if your risk assessment or material flow analysis indicates that losses from a process will cause:* *the breach of an environmental quality standard* *the breach of a benchmark*	risks of non-conforming material entering the in-feed. These measures, together with other pollution control techniques in place at the site mean that it is highly unlikely that environmental standards will be exceeded or that the activities will cause a significant environmental impact. 13. Procedures for managing changes to the process will be part of the facility's EMS. 14. Dust collection and abatement is in place for the mechanical treatment activities. 15 & 16. Electrolyte is separated from the solid residues from battery shredding and collected for treatment off-site. 17. All fractions from the processing are stored separately in FIBCs (or IBCs in the case of the electrolyte) before being transferred off-site for recovery or additional treatment. 18. GBCTR will include a full description of the processed fractions when transferring them for recovery or treatment elsewhere. 19. Not relevant 20. Weight of all outputs will be recorded. 21 – 23. Cable and junction boxes are the only components removed. These will be stored separately pending transfer off-site. 24 & 25. The site has dedicated battery storage areas with appropriate containment. 26, 27 & 28. Indoor and outdoor areas have impermeable surfacing and sealed drainage. All external storage and treatment areas are undercover or in weatherproof containers/packaging.

Appropriate Measure	Compliance
a significant environmental impact *13. To track and control the process of change, you must have a written procedure for proposing, considering and approving changes to technical developments, or to procedural or quality changes.* *14. You must minimise the release of diffuse emissions to air from activities which may give rise to them (for example, shredding or granulating) by:* *carrying out the activity using enclosed equipment or in an enclosed building* *maintaining the enclosed equipment or buildings under an appropriate pressure* *collecting and directing the emissions to an appropriate abatement system* *15. Unless you are preparing it for reuse, you must remove all fluids from WEEE along with those substances, mixtures and components listed in Annex VII of the WEEE Directive.* *16. Removal may be a staged process and may be undertaken at different facilities. You must be able to demonstrate either:* *you have removed the substances, mixtures and components listed in Annex VII of the WEEE Directive from WEEE as required by the conditions of your permit* *those substances, mixtures and components will be removed at a suitably authorised downstream treatment facility* *17. You must make sure that any substances, mixtures and components removed as part of your treatment process are subsequently recovered or disposed of at an appropriately permitted facility.* *18. If you transfer partially treated WEEE to another Site you must properly describe it, so the recipient knows which treatments are complete and which still need to be done.* *19. You should no longer routinely find certain hazardous items and substances that were once used in electrical appliances but are now banned. However, they may still be present on occasions.* *20. You must monitor and record the outputs of your treatment activity, including their weight. The monitoring must be used to provide evidence that the treatment and removal of these components and substances has been carried out to a satisfactory standard.* *21. When removing components, you must safely remove the whole item where breaking it up might:* *pollute the recyclate or waste stream* *result in unacceptable emissions* *22. Components that you must always remove whole, that is intact and identifiable, (unless this guidance states specific circumstances where you do not need to) include:* *capacitors containing polychlorinated biphenyls (PCBs)* *mercury containing components*	

Appropriate Measure	Compliance
toner cartridges *components with asbestos* *components with refractory ceramic fibres* *components with radioactive substances* *gas discharge lamps including CCFL backlights* *cathode ray tubes* *electrolyte capacitors containing substances of concern that have a height and/or diameter greater than 25mm or have a proportionately similar volume* *batteries and powerpacks* *23. Instead of removing them as whole components, you may recover the following as fragments or materials using mechanical treatment:* *chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) or hydrofluorocarbons (HFCs), hydrocarbons (HCs)* *external electric cables* *printed circuit boards* *liquid crystal displays* *the activated coating in cathode ray tubes (CRTs)* *plastic with brominated flame retardants (BFRs)* *24. You may either:* *sort batteries on site* *send batteries as a mixture of chemistry types to a specialist battery treatment operator for sorting* *25. You must pack and store lithium and lithium-ion batteries removed from WEEE during treatment in a way to minimise the likelihood of electrical shorting, physical impact and overheating.* *26. All outdoor WEEE treatment areas must have an impermeable surface with a sealed drainage system. It must collect all surface water run-off and channel it to a blind sump unless it may be lawfully discharged.* *27. Indoor WEEE treatment areas must have an impermeable surface and you must provide spillage collection facilities appropriate to the materials being handled.* *28. WEEE treatment should take place under weatherproof covering such as a roofed building. Where this is not practicable, for example, due to the large size of the plant, appropriate measures must be taken to minimise the exposure of waste to rain and wind. This may include the covering of:* *Hoppers* *Conveyors*	

Appropriate Measure	Compliance
skips of treated materials *storage bays containing treated materials*	
5.3 Treatment of WEEE containing BRFs and POPs *1. You must identify, separate and remove any plastic containing BFRs for further treatment.* *2. Some BFRs used in electrical appliances are POPs. An industry-led investigation identified the presence of decabromodiphenyl ether (deca BDE) and other polybrominated diphenyl ethers (PBDE) in some WEEE plastics.* *3. You must make sure that any items of WEEE and any component or material fractions derived from the treatment of WEEE that is POPs waste (as defined by Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants) are treated as required by that regulation.* *4. POPs may be present in any WEEE category. In large domestic appliance (LDA) white goods (tumble driers, washing machines, dishwashers and cookers only) and temperature exchange equipment, POPs have been shown to be present but in insufficient quantities to make the appliances themselves POPs waste.* *5. All other categories of WEEE should be regarded as POPs waste, unless you have clear evidence of the chemical composition of the cables, printed circuit boards and plastic components in the individual devices present that demonstrates it is not.* *6. Plastic removed from WEEE that is POPs waste must be managed as POPs waste.* *7. Components that have been found to contain POPs above the POPs waste threshold include printed circuit boards and electrical cable.* *8. The treatment of WEEE that is not POPs waste, but which may contain POPs in some components, may result in fractions where the POPs threshold is exceeded. You must assess plastic containing fractions at each stage in the treatment process to establish whether the threshold is exceeded and, where it is, manage those fractions as POPs waste.* *9. You may treat any plastic that is POPs waste to separate the POPs containing fraction from the non-POPs containing plastic. For example, density separation can be used to separate plastic containing all BFRs from that which does not. The non-BFR plastic may then be recycled. You must demonstrate that your process reliably achieves a satisfactory separation.* *10. Other hazardous chemicals may be used as flame retardants. You must consider antimony trioxide when you are classifying any WEEE or plastic containing fraction from the treatment of WEEE.* *11. You must not repair or refurbish for reuse any WEEE that is a POPs waste – it must be treated to destroy the POP.*	1 – 7. Plastic components of certain PV panels and cables removed from panels may contain POPS. These material fractions will be stored separately pending transfer off-site for treatment / disposal. 8. Incoming PV panels will be assessed to establish whether they may contain POPs and plastics fractions will be characterised and handled accordingly. 9. No additional separation of POPs plastic will take place at the site. 10. Antimony trioxide may be present in some types of PV panel. 11. No waste will be repaired for re-use at the facility. 12. deca BDE may be present in junction boxes and cables. See 1- 7 above. 13, 14. No waste will be repaired for re-use at the facility.

Appropriate Measure	Compliance
12. Deca BDE was the last of the PBDEs to be banned from use in electrical equipment under the Restriction of Hazardous Substances Directive (RoHS) and came into effect during 2008. Even so, there is evidence that deca BDE is present in some appliances manufactured since then. *13. If you prepare for reuse WEEE that may be POPs waste, you can only do so if it has an original manufacture date on or after 1 January 2009 and if it is reused within the UK.* *14. If you repair or refurbish WEEE that may be POPs waste and intend to export the equipment for reuse abroad, you must demonstrate that the equipment does not contain POPs.*	
5.4 Process monitoring *1. At least once a year, for every WEEE stream you treat, you must carry out a mass balance exercise to determine and record the mass of each individual output fraction derived from a given mass of input material. The batch size must be large enough to make sure you can assess a representative sample of typical input materials.* *2. You should compare each set of results with previous results to monitor the performance of your Site and to ensure it is performing optimally.* *3. Where process monitoring requires chemical analysis to be carried out on waste fractions and residues produced by your treatment process, this must be carried out by an independent accredited laboratory, using recognised accredited methods where they are available.* *4. You must have, and be able to provide, a full description of the material testing and analysis procedures and methods used, which provide details of the calibration methods and reference standards used.* *5. You must choose the sample containers and packaging used for storing and transporting according to the nature and requirements of the materials they will contain. For example, chemical properties, pressure and gas tightness.* *6. You must clearly label sample containers with at least the name of the treatment facility, a description of the waste material or residue contained, the waste stream it was produced from and the date of sampling.* *7. You must make sure that any required sample is representative of the waste and has been taken by someone technically competent to do so. A representative sample is one that takes account of the full variation and any partitioning of the material.* *8. Samples must be stored in a dark, cool place and dispatched to the laboratory for analysis as soon as possible, preferably within 24 hours of being taken.*	1 & 2. A mass balance will be carried out at least once per year for the two waste streams treated and processed on Site. GBCTR will monitor all inputs and outputs on an electronic waste tracking system. 3 – 11. GBCTR will ensure procedures covering these points are included in its environmental management system.

Appropriate Measure	Compliance
9. You must carry out sampling under normal operating conditions unless otherwise stated. *10. If process monitoring shows that the performance of your treatment plant does not meet any of the standards stated in this guidance, you must send a report to the Environment Agency, summarising:* *the actions you will take to improve performance in order to achieve the standards given, including any additional sampling and testing* *the dates you will complete these actions by, including the dates for any additional sampling and testing* *11. Wherever possible you should sample waste fractions and residues in line with relevant guidance.*	
5.5 Treatment of gas discharge lamps	Not relevant. No acceptance/treatment of gas discharge lamps.
5.6 Treatment of cathode ray tube equipment	Not relevant. No acceptance/treatment of cathode ray tube equipment.
5.7 Treatment of FPD equipment	Not relevant. No acceptance/treatment of FPD equipment.
5.8 Treatment of SMW	Not relevant. No acceptance/treatment of SMW equipment.
5.9 Treatment of IT, telecommunications and business equipment	Not relevant. No acceptance/treatment of IT, telecommunications and business equipment.
5.10 Treatment of LDA	Not relevant. No acceptance/treatment of LDA.
5.11 Treatment of photovoltaic panels 1. Photovoltaic panels may contain hazardous substances such as lead (in solder), cadmium telluride and compounds of selenium (in the semiconductor layer of non-silicon based photovoltaic panels). You must establish, maintain and use an effective process for identifying non-silicon based photovoltaic panels. 2. You must remove the lead from all photovoltaic panels and you must remove the hazardous semi-conductor layer from non-silicon based photovoltaic panels.	1 –3. Non-silicon based PV panels will not be accepted for processing at the site.

Appropriate Measure	Compliance
• **Process monitoring for the treatment of photovoltaic panels** 3. Where you shred non-silicon based photovoltaic panels, you must sample and test the recycled glass fraction at least once every 6 months for cadmium with a limit value of 10mg/kg cadmium.	
5.12 Post-shredding treatments *1. You may use a range of separation technologies to further segregate and purify shredded fractions of WEEE. For example, eddy-current separators, electrostatic separators, and density separation, either at the shredding facility or elsewhere.* *2. You must fully characterise and classify fractions produced by these processes.* *3. Where materials originate from WEEE that was POPs waste, fractions of plastic containing brominated flame retardants must be managed as POPs waste.* *4. Where materials originate from WEEE that was not POPs waste, fractions of plastic containing brominated flame retardants must be assessed to determine if they are POPs waste.* *5. You must fully characterise and classify (including for POPs) process solutions and washings from density separation processes before determining suitable disposal options. Where these originate from the treatment of POPs waste, any POPs must be destroyed.* *6. You must only use waste codes for single material outputs, for example plastic, where the treatment involved is aimed at producing a pure material fraction. Contamination by other materials must be negligible.* ***Process monitoring for the separation of BFR containing plastic*** *7. You must monitor at least once every 3 months how much BFR containing plastic is present in any fraction destined for recycling.*	1 – 5. Separated fractions will be characterised and classified and where it is established that they contain POPs, handles in accordance with those requirements. 6. The appropriate EWC code will be assigned to waste outputs in accordance with WM3 guidance. 7. If relevant, the appropriate monitoring will be carried out.
5.13 Record keeping for all treatment residues *You must record in the waste tracking system:* • *that the WEEE has been treated or consigned to another WEEE treatment facility* • *what WEEE has been prepared for reuse or has been consigned to a preparing for reuse operator* • *what the treatment residues, treated components and fractions are*	GBCTR will record information for all treatment residues on an electronic waste tracking system.
6.1 Point source emissions to air	1. Details of abatement systems can be found in Section 5 of the BAT-OT.

Appropriate Measure	Compliance
1. You must contain the waste treatment process to make sure that you collect, extract and direct all process emissions to an appropriate abatement system for treatment before release. *2. You must identify the main chemical constituents of the Site's point source emissions as part of the Site's inventory of emissions to air. You must include the speciation of volatile organic compounds (VOCs) if you have identified them in the emissions inventory and it is practicable to do so.* *3. You must assess the fate and impact of the substances emitted to air, following the Environment Agency's air emissions risk assessment methodology.* *4. To reduce point source emissions to air (for example, dust, volatile organic compounds and odour) from the treatment of waste, you must use an appropriate combination of abatement techniques, including one or more of the following systems:* • *Adsorption* • *fabric filter* • *wet scrubbing* • *HEPA filter* • *condensation and cryogenic condensation* • *cyclone* • *electrostatic precipitator (ESP)* • *thermal oxidation* *5. You must assess and design vent and stack locations and heights to make sure dispersion capability is adequate.* *6. Where monitoring is required, including for odour, you must install a suitable monitoring point. Monitoring points will be required to meet MCERTS standards.* *7. Your procedures must make sure you correctly install, operate, monitor and maintain abatement equipment. For example, this includes monitoring and maintaining:* • *appropriate flow and chemical concentration of scrubber liquor* • *the handling and disposal or regeneration of spent scrubber or filter medium*	2 – 5. An Air Emissions Risk Assessment (AERA) has been carried out on the residual emissions of particulates. See Section 6 of the BAT-OT and AERA report. 6. Monitoring points will be installed in accordance with MCERTS requirements. 7. Site procedures will be in place to ensure that abatement equipment is correctly installed, operated, monitored and maintained.
6.2 Fugitive emissions to air (including odour) *1. You must use appropriate measures to prevent emissions of dust, mud and litter and odour.* *2. You must design, operate and maintain storage and treatment plant in a way that prevents fugitive emissions to air, including dust, organic compounds and odour. Where that is not possible, you must minimise these emissions. Storage and treatment plant includes associated equipment and infrastructure such as:* • *shredder*	1. See Section 6 of the BAT-OT document for controls used to prevent emissions of dust, litter, mud, odour and pests from Site operations. 2, 3. See Appendix A BAT14. 4. Waste pre-acceptance and waste acceptance procedures will be in place to reduce the risk of accepting non-conforming wastes and managing them in the unlikely event

Appropriate Measure	Compliance
• *sorting equipment* • *conveyors* • *skips or containers* • *building fabric, including doors and windows* • *pipework and ducting* *3. To make sure fugitive emissions are collected and directed to appropriate abatement, your treatment plant must use high integrity components (for example, seals or gaskets).* *4. You must use your waste pre-acceptance, waste acceptance and site inspection checks and procedures to identify and manage wastes that could cause, or are causing, fugitive emissions to air. When you identify any of these wastes you must:* • *take appropriate, risk assessed measures to prevent and control emissions* • *prioritise their treatment or transfer* *5. Where necessary, to prevent fugitive emissions to air from the storage and handling of odorous or dusty wastes, you should use a combination of the following measures:* • *store and handle such wastes within a building or enclosed equipment* • *keep buildings and equipment under adequate negative pressure with an appropriate abated air circulation or extraction system* • *where possible, locate air extraction points close to potential emissions sources* • *use fully enclosed material transfer and storage systems and equipment, for example, conveyors, hoppers, containers, tanks and skips* • *keep building doors and windows shut to provide containment, other than when access is required for loading or unloading* • *minimising drop height* • *use misting systems and wind barriers* *6. Where a dust management plan is required, you must develop and implement it following our guidance on emissions management plans for dust.*	that they are received on Site. Wastes accepted at the site are not dusty. 5. see Appendix A BAT14. 6. The site has a DEMP in place.
Maintenance and cleaning *7. You must set up a leak detection and repair programme. You must use it to promptly identify and mitigate any fugitive emissions from treatment plant and associated infrastructure (such as pipework, conveyors, tanks).* *8. You must regularly inspect and clean all waste storage and treatment areas, equipment (including conveyor belts) and containers. You must contain any residues collected during cleaning.*	7 – 11. See BAT14 Appendix A. .

Appropriate Measure	Compliance
9. Your maintenance and cleaning schedules must make sure that your plant is regularly cleaned to avoid large-scale decontamination activities. *10. You must take measures to prevent the corrosion of plant and equipment (for example, conveyors or pipes). This includes:* • *selecting and using appropriate construction materials* • *lining or coating equipment with corrosion inhibitors* • *regularly inspecting and maintaining plant* *11. You must have an appropriate regular maintenance programme covering all buildings, plant and equipment. This must also include protective equipment such as air ventilation and extraction systems, curtains and fast-action doors used to prevent and contain fugitive releases.*	
Odorous wastes *12. You must have procedures to minimise the amount of time odorous wastes spend in your storage and handling systems (for example, pipes, conveyors, hoppers, tanks). In particular, you must have provisions to manage waste during periods of peak volume.* *13. You must have measures to contain, collect and treat odorous emissions, including using contained buildings and plant or equipment with appropriate air extraction and abatement. We do not consider masking agents to be appropriate measures for the treatment of odorous emissions.* *14. You must monitor and maintain odour abatement systems to ensure optimum performance. For example, you should make sure that scrubber liquors are maintained at the correct pH and replenished or replaced at an appropriate frequency.* *15. Contaminated waters have potential for odours. You must store them in containers or enclosed tanks that are vented to an abatement system.* *16. Where you expect odour pollution at sensitive receptors, or it has been substantiated, you must periodically monitor odour emissions using European (EN) standards. For example, either:* • *dynamic olfactometry according to EN 13725 to determine the odour concentration* • *EN 16841-1 or -2 to determine the odour exposure* *17. If you are using alternative methods for which no EN standards are available (for example, estimating odour impact), you should use ISO, national or other international standards to make sure you use data of an equivalent scientific quality. You must set out the monitoring frequency in the odour management plan.*	12 – 19. Not applicable. There will be no odorous wastes handled on site. Waste pre-acceptance and waste acceptance procedures will be in place to reduce the risk of accepting non-conforming wastes and managing them in the unlikely event that they are received on Site. See Section 6 of the BAT-OT.

Appropriate Measure	Compliance
18. Where you expect odour pollution at sensitive receptors, or it has been substantiated, you must also set up, implement and regularly review an odour management plan. It must be part of your management system and include all of the following elements: • *actions and timelines to address any issues identified* • *a procedure for conducting odour monitoring* • *a procedure for responding to identified odour incidents, for example, complaints* • *an odour prevention and reduction programme designed to identify the source(s), to characterise the contributions of the sources and to implement prevention and reduction measures* *19. Where an odour management plan is required, you must develop and implement it following our guidance on odour management plans.*	
6.3 Emissions of noise and vibration *1. You should design the layout of the facility to locate potential sources of noise (including building exits and entrances) away from sensitive receptors and boundaries. You should locate buildings, walls, and embankments so they act as noise screens.* *2. You must use appropriate measures to control noise, for example, including:* • *adequately maintaining plant or equipment parts that may become noisier as they deteriorate – such as bearings, air handling plant, building fabric, and specific noise attenuation kit associated with plant or machinery* • *closing doors and windows of enclosed areas and buildings* • *avoiding noisy activities at night or early in the morning* • *minimising drop heights and the movement of waste and containers* • *using broadband (white noise) reversing alarms and enforcing the on-site speed limit* • *using low-noise equipment, for example, drive motors, fans, compressors and pumps* • *adequately training and supervising staff* • *where possible, providing additional noise and vibration control equipment for specific noise sources – such as noise reducers or attenuators, insulation, or sound-proof enclosures* *3. Where noise or vibration pollution at sensitive receptors is expected, or has been substantiated, you must create, use and regularly review a noise and vibration management plan. This must be part of the environmental management system, and must include:* • *actions and timelines to address any issues identified*	See BAT17 and 18 Appendix A.

Appropriate Measure	Compliance
• *a procedure for noise and vibration monitoring* • *a procedure for responding to identified noise and vibration events, for example, complaints* *4. Your noise and vibration management plan should also include a noise and vibration reduction programme designed to:* • *identify the sources of noise and vibration* • *measure or estimate noise and vibration exposure* • *characterise the contributions of the sources* • *implement prevention and reduction measures* *5. Where a noise and vibration management plan is required, you must develop and implement it following our guidance.*	
6.4 Point source emissions to water and sewer *1. You must identify the main chemical constituents of the site's point source emissions to water and sewer as part of the site's inventory of emissions.* *2. You must assess the fate and impact of the substances emitted to water and sewer, following the Environment Agency's risk assessment guidance.* *3. Except for uncontaminated surface water, for example roof drainage, discharges to water or sewer must comply with the conditions of an environmental permit or trade effluent consent. Relevant sources of waste-water include (but are not limited to):* • *water or condensate collected from treatment processes* • *waste compactor runoff* • *vehicle washing* • *vehicle oil and fuel leaks* • *washing of containers* • *spills and leaks in waste storage areas* • *loading and unloading areas* • *uncovered storage areas* *4. POPs may leach or wash out in particulates from some wastes, such as shredded WEEE plastic or granulated cable, if exposed to the weather. You must prevent the release of POPs to water or sewer by storing these wastes and any other shredded POPs waste under weatherproof covering.* *5. To reduce emissions to water and sewer, if you need to treat waste water before discharge or disposal, you must use an appropriate combination of treatment techniques, including one or more of the following:*	See BAT 3, BAT 6 Appendix A.

Appropriate Measure	Compliance
• *preliminary or primary treatment – for example, equalisation, neutralisation or physical separation* • *physico-chemical treatment – for example, adsorption, distillation or rectification, precipitation, chemical oxidation or reduction, evaporation, ion exchange, or stripping* • *biological treatment – for example, activated sludge process or membrane bioreactor* • *nitrogen removal – for example, nitrification and denitrification* • *solids removal – for example, coagulation and flocculation, sedimentation, filtration or flotation*	
6.5 Fugitive emissions to land and water *1. You must use appropriate measures to control potential fugitive emissions and make sure that they do not cause pollution. See the guidance on emissions to water and leaks from containers.* *2. You must have these in all operational areas of the facility:* • *an impermeable surface* • *sealed construction joints* • *spill containment kerbs* *3. For outdoor operational areas you must also have a sealed drainage system.* *4. Your sealed drainage system must collect all surface water run-off and channel it to a blind sump unless it may be lawfully discharged to water or sewer.* *5. You must collect and treat separately each water stream generated at the facility, for example, surface run-off water or process water. Separation must be based on pollutant content and treatment required. In particular you must make sure you segregate uncontaminated water streams from those that require treatment.* *6. You must use suitable drainage infrastructure to collect surface drainage from areas of the facility where you store, handle and treat waste. You must also collect washing water and occasional spillages.* *7. Depending on the pollutant content, you must either:* • *recirculate what you have collected* • *discharge it in accordance with an environmental permit or trade discharge consent* • *send it for further treatment*	1 – 4. See Section 6 of the BAT-OT for measures taken to control potential fugitive emissions. 5. Process effluent is separately collected and transferred off site for treatment. Only uncontaminated surface water is discharged to sewer. 6. The Site benefits from a sealed drainage system. 7. Any surface water run-off including any potentially contaminated water from the Site is passed through an interceptor before discharge to sewer. 8. Maintenance procedures will be in place. 9. See section 2.4 above 10. Water held in buffer storage in the case of an incident, will be tested prior to release to foul sewer or tankering off-site, depending on the test result. 11. Emissions from washing or cleaning will be released to foul sewer. 12. Existing measures are in place to ensure oils and fuels are stored appropriately as detailed in Section 5 of this BAT-OT document.

Appropriate Measure	Compliance
8. You must have design and maintenance provisions in place to detect and repair leaks. These must include regularly monitoring, inspecting and repairing equipment and minimising underground equipment and infrastructure. *9. You should provide appropriate buffer storage capacity at your facility to store waste waters, taking into account:* • *potential abnormal operating scenarios and incidents* • *the nature of any polluting substances and their impact on the downstream waste water treatment plant and receiving environment* *10. You must have appropriate measures in place to monitor, treat and reuse the water held in the buffer storage before discharging.* *11. You must take measures to prevent emissions from washing and cleaning activities, including:* • *directing liquid effluent and wash-waters to foul sewer or collecting them in a sealed system for off-Site disposal – you must not discharge them to surface or storm drains* • *where possible, using biodegradable and non-corrosive washing and cleaning products* • *storing all detergents, emulsifiers and other cleaning agents in suitable bunded or containment facilities, within a locked storage area, or in a building away from any surface water drains* • *preparing cleaning or disinfection solutions in contained areas of the Site and never in areas that drain to the surface water system* *12. Where relevant, you must have measures to prevent pollution from the on-Site storage, handling and use of oils and fuels.*	
Spill response plan *13. You must produce and implement a spillage response plan and train staff to follow it and test it.* *14. Your procedures and associated training must make sure you deal with spillages immediately.* *15. You must keep spill kits at locations close to areas where a spillage could occur and make sure relevant staff know how to use them. Make sure kits are replenished after use.* *16. You must take measures to stop spillages from entering drains, channels, gullies, watercourses and unmade ground. You must make available proprietary sorbent materials, sand or drain mats for use when required.*	13 – 17. The Site will adhere to the spillage response in its AMP.

Appropriate Measure	Compliance
17. You must make sure your spillage response plan includes information about how to recover, handle and correctly dispose of waste produced from a spillage.	
Designing and maintaining surfacing and subsurface structures *18. For subsurface structures, you must:* • *establish and record the routing of all site drains and subsurface pipework* • *identify all sub-surface sumps and storage vessels* • *engineer systems to minimise leakages from pipes and make sure they are detected quickly if they do occur, particularly where hazardous substances are involved* • *provide secondary containment or leakage detection for sub-surface pipework, sumps and storage vessels* • *establish an inspection and maintenance programme for all subsurface structures, for example, pressure tests, leak tests, material thickness checks or CCTV* *19. For surfacing, you must design appropriate surfacing and containment or drainage facilities for all operational areas, taking into account:* • *collection capacities* • *surface thicknesses* • *strength and reinforcement* • *falls* • *materials of construction* • *permeability* • *resistance to chemical attack* • *inspection and maintenance procedures* *20. You must have an inspection and maintenance programme for impermeable surfaces and containment facilities.*	18. Subsurface structures, such as drainage channels and interceptor tanks have been identified and indicated on Site Layout Drawing 002. GBCTR has an inspection and maintenance programme which also applies to subsurface structures. 19. The surfacing and containment or drainage facilities for all operational areas of the permit has been designed in accordance with these aspects. 20. GBCTR has an inspection and maintenance programme which also applies to impermeable surfaces and containment facilities.
Tanks and bunding *21. You must bund all above-ground tanks containing liquids whose spillage could be harmful to the environment.* *Bunds must:* • *be impermeable and resistant to the stored materials* • *have no outlet (that is, no drains or taps) and drain to a blind collection point* • *have pipework routed within bunded areas with no penetration of contained surfaces*	21. See Section 6.5 of the BAT-OT details for measures.

Appropriate Measure	Compliance
• *be designed to catch leaks from tanks or fittings* • *have a capacity greater than 110 percent of the largest tank or 25 percent of the total tankage, whichever is the larger* • *have regular visual inspections – any contents must be pumped out or otherwise removed under manual control after checking for contamination* • *be fitted with a high-level probe and an alarm (as appropriate) if not frequently inspected* • *have tanker connection points within the bund (where possible), otherwise provide adequate containment* • *have programmed engineering inspections – normally visual, but extending to water testing if structural integrity is in doubt* • *be emptied of rainwater regularly to maintain their containment capacity*	
1. Where you are required to monitor emissions to comply with the requirements of your environmental permit you must follow our monitoring your emissions guidance. *2. You must create and maintain an inventory (emissions inventory) of point source emissions to air and water (including emissions to sewer) for your facility.* ***7.1 Emissions to air*** *1. Your facility's emissions inventory must include information about the relevant characteristics of point source emissions to air, such as the:* • *average values and variability of flow and temperature* • *average concentration and load values of relevant substances and their variability* • *flammability, lower and higher explosive limits and reactivity* • *presence of other substances that may affect the waste gas treatment system or plant safety – for example, oxygen, nitrogen, water vapour, dust* *2. Monitoring locations must meet MCERTS standards. Monitoring must be carried out using MCERTS qualified accredited methods and MCERTS certified staff. Further guidance can be found in our guidance M1 sampling requirements for stack emissions monitoring.* *3. You must carry out emissions monitoring when the plant is operating at or near to full treatment capacity. Information regarding the plant treatment processing rate and air flow rate at the time of monitoring must be recorded and submitted with the monitoring results.* *4. You must monitor point source emissions to air from your treatment plant for the following substances using the monitoring standards stated. You must monitor at the frequencies stated and meet the specified emission limits unless your permit states alternative requirements.*	1. Emissions are monitored in line with the EA's requirements. 2. An inventory of emissions is kept for the site. Emissions to air: 1-4 : The current monitoring schedule and authorised emission limits are shown in section 6 of the BAT-OT.

Appropriate Measure	Compliance
Channelled emissions to air from all mechanical treatment of WEEE • *Dust - Emission limit – 5 mg/m³ (where it is inappropriate to fit a fabric filter due to the potential effects of deflagration on the filter, the limit is 10 mg/m³) – every 6 months* • *TVOC – every 6 months* • *Dioxin-like PCBs – every 12 months* • *PCDD/F – every 12 months* • *BFRs – every 12 months* • *Metals and metalloids excluding mercury – every 12 months*	
7.2 Emissions to water or sewer *1. Your facility's emissions inventory must include information about the relevant characteristics of point source emissions to water or sewer, such as:* • *average values and variability of flow, pH, temperature, and conductivity* • *average concentration and load values of relevant substances and their variability – for example, COD (chemical oxygen demand) and TOC (total organic carbon), nitrogen species, phosphorus, metals, priority substances or micropollutants* • *data on bio-eliminability – for example, BOD (biochemical oxygen demand), BOD to COD ratio, Zahn-Wellens test, biological inhibition potential, for example, inhibition of activated sludge* *2. For relevant emissions to water or sewer identified by the emissions inventory, you must monitor key process parameters (for example, waste water flow, pH, temperature, conductivity, or BOD) at key locations. For example, these could either be at the:* • *inlet or outlet (or both) of the pre-treatment* • *inlet to the final treatment* • *point where the emission leaves the facility boundary* *3. For the following types of discharges, you must monitor point source emissions to water or sewer for the substances listed using the monitoring standards stated. You must meet the specified emission limits unless your permit states otherwise.* ***Direct discharges to a water body from all Sites carrying out the mechanical treatment of WEEE*** • *TOC – Emission limit 60 mg/l – every month* • *COD – Emission limit 180 mg/l – every month* • *Total suspended solids – Emission limit 60 mg/l – every month*	1-3. Only uncontaminated surface water is discharged to sewer. It is not considered necessary to apply emission limits or monitoring requirements for discharge to sewer. The discharge is controlled under a Trade Effluent Discharge Consent.

Appropriate Measure	Compliance
Discharges to sewer or a water body from all mechanical treatment of WEEE • *Hydrocarbon oil index – Emission limit 10 mg/l – every month* ***Discharges to sewer or a water body from all mechanical treatment of WEEE, when the substance concerned is identified as relevant based on your facility's emissions inventory*** • *Metals and metalloids (frequency every month), including:* ○ *arsenic, 0.05 mg/l* ○ *cadmium, 0.05 mg/l* ○ *chromium, 0.15 mg/l* ○ *copper, 0.5 mg/l* ○ *lead, 0.1 mg/l* ○ *nickel, 0.5 mg/l* ○ *mercury 0.005 mg/l* ○ *zinc, 1.00 mg/l* ○ *PFOA, PFOS and deca BDE (frequency every 6 months)*	
For your facility, you must monitor and review the annual quantity of: • *water, energy and raw materials used* • *residues and waste water produced* *You must do this at least once every year.* ***8.1 Energy efficiency*** *1. You must create and implement an energy efficiency plan at your facility. This must:* • *define and calculate the specific energy consumption of the activity (or activities) you do and waste stream(s) you treat* • *set annual key performance indicators – for example, specific energy consumption (expressed in kWh/tonne of waste processed)* • *plan periodic improvement targets and related actions* *2. You must regularly review and update your energy efficiency plan as part of your facility's management system.* *3. You must have and maintain an energy balance record for your facility. This must provide a breakdown of your energy consumption and generation (including any energy or heat exported) by the type of source (electricity, gas, conventional liquid fuels, conventional solid fuels, and waste). You should provide Sankey diagrams or energy balances to show how energy is used in your waste treatment processes.* *4. You must regularly review and update your energy balance record as part of your facility's management system, alongside the energy efficiency plan.*	1 – 7. See Section 8 of the BAT-OT.

Appropriate Measure	Compliance
5. You must have operating, maintenance and housekeeping measures in place in relevant areas, for example, for: • *air conditioning, process refrigeration and temperature exchange systems (leaks, seals, temperature control, evaporator or condenser maintenance)* • *the operation of motors and drives* • *compressed gas systems (leaks, procedures for use)* • *steam distribution systems (leaks, traps, insulation)* • *space heating and hot water systems* • *lubrication to avoid high friction losses* • *boiler operation and maintenance, for example, optimising excess air* • *other maintenance relevant to the activities within the facility* *6. You must have measures in place to avoid gross energy inefficiencies. These should include, for example:* • *insulation* • *containment methods (such as seals and self-closing doors)* • *avoiding unnecessary discharge of heated water or air (for example, by fitting simple control systems such as timers and sensors)* *7. You should implement additional energy efficiency measures at the facility as appropriate, following our guidance on energy efficiency standards for industrial plants.*	
8.2 Raw materials (installations only) *1. You must maintain a list of the raw materials used at your facility and their properties. This includes auxiliary materials and other substances that could have an environmental impact.* *2. You must regularly review the availability of alternative raw materials and use any suitable ones that are less hazardous or polluting. This should include, where possible, substituting raw materials with waste or waste-derived products.* *3. You must justify the continued use of any substance for which there is a less hazardous alternative.* *4. You must have quality assurance procedures in place to control the content of raw materials.*	1 – 4. See Section 8.2 of the BAT-OT.
8.3 Water use (installations only) *1. You must take measures to make sure you optimise water consumption to:* • *reduce the volume of waste water generated* • *prevent or, where that is not practicable, reduce emissions to soil and water* *2. You must take these measures:*	1 – 9. See Section 8.3 of the BAT-OT.

Appropriate Measure	Compliance
• *implement a water saving plan (involving establishing water efficiency objectives, flow diagrams and water mass balances)* • *optimising the use of washing water (for example, dry cleaning instead of hosing down, using trigger control on all washing equipment)* • *recirculating and reusing water streams within the plant or facility, if necessary after treatment* • *reducing the use of water for vacuum generation (for example, using liquid ring pumps with high boiling point liquids) where relevant* *3. You must carry out a regular review of water use (a water efficiency audit) at least every 4 years.* *4. You must also:* • *produce flow diagrams and water mass balances for your activities* • *establish water efficiency objectives and identify constraints on reducing water use beyond a certain level (usually this will be site specific)* • *identify the opportunities for maximising reuse and minimising use of water* • *have a timetabled improvement plan for implementing additional water reduction measures* *5. To reduce water use and associated emissions to water, you should apply these general principles in sequence:* • *use water efficient techniques at source where possible* • *reuse water within the process, by treating it first if necessary – if not practicable, use it in another part of the process or facility that has a lower water quality requirement* • *If you cannot use uncontaminated roof and surface water in the process, you should keep it separate from other discharge streams – at least until after you have treated the contaminated streams in an effluent treatment system and have carried out final monitoring.* *6. You should establish the water quality requirements associated with each activity and identify whether you can substitute water from recycled sources. Where you can, include it in your improvement plan.* *7. Where there is scope for reuse (possibly after some form of treatment) you should keep less contaminated water streams, such as cooling waters, separate from more contaminated streams.* *8. You must minimise the volume of water you use for cleaning and washing down by:* • *vacuuming, scraping or mopping in preference to hosing down* • *reusing wash-water (or recycled water) where practicable*	

Appropriate Measure	Compliance
• *using trigger controls on all hoses, hand lances and washing equipment* *9. You must directly measure fresh water consumption and record it regularly at every significant usage point, ideally on a daily basis.*	
8.4 Waste minimisation, recovery and disposal *1. You must have and implement a residues management plan that:* • *minimises the generation of residues arising from waste treatment* • *optimises the reuse, regeneration, recycling or energy recovery of residues, including packaging* • *makes sure you properly dispose of residues where recovery is technically or economically impractical* *2. Where you must dispose of waste, you must carry out a detailed assessment identifying the best environmental options for waste disposal.* *3. You must regularly review options for recovering and disposing of waste produced at the facility. You must do this as part of your management system to make sure you are using the best environmental options and promoting the recovery of waste where technically and economically viable.*	1 – 3. See Section 8.4 of the BAT-OT.

Appendix C

Appropriate Measures for Non-Hazardous and Inert Waste

Appropriate Measure	Compliance
3.3 Quarantine *1. Your facility must have a dedicated waste quarantine area or areas which you use to temporarily store waste being rejected, or non-conforming waste whilst it is being assessed. Quarantine areas must have impermeable surface with self-contained drainage if there is a risk of contaminated runoff from the quarantined waste.* *2. Where there is a risk of fugitive emissions from quarantined waste you must store it in closed or covered containers or within a building.* *3. Quarantine storage must be separate from all other storage and clearly marked as a quarantine area.* *4. You should store the waste in quarantine in closed containers or cover it to prevent emissions if appropriate. For example, you should sheet quarantined contaminated soil or store it in a covered skip to prevent rainfall or wind from mobilising pollutants.* *5. You must have written procedures for dealing with wastes held in quarantine, including a maximum storage volume. The maximum storage time must take account of the potential for odour generation, pest infestation and storage conditions. If the waste is infested or odorous you must remove it within 24 hours or sooner.*	1. The facility has a dedicated quarantine area which can be used to temporarily store waste being rejected, or non-conforming waste whilst it is being assessed. It has an impermeable surface, and the drainage system can be isolated from these areas if there is a risk of contaminated runoff from the quarantined waste. 2. If there is a risk of fugitive emissions from quarantined waste it will be stored in closed or covered containers. 3. Quarantine storage is separate from all other storage. 4. Quarantined waste is stored in appropriate containers. 5. Written quarantine procedures for dealing with wastes held in quarantine are detailed in Sections 3.2 of this BAT-OT.
General waste storage *6. You should clearly mark all waste storage areas and provide signs indicating the type of waste stored there.* *8. Except for inert waste, you must follow the first-in-first-out principle, unless you need to prioritise more recently received wastes because they pose a higher risk of pollution.* *9. You must minimise refuse derived fuel (RDF) and solid recovered fuel (SRF) storage durations. You must implement an auditable bale identification system so that you can remove bales in date order.* *10. You must securely wrap bales of RDF and SRF with high-density polyethylene (HDPE) membrane or equivalent. This is to prevent water entering, access by pests and odour release. You should inspect bales regularly and rewrap any that are damaged. If they are wrapped securely, you can store them outside (unless your permit forbids this). If you store bales outside, your fire prevention plan must manage the risks from solar heating during hot weather.* *11. You must thoroughly clean storage bays and containers on a regular basis to prevent the build-up of aging waste, which will be a source of odour and attract vermin.* *12. All waste containers must be fit for purpose, that is:* • *in sound condition*	Items 1 – 5 and item 7 are covered in responses in Appendix B: WEEE EA Appropriate Measures 6. Materials storage and handling procedures are described in Section 4 of the BAT-OT document. 8. The first in first out (FIFO) principle applies to all materials received to Site. 9 – 10. Not relevant. No RDF or SRF accepted or processed on Site. 11. The Site will be kept clean and tidy by way of a regularised housekeeping regime. The waste types stored will not result in odour or attract vermin. 12. Waste containers will be fit for purpose according to the waste type and will be monitored for wear as part of the planned maintenance and repair schedule.

Appropriate Measure	Compliance
• *not corroded, if metal* • *have well-fitting lids* • *suitable for the contents* • *with caps, valves and bungs in place and secure* • *within the manufacturer's designed lifespan, particularly for plastic containers*	
4.1 Segregation *1. You should keep different types of waste segregated if contamination would inhibit the recovery of the waste.* *2. Where paper, plastic, metal or glass have been collected separately, they must not be mixed with other waste or material. This duty applies where you are required to keep wastes separate and to help with or improve waste recovery.*	1. Materials storage and handling procedures to ensure different types of waste are segregated are described in Section 4 of the BAT-OT document. Containment for all the hazardous waste types including waste containing hazardous material or fluids will either be in an enclosed structure with a roof or include the use of weatherproof covering. 2. These types of waste will not be mixed with other wastes or material.
Waste Treatment *1. Waste treatment must have a clear and defined benefit. You must fully understand, monitor and optimise the waste treatment process to make sure you treat waste effectively and efficiently. You must not treat waste to deliberately dilute it. The treated output material must meet your expectations and be suitable for its intended disposal or recovery route. You must identify and characterise emissions from the process and take appropriate measures to control them at source.*	The overall objective of the Site is to maximise the recovery of materials from waste, thereby moving waste up the hierarchy and minimising the volume sent to landfill or Energy from Waste (EfW) facilities for disposal.
5.1 Soils and Inert Waste	Not relevant.
5.2 Waste treatment outputs, including fines *1. You must not make assumptions about the nature of the outputs from your waste treatment processes. You must make sure that you appropriately classify the outputs following WM3 If you do not, you may breach your Duty of Care for waste and commit an offence under the Environmental Protection Act 1990.* *This is particularly important for fines arising from shredding and trommelling processes, which generally:* • *require disposal at cost* • *contain a range of contaminants* • *are likely to be subject to a mirror entry code in the LoW, for example 19 12 11* versus 19 12 12.*	1. Waste outputs will be assessed in accordance with the requirements of the WM3 Waste Classification guidance document. 2. Any hazardous waste collected from the facility will be consigned in accordance with the Hazardous Waste (2005) Regs. 3. Not relevant. No end-of-waste material is produced on site.

Appropriate Measure	Compliance
2. Any hazardous waste taken from your facility must be consigned following our guidance Dispose of hazardous waste. *3. If an output is not waste, for example because end-of-waste criteria have been met, or the material has been produced in accordance with a Quality Protocol (resource framework), then you do not need to store the output within your permitted area. However, non-waste materials are still able to cause pollution, for which you remain liable. You must implement appropriate measures to prevent and minimise risks of pollution from non-waste and waste materials.*	
5.3 Waste treatment for landfill	Not relevant.
6.1 Enclosure within buildings *1. Enclosing activities within buildings can be an appropriate measure for preventing and minimising emissions of pollution, given that an appropriately designed building will reduce a range of types of pollutants, in particular, noise, dust and odour. A partially enclosed building may be an appropriate measure on its own, or together with other appropriate measures, depending on the site-specific circumstances.* *2. If your waste treatment activities are likely to cause (or are causing) significant pollution at sensitive receptors which cannot be addressed by alternative measures, then you must carry out that waste treatment activity within an enclosed building.* *3. You must also carry out non-treatment activities, such as storing and transferring waste (including loading and unloading) in enclosed buildings if these activities are likely to cause (or are causing) significant pollution at sensitive receptors which cannot be addressed by alternative measures.* *4. Material transfer and storage systems and equipment (for example conveyors, hoppers, containers and tanks) can extend outside the enclosed building so long as they are also fully enclosed.* *5. You must regularly assess your enclosed building's integrity. You should consider using BS EN ISO 9972:2015 to demonstrate building containment. This method is based on fan pressurisation. You should carry out a smoke test at least annually and where potential faults in building integrity are likely to be causing pollution such as odour.* *6. Enclosed buildings must be ventilated to provide a safe working environment for employees. Your building's ventilation system must be properly designed and effective in order for the building to provide adequate containment and prevent fugitive emissions and unacceptable noise. The engineer designing the ventilation system must be appropriately qualified. To validate the size of supply points (louvers), and the*	1. All treatment which may result in dust or noise takes place within an enclosed building. Pre-cleaning of panels and discharging of batteries takes place under cover outside the main building. Sections 6 of the BAT-OT summarises appropriate techniques and controls to minimise the emissions of noise, dust and odour respectively. 2 – 3. The activities at the site are unlikely to cause significant pollution at sensitive receptors. Point source air emissions abatement is in place for the shredders and mechanical separation processes. 4. Not relevant to this site. 5. GBCTR's site procedures include maintenance inspections and a preventive and reactive maintenance programme. This will include the building fabric and integrity. 6 – 7. Equipment within the building incorporates localised dust collection and filtration system and has been selected to minimise the emissions of noise. 8. see 5 above. 9. See 6-7 above. 10. The buildings have been designed for industrial use and a noise impact assessment has been carried out.

Appropriate Measure	Compliance
volume of dirty air that needs to be extracted, the engineer must understand and consider: the needs of the occupants working in the building heat release the volume of moist gas emissions that will be generated *7. The air inside the enclosed building must be maintained under negative pressure, or you must install a localised extraction system that extracts dirty air from sources of pollution within the building. Sources that could potentially benefit from localised extraction include:* *shredders and trommels* *waste loading and unloading areas* *odorous stockpiles* *8. You must regularly assess the integrity of your building for damage that could result in fugitive emissions, including noise breakthrough. You must prevent and minimise damage by implementing a maintenance programme.* *9. You must implement measures to control door opening, to make sure that the engineered ventilation system works as effectively as possible. It must direct emissions to the abatement system, rather than letting them escape as fugitive emissions through doors or windows. If you use negative pressure, it must be maintained when doors are opened, and you must monitor the pressure to demonstrate its effectiveness. Additional measures to minimise fugitive emissions may be required in some cases, for example installing an airlock entry system.* *10. To reduce emissions of noise and vibration, the building must have an appropriate minimum surface density. You must install acoustic seals on doors and windows, following advice from an acoustic specialist.*	
6.6 Pests *1. You must manage waste in a way that prevents pests. For example, if you do not manage flies, rats and birds they can affect operations, be a nuisance to neighbours and pose an environmental and health hazard as a potential vector for pathogens. We have produced internal guidance for our officers on fly management. Contact us if you would like a copy.* *2. If you expect pests will cause pollution, hazard or annoyance at sensitive receptors, or if this has been substantiated, you must create, use and regularly review a pest management plan, following our guidance.* *3. Your pest management plan must include procedures for:*	1 – 2. The wastes accepted at the Site will not be susceptible to pests due to negligible contamination with organic residues. 3. A pest management plan is not appropriate for this Site. In the unlikely event that birds, vermin or pests are identified on Site, a specialist pest control contractor will be employed to undertake measures to remove the animals from the Site.

Appropriate Measure	Compliance
inspecting for and controlling pests *rejecting loads of infested waste* *treating pest infestations promptly, and removing waste if necessary* *storing, handling and using approved pest control products – you can get information on using chemicals at work from the Health and Safety Executive*	
1. You must have and implement a residues management plan that: *minimises the generation of residues arising from waste treatment* *optimises the reuse, regeneration, recycling or energy recovery of residues, including packaging* *makes sure you properly dispose of residues where recovery is technically or economically impractical* 2. Where you must dispose of waste, you must carry out a detailed assessment identifying the best environmental options for waste disposal. You must review on a regular basis options for recovering and disposing of waste produced at the facility. You must do this as part of your management system to make sure that you are still using the best environmental options and promoting the recovery of waste where technically and economically viable.	1 – 2. See Section 2.1.6 of the BAT-OT. The site's EMS will include procedures for periodic review of options for waste minimisation.

Appendix D

Appropriate Measures for Chemical Waste

No.	Appropriate Measures	Specific Measures
4. WASTE STORAGE, SEGREGATION AND HANDLING APPROPRIATE MEASURES		
	5. You must clearly mark hazardous waste storage areas and provide signs showing the maximum quantity and hazardous properties of wastes that can be stored there. *6. Storage area drainage infrastructure must:* • *Contain all possible contaminated run-off* • *Prevent incompatible wastes coming into contact with each other* • *make sure that fire cannot spread* *7. Secondary and tertiary containment systems must conform to CIRIA guidance C736 Containment systems for the prevention of pollution.* *8.. You must store containerised wastes that are sensitive to air, light, heat, moisture or extreme ambient temperatures under cover protected from such ambient conditions. Covered areas must have good ventilation. This applies to any such container:* • *held in general storage, reception storage (pending acceptance) or quarantine* • *being emptied, repackaged or otherwise managed* *9. You must store wastes in sealed metal containers under cover if they have the potential for self-heating or self-reactivity. You must monitor the containers for heat build-up. Such wastes include rags and filter materials contaminated with metal swarf, low boiling point oils or low flash point solvents.* *10. Wherever practicable you should store all other wastes under cover. Covered areas must have good ventilation. This applies to any such container:* • *held in general storage, reception storage (pending acceptance) or quarantine* • *being emptied, repackaged or otherwise managed* *11. You must not store hazardous waste in open-topped containers. Empty open-topped containers should be kept in a building or undercover to prevent rainwater ingress.* *12. You must not store or hold wastes on site in vehicles or vehicle trailers unless you are receiving them or preparing them for imminent transfer (meaning that you will remove them from site within 24 hours, or 72 hours if over a weekend).* *13. You should pay particular attention to avoid the build-up of static electricity when you are storing or handling flammable wastes and materials. You should*	5. Waste will be stored in accordance with the procedures outlined in Section 4 of the BAT-OT document and measures outlined in the Site's Fire Prevention Plan (FPP). These outline materials storage duration and capacity. 6. There is no separate drainage area for storage; it is part of the site system. Waste materials are not incompatible with each other. The FPP details measures that are in place to prevent fire spreading. 7. Electrolyte bund construction conforms to the relevant CIRIA standard. 8. All solid chemical wastes are stored in FIBC within the enclosed building. The electrolyte tank is nitrogen blanketed and any gaseous releases are vented via the caustic scrubber and RTO. 9. Electrolyte is stored in a dedicated tank. 10. See 8. 11. See 8. 12. Waste deliveries from vehicles/vehicle trailers will be transferred within 24 hours or 72 hours if over a weekend. 13. Leak detection and alarm systems are provided for the nitrogen blanketed shredding, drying, vapour collection and storage stages. 14. Bunding is provided for all liquid storage. See Section 6.5 of the BAT-OT. 15. A tracking system is used to ensure waste does not accumulate or exceed duration periods. 16. Chemical waste is not accepted for treatment at the site. Chemical waste produced at the site is stored in labelled FIBCs in dedicated areas as shown on Drawing 002.. 17. Storage racking will be clearly marked for the storage of hazardous and non-hazardous wastes to ensure the different types of materials are always segregated. 18. All solid waste output fractions area stored indoors. 19. Uncontaminated rainfall run- off from external surfaces is released to sewer. There is no cooling water produced at the Site. 20. Wastes are not incompatible. See FPP for storage and separation arrangements. The site has a sealed drainage system.

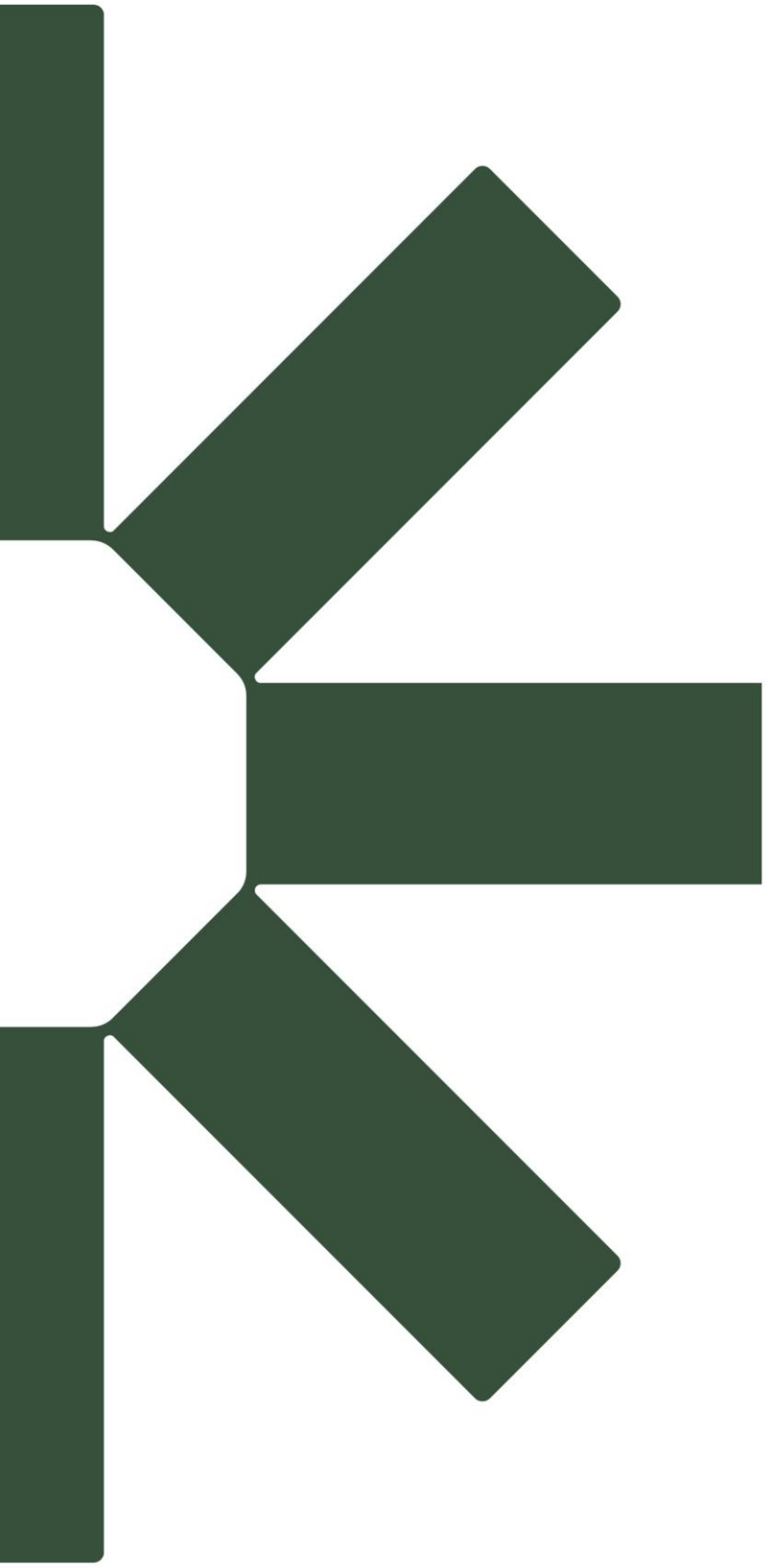
No.	Appropriate Measures	Specific Measures
	use leak detection systems and alarms (for example VOC alarms) and automatic fire suppression equipment based on a recorded risk assessment. *14. You must provide adequate bunding of all storage areas, and containment and treatment of any water run-off.* *15. You must not accumulate waste. You must treat wastes, or remove them from the site, as soon as possible.* *16. All stored containers must keep the labelling they had at acceptance. If the label is damaged or no longer legible you should replace the label with that same information.* *17. You must handle and store containers so that the label is easily visible and continues to be legible.* *18. You should keep solid waste dry and avoid the dilution of hazardous waste.* *19. You must keep clean rainwater and clean cooling water separate from wastes and waste waters.* *20. You must keep incompatible wastes segregated so that they cannot come into contact with one another. You must store flammable wastes apart from other wastes to prevent fire spreading between them and other materials. You must use sealed drainage systems to prevent leaks and spillages contaminating other wastes.* *21. There must be pedestrian and vehicular access (for example, forklift) at all times to the whole storage area so that you can retrieve containers without removing others that may be blocking access – other than removing those in the same row.* *22. You must store all waste containers in a way that allows easy inspection. You must maintain safe access, with a gap of at least 0.7m between rows of bulk containers or palletised wastes.* *23. You must move drums and other mobile containers between different locations (or loaded for removal off site) following written procedures. You must then amend your waste tracking system to record these changes.* *24. You must stack bags and boxes of waste no more than 1m high on a pallet. You must not stack pallets more than 2 high.* *25. You must stack containers specifically designed for stacking, and no more than 2.2m high on a pallet.* *26. You must store all other containers on pallets. You must not stack these pallets more than 2 high, except for empty containers which can be stacked 3 high.*	21 - 23. All waste is readily accessible for handling and inspection. All waste movements are tracked. 24 - 26. Solid chemical waste is stored in FIBCs in racking. 27 – 28. See above. Electrolyte is stored in IBCs. 29. Procedures will be in place for the handling of containers and packaging. 30. Electrolyte tank is nitrogen blanketed. 31 - 34. Not applicable. 35. The racking system conforms to FPP requirements and is design in accordance with HSG76. 36. See Section 6 of the BAT-OT for description of engineered containment. 37. Not applicable.

No.	Appropriate Measures	Specific Measures
	27. Stacked bags, boxes and containers must be stable. They must be secured with, for example, banding or shrink-wrap, if required. The packages must not extend beyond (over-hang) the sides of the pallet. Any shrink-wrap used must be clear or transparent so that you can identify waste types, damaged containers, leaks or spillages and incorrectly stacked containers. You must be careful not to damage any packages during stacking. *28. All waste containers must remain fit for purpose. You must check any containers (and pallets they may be stored on) daily and record non-conformances. Non-compliant containers and pallets must be made safe. You must immediately and appropriately manage any unsound, poorly labelled or unlabelled containers (for example, by relabelling, over drumming and transferring the container's contents). You must risk assess, approve and record the use of containers, tanks and vessels:* • *beyond their specified design life* • *where you use them for a purpose, or substances, other than the ones they were designed for* *29. You must not handle waste or its packaging in a way that might damage its integrity, unless it is appropriate to destroy a waste or its packaging, for example by shredding. You must not, for example, walk on or throw waste or waste packages.* *30. You should, where applicable and based on a recorded risk assessment, make inert the atmosphere of tanks containing organic liquid waste with a flashpoint less than 21°C. This can be done, for example, by using nitrogen gas.* *31. You must store asbestos waste double bagged or wrapped, in sealed, closed and locked containers. You must not store asbestos waste loose. You must not put asbestos wastes into bays or transfer it between different skips or containers. You must not use mechanical equipment, for example loading shovels, chutes and conveyors to move asbestos waste.* *32. You must not stack wheeled containers on top of one another. Do not stack empty wheeled containers into one another more than 2.2m high.* *33. All containers that need them should have a lid or bung, and the lid or bung must be closed except when the container is being sampled, having waste added into it or having waste removed from it.* *34. You must not stack skips containing waste. Skips containing hazardous waste must be enclosed when not being loaded or unloaded. You should store loose bulk hazardous wastes under cover.*	

No.	Appropriate Measures	Specific Measures
	35. You can use racking systems to store waste but you must consider segregation, ability to inspect, separation and fire suppression measures. Racking systems must be designed and constructed in accordance with HSG76 Warehousing and storage. *36. You must:* • *contain wash waters within an impermeable area and either discharge them to foul sewer or dispose of them appropriately off site.* • *prevent run-off into external areas or to surface water drain* *37. You must manage waste in a way that prevents pests or vermin. You must have specific measures and procedures in place to deal with wastes that are identified as causing pests or vermin.*	
5. WASTE TREATMENT APPROPRIATE MEASURES		
	5.1 General waste treatment *6. You must clearly define the objectives and reaction (chemical, physical or biological) processes for each treatment process. You must define the end point to the process so that you can monitor and control the reaction. You must define the suitable inputs to the process, and the design must take into account the likely variables expected within the waste stream. You must sample and analyse the waste to check that an adequate end point has been reached.* *7. For each new reaction, you must assess the proposed mixes of wastes and reagents before treatment by carrying out a scale laboratory test mix of the wastes and reagents to be used. You must predetermine a batch 'recipe' for all reactions and mixes of wastes. You must also take into account the potential scale up effects, for example, the increased:* • *heat of reaction with increased reaction mass relative to the reactor volume* • *residence time within the reactor and modified reaction properties* *Your treatment must comply with HSG143 Designing and operating safe chemical reaction processes.* *8. The reactor vessel and plant must be specifically designed, commissioned and operated to be fit for purpose. The designs need to consider chemical process hazards and a hazard assessment of the chemical reactions. They also need to consider prevention and protective measures and process management, such as:* • *working instructions* • *staff training*	6 – 11 are not applicable as no chemical treatment of waste takes place at the facility

No.	Appropriate Measures	Specific Measures
	• *appropriate process control measures* • *monitoring systems, alarms and interlocks* • *plant maintenance* • *checks* • *audits* • *emergency procedures* *9. To track and control the process of change, you must have a written procedure for proposing, considering and approving changes to technical developments or procedural or quality changes.* *10. Where an emission is expected, all treatment or reactor vessels must be enclosed. Only vent them to the atmosphere via an appropriate scrubbing and abatement system (subject to explosion relief).* *11. You must monitor the reaction to make sure it is under control and proceeding towards the anticipated result. Vessels used for treatment must be equipped appropriately, for example with high level, pH and temperature monitors. These monitors must be automatic and continuous, linked to a clear display in the control room or laboratory, and have an audible alarm. Your risk assessment may require you to link process monitors to cut-off devices.*	
6. EMISSIONS CONTROL APPROPRIATE MEASURES		
	6.2 Fugitive emissions to air (including odour) *13. You must have procedures to minimise the amount of time odorous wastes spend in your storage and handling systems (for example, pipes, conveyors, hoppers, tanks). In particular, you must have provisions to manage waste during periods of peak volume.* *14. You must have measures to contain, collect and treat odorous emissions, including using contained buildings and plant or equipment with appropriate air extraction and abatement. We do not consider masking agents to be appropriate measures for the treatment of odorous emissions.* *15. You must monitor and maintain odour abatement systems to ensure optimum performance. For example, you should make sure that scrubber liquors are maintained at the correct pH and replenished or replaced at an appropriate frequency.* *16. You must store contaminated waters that have potential for odours in covered or enclosed tanks or containers vented through suitable abatement.*	13-19. Not applicable. There are no odorous wastes or residues at the facility. See Section 12 of the BAT-OT.

No.	Appropriate Measures	Specific Measures
	17. Where odour pollution at sensitive receptors is expected, or has been substantiated, you must periodically monitor odour emissions using European (EN) standards *18. Where odour pollution at sensitive receptors is expected, or has been substantiated, you must also set up, implement and regularly review an odour management plan.* *19. Where an odour management plan is required, you must develop and implement it following our guidance.*	



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