



IP 0006/13

WEEE TREATMENT FACILITY AT WEEE RECYCLE 4U COMPANY LTD, HAL FAR

APPLICATION FOR IPPC PERMIT

VOLUME 2: IPPC APPLICATION



Version 5: April 2020



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Quality Assurance

WEEE Treatment Facility at WEEE Recycle 4U Company Ltd, Hal Far
Application for IPPC Permit: Volume 2
 April 2020

Report for: WEEE Recycle 4U Company Ltd

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En-Sure Ltd
Kappara Business Centre
113 Birkirkara Road
San Gwann SGN 4197

Tel.: 21378180
Email: info@ensure.com.mt
Web: www.ensure.com.mt



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1. INTRODUCTION

- 1.1. This Integrated Pollution Prevention and Control (IPPC) application was commissioned by Mr Charles Galea on behalf of WEEE Recycle 4U Company Ltd, to support its application for operation a proposed WEEE treatment facility at Hal Far. The project is permitted by PA 0441/16 and PA 05335/18.
- 1.2. Hereafter in the IPPC application, the proposed installation is referred to as 'the Scheme'. WEEE Recycle 4U Company Ltd is referred to as 'the Applicant'.
- 1.3. This IPPC application was first submitted to the then-Malta Environment and Planning Authority (MEPA), now the Environment and Resources Authority (ERA) in November 2015. Following reviews by ERA and other consultees, some updates were made to the IPPC application (as detailed in **Volume 5**). Updates were also made subsequently to the site layout and certain operational details. The original IPPC application has therefore been updated to ensure consistency with these later submissions.

Background to the Scheme

- 1.4. The Scheme comprises an industrial unit for the recycling and treatment of Waste Electrical and Electronic Equipment (WEEE) as well as shredding of wood. The site, located at HHF 040, Hal Far Industrial Estate (**Figure 1.1**), was abandoned and undeveloped prior to the start of construction of the Scheme.
- 1.5. The Applicant intends to relocate, expand and upgrade his current operations from the current location at three garages at the Ta' Magġi Industrial Zone in Żabbar to the Scheme site. Operations at the Ta' Magġi site (permitted by Environmental Permit EP 009/10/K) are currently being carried out by the company Electronic Products Ltd, of which Mr Galea is Managing Director; operations at the new site will be carried out by WEEE Recycle 4U Company Ltd, of which Mr Galea is also the owner.
- 1.6. An Environmental Impact Statement has also been prepared for the Scheme.
- 1.7. In 2019, an Environmental Permit (EP 033/18/A) was issued for the Scheme site, authorising storage of up to 49 tonnes of WEEE, and dismantling of WEEE.

Structure of the IPPC Application

- 1.8. The IPPC application is composed of five volumes:
 - **Volume 1** comprises the IPPC application forms A and B;
 - **Volume 2** (the current volume) consists of the IPPC application document;
 - **Volume 3** is a land and groundwater risk assessment for the Scheme;

- **Volume 4** is a baseline land monitoring report for the Scheme (unchanged from the version submitted to ERA in February 2017); and
- **Volume 5** consists of the Applicant's response to the feedback from ERA and other consultees on the IPPC application, as well as the response from ERA and the Applicant regarding the feedback received during public consultation on the IPPC application.

Figure 1.1: Location of the Scheme



2. THE SCHEME

B1.2 Non-Technical Summary

2.1. MEPA's ToR were:

Please provide a non-technical summary of the proposed installation activities.

- 2.2. This Integrated Pollution Prevention and Control (IPPC) application was commissioned by Mr Charles Galea on behalf of WEEE Recycle 4U Company Ltd, to support its application for operation a proposed WEEE treatment facility at Hal Far. The project is permitted by PA 0441/16 and PA 05335/18; PA 6212/19 has also been submitted to cover a future proposed extension to the site, including an extension to the garage.
- 2.3. Hereafter in the IPPC application, the installation is referred to as 'the Scheme'.
- 2.4. The Scheme comprises an industrial unit for the recycling and treatment of Waste Electrical and Electronic Equipment (WEEE)¹ as well as shredding of wood. The site, located at HHF 040, Hal Far Industrial Estate (**Figure 2.1**), was abandoned and undeveloped prior to the start of construction of the Scheme.
- 2.5. The Applicant intends to relocate, expand and upgrade his current operations from their current location at three garages at the Ta' Magġi Industrial Zone in Żabbar to the Scheme site. Operations at the Ta' Magġi site are currently being carried out by the company Electronic Products Ltd, of which Mr Galea is Managing Director; operations at the new site will be carried out by WEEE Recycle 4U Company Ltd, also owned by Mr Galea.
- 2.6. The Scheme is a treatment and processing facility for electrical and electronic waste. **Figure 2.2** shows block plans of the Scheme. The site will include a weighbridge, a central building for the treatment of WEEE, an outdoor covered storage area, a maintenance garage, and ancillary facilities.

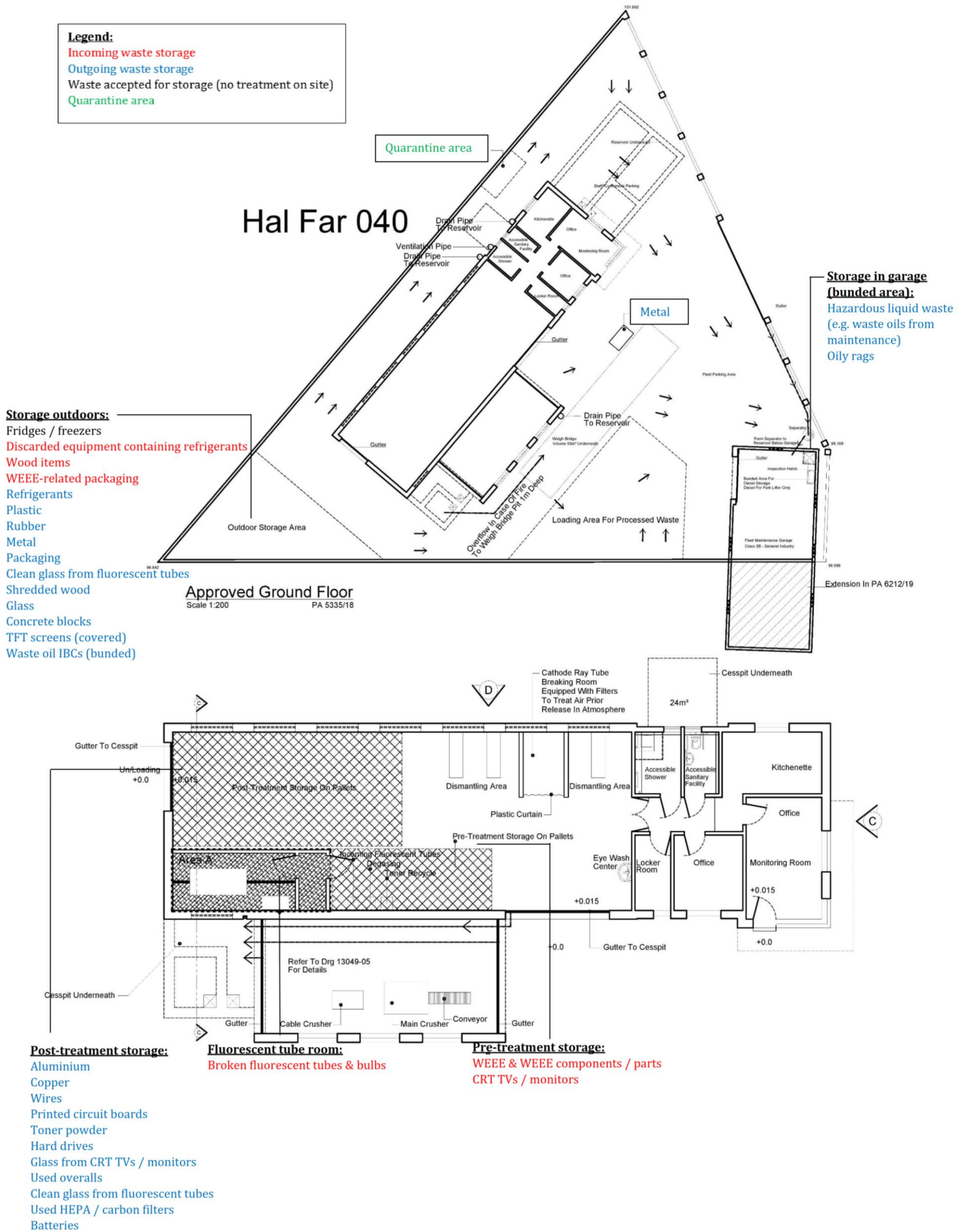
¹ The term "WEEE" is used to refer to all types of waste electronics and electrical equipment, such as white goods, computers, lightbulbs, switches, toners, printers and so on.

Figure 2.1: Location of the Scheme site



INDICATIVE ONLY - Not to be used for direct interpretation

Figure 2.2: Scheme layout



- 2.7. The Scheme is mainly intended for the storage and treatment of all types of WEEE, including the following categories:
- Large / medium-sized appliances including fridges, freezers, washing machines, microwave ovens, air-conditioning units, electric fans and electric radiators;
 - Small household appliances including toasters, irons, vacuum cleaners and hairdryers;
 - IT and telecommunications equipment including computers, servers, photocopiers, mobile phones, printers, toners, and facsimile machines;
 - Cathode ray tube (CRT) monitors and liquid crystal displays (LCDs);
 - Consumer electronics including DVD players, hi-fi equipment, electric guitars, amplifiers, radios and cameras;
 - CRT TVs and flat-panel TVs;
 - Lighting equipment, including fluorescent and neon tubes / lights;
 - Electrical and electronic tools including drills, electric saws, sewing machines, lawnmowers, sanders, nail guns, etc.;
 - Toys, leisure and sports equipment including video game consoles, electronic fitness equipment, electric trains and car racing systems, coin slot machines, etc.;
 - Medical devices including analysers, imaging and radio therapy equipment;
 - Monitoring and control instruments including smoke detectors and thermostats; and
 - Automatic dispensers including cold drinks and snacks dispensers, and cash machines.
- 2.8. Batteries will also be accepted for storage prior to export.
- 2.9. The Scheme will also shred clean wood waste to generate a product that can be used for animal bedding or briquettes (once the required permit is obtained from ERA).
- 2.10. Treatment of each WEEE stream will be carried out in accordance with an ERA-approved work plan, as described in section B2.2.1 of the IPPC application. In general, the process will involve the following steps:
- Receipt of goods and storage in a designated area;
 - Depollution of equipment when required (e.g. degassing of air-conditioning units containing refrigerant gas, removal of oil from oil heaters);

- Manual dismantling and segregation of components into different waste streams; in the case of toner cartridges, dismantling occurs in specialised equipment which also allows for separate collection of the toner powder;
 - Crushing of certain components using a designated crusher; and
 - Storage of each waste stream, segregated by type, in designated areas prior to transfer to authorised facilities, locally or abroad.
- 2.11. The Scheme is designed to maximise the reuse, recycling and recovery of waste. As described in section B3.1 of the IPPC application, over 99% of the incoming waste will be reused, recycled or recovered. Procedures will also be in place for quarantining unauthorised waste.
- 2.12. The Scheme site will include designated areas for the main site activities, including a building for receipt and sorting of incoming waste, dismantling and crushing certain WEEE items, and storing hazardous materials / waste. A covered outdoor area will also be used to store certain dismantled components, certain WEEE awaiting export (e.g. fridges / freezers) and wood. Maintenance of the Scheme's vehicles will be carried out in a garage. A containment system will be provided for hazardous substances and waste, as described in sections B2.3 and B3.1.
- 2.13. An impermeable hardstanding surface will be installed over the entire site, and a surface water management system will be in place to collect rainwater in underground reservoirs for reuse, with prior treatment in an oil-water interceptor of rainwater that reaches the ground in outdoor areas. This ensures that emissions from any spills are contained and do not contaminate the underlying bedrock / aquifer or disperse beyond the site. Spill kits will also be available for use by staff. Further details are included in the Spill Prevention and Response Plan in section B2.8 and in section B3.5 on rainwater management.
- 2.14. Wastewater from washing of floors and any spills inside the WEEE treatment building will be received in an underground cesspit and treated before reuse. Wastewater from fluorescent tube crushing will be recirculated; this crushing room will also be linked to a sealed prefabricated tank connected to a treatment system that removes mercury from washwater and process effluent before reuse. The fluorescent tube room will also have sealed vinyl flooring. Any spills and used wash water from the garage will be treated in an oil-water separator before being received in an underground reservoir. Further information on wastewater management is included in section B3.3.
- 2.15. The Scheme will also have a Fire and Explosion Prevention and Response Plan (referred to in section B2.8 of this application). Staff will also receive training on emergency prevention and response.
- 2.16. As described in section B3.6 of this Application, air emissions will be minimised through the use of specialised filters installed in the CRT breaking room and the fluorescent tube crushing room. Tubes / lamps that are received broken will be

stored inside the fluorescent tube crushing room to reduce the risk of fugitive emissions.

- 2.17. A preventive maintenance programme has also been prepared to reduce the risk of breakdown and unforeseen emissions; this is included in section B2.5 of this Application. Corrective maintenance will also be carried out as needed to reduce the risk of abnormal emissions.
- 2.18. Training is also planned, as mentioned in section B2.9, to ensure that staff are aware of their responsibilities and the procedures they need to follow to protect the environment.
- 2.19. A monitoring programme will also be in place to ensure that the mitigation measures are working effectively; this is described in section B3.10 of the IPPC application.

B1.4 Site Maps and Reports

- 2.20. The IPPC application form requires the submission of:

***B1.4.1:** A site report, providing a history of the site (including current and past uses) and describing the condition of the site of that part of the installation in respect of which you are applying for a permit, and, in particular, identifying any substance in, on or under the land which may constitute a pollution risk. A baseline report assessing the state of the groundwater and land may also be required by the Authority.*

***B1.4.2:** A suitable map (or maps) showing the location of the site of the installation, and the area of the site covered by the site report and which an IPPC permit is being applied for. The outline of the site should be clearly marked in colour, and the surroundings of the site should be included in the map.*

***B1.4.3:** Suitable block plans, properly labelled, showing the location and nature of the various activities being proposed on that site.*

- 2.21. A land and groundwater risk assessment has been submitted as part of the IPPC application (**Volume 3**). This document provides details of the history of the site and assesses the risk of land and groundwater contamination from the Scheme; this step is required by the Industrial Emissions (IPPC) Regulations and European Commission guidance (Communication 2014/C 136/03) in order to determine whether a baseline report is required. Site maps and block plans are also included in this risk assessment.
- 2.22. The risk assessment considers that as a result of the planned mitigation measures, risks to land and groundwater from the Scheme are low and very low,

with no risk to land / groundwater being detected in the case of spillages of hydrocarbon-based products and a fire in the fluorescent tube crushing room.

- 2.23. Since baseline land / groundwater measurements are only required when the activity involves the use, production or release of relevant hazardous substances, and taking into account the possibility of soil and groundwater contamination by the Scheme, the risk assessment recommends that baseline land and groundwater monitoring is not required.
- 2.24. However, ERA² advised that baseline land monitoring was to be carried out in view of the history of the site (notably its former use as an airfield, and the more recent dumping of predominantly construction waste) as well as the site surroundings (industrial and agricultural). Baseline monitoring was carried out in January 2017; a copy of the baseline monitoring report is included as **Volume 4**.

² Natalie Ellul (email), 15th September 2016.

3. TECHNIQUES

3.1. This Chapter describes the operational techniques proposed at the Scheme.

B2.1 Environmental Management System

3.2. The requirements for an Environmental Management System were described in the former MEPA's application form; these are reproduced below:

Provide details of your proposed management techniques and environmental management system (EMS). An EMS can take the form of a standardised system (e.g. EN ISO 14001:1996; EMAS) or a non-standardised ("customised") system, provided that is properly designed and implemented.

3.3. Additionally, the BREF for Waste Treatments Industries includes recommendations regarding the establishment of an EMS.

3.4. The Applicant's operations at the Ta' Magġi Industrial Zone in Żabbar are certified to the ISO 14001 standard on Environmental Management Systems. The scope of that EMS includes the management of WEEE, from waste collection to dismantling and separation of waste streams and transfer to end facilities. A copy of that facility's ISO 14001 certificate is included in **Annex 1**. The company's Environmental Policy is included in **Annex 2**. The current EMS Manual is presented in **Annex 3**.

3.5. The Environmental Management Programme (EMP) for the year 2015 sets out one target for the site in Żabbar, namely to separate and / or reuse at least 99% of waste.

3.6. The Applicant intends to implement an EMS that conforms to the requirements of the ISO 14001 standard at the Scheme, based on the EMS currently in place at the Applicant's operations in Żabbar. This has since already been implemented for the current operations at the Scheme site; a copy of the current ISO 14001 certificate is included in **Annex 1**.

3.7. Once the IPPC permit is issued, the Managing Director, Mr Charles Galea (who is one of the Technically Competent Persons for the Scheme) will conduct a review and update of the current Environmental Policy, EMS Manual and objectives and targets. This review will take into account at least the following elements:

- The requirements of the IPPC permit;
- New legislation and national policy, in particular concerning waste management; and
- New activities undertaken at the Scheme.

- 3.8. The Environmental Policy will be reviewed annually. The Scheme's achievement of the targets set in the previous year's EMP will also be reviewed annually, and new targets will be set for the forthcoming year as appropriate. It is expected that targets will include a recovery rate for waste separation and reuse / recovery, as is the case with the EMS for the existing site. These will also be reported to ERA as part of the Annual Environmental Report.
- 3.9. Information regarding the technically competent management for the Scheme is included in section B8.2 of the IPPC application. Day-to-day operational management will be the responsibility of Mr Collins Kyereme, whereas Mr Charles Galea will be responsible for oversight of operation and the company's strategic direction, and will visit the site daily.

B2.2 Activities

B2.2.1 Proposed Activities

- 3.10. The former MEPA's ToR included a requirement to *"describe the proposed installation activities."*
- 3.11. The Scheme is mainly intended for the storage and treatment of all types of WEEE, including the following categories:
- Large / medium-sized appliances including fridges, freezers, washing machines, microwave ovens, air-conditioning units, electric fans and electric radiators;
 - Small household appliances including toasters, irons, vacuum cleaners and hairdryers;
 - IT and telecommunications equipment including computers, servers, photocopiers, mobile phones, printers, toners, and facsimile machines;
 - Cathode ray tube (CRT) monitors and liquid crystal displays (LCDs);
 - Consumer electronics including DVD players, hi-fi equipment, electric guitars, amplifiers, radios and cameras;
 - CRT TVs and flat-panel TVs;
 - Lighting equipment, including fluorescent and neon tubes / lights;
 - Electrical and electronic tools including drills, electric saws, sewing machines, lawnmowers, sanders, nail guns, etc.;
 - Toys, leisure and sports equipment including video game consoles, electronic fitness equipment, electric trains and car racing systems, coin slot machines, etc.;
 - Medical devices including analysers, imaging and radio therapy equipment;

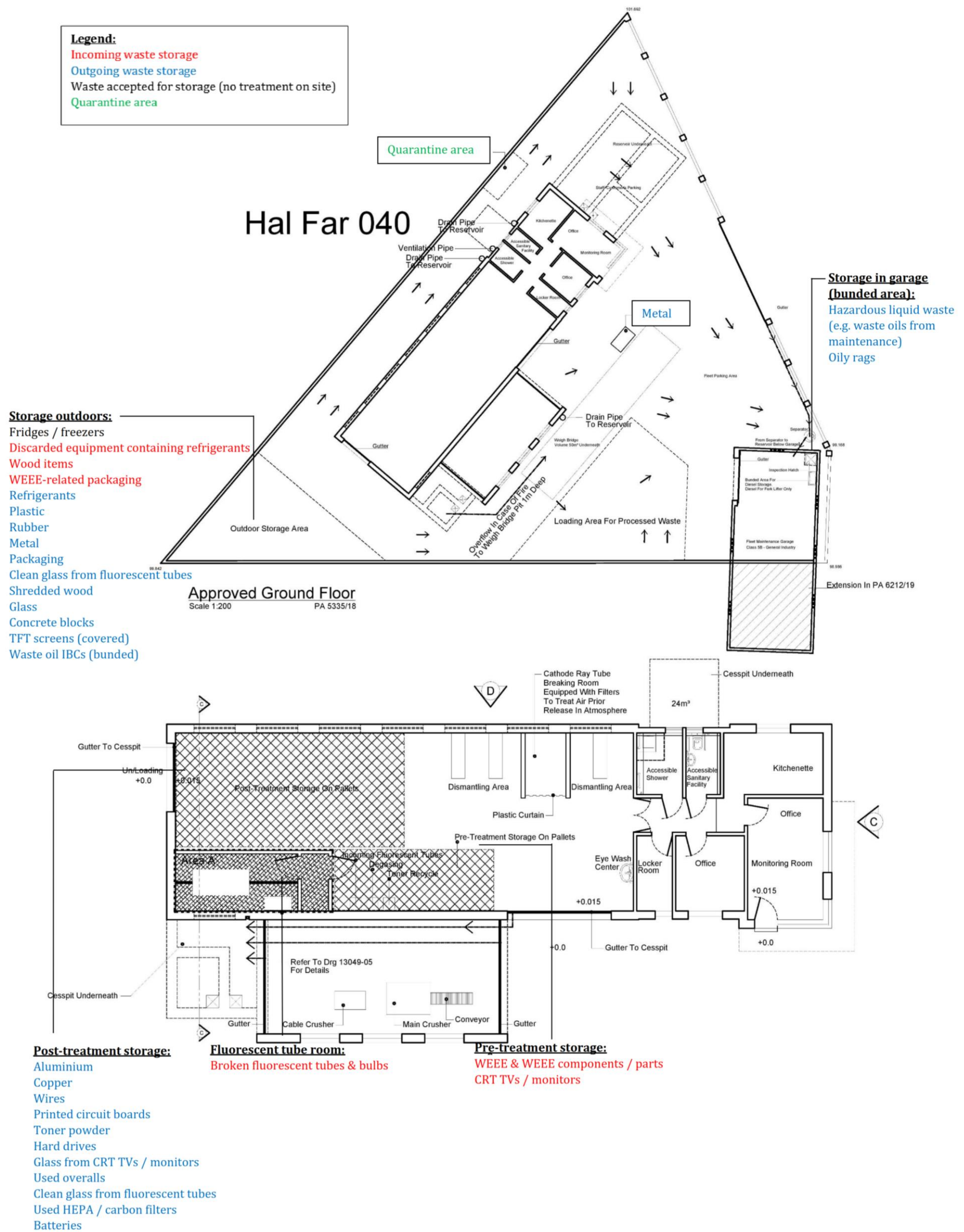
- Monitoring and control instruments including smoke detectors and thermostats; and
 - Automatic dispensers including cold drinks and snacks dispensers, and cash machines.
- 3.12. Batteries will also be accepted for storage prior to export.
- 3.13. The Scheme will also shred clean wood waste to generate a product that can be used for animal bedding or briquettes³.
- 3.14. Further information on the waste types to be accepted, including waste acceptance and waste storage procedures, is included in section B3.1 of the IPPC application.
- 3.15. The proposed layout of the Scheme is shown in **Figure 3.1**.
- 3.16. The Scheme will operate Monday to Friday (7:00 – 5:00) and Saturday (7:00 – 13:00). Operations on Saturday afternoon will typically be limited to cleaning / maintenance activities.

WEEE Processing

- 3.17. Treatment of each WEEE stream will be carried out in accordance with an ERA-approved work plan. Proposed work plans for various WEEE streams are included below.
- 3.18. The general WEEE treatment process will involve the following steps:
- Receipt of goods in the WEEE treatment building (shown in **Figure 3.1**);
 - Sorting and storage in a designated area, depending on the type of waste (as described in section B3.1 of the IPPC application);
 - Depollution of equipment when required (e.g. degassing of air-conditioning units containing refrigerant gas, removal of oil from oil heaters);
 - Manual dismantling and segregation of components into different waste streams; in the case of toner cartridges, dismantling occurs in specialised equipment which also allows for separate collection of the toner powder;
 - Crushing of certain components using one of three crushers, as described in further detail below; and
 - Storage of each waste stream, segregated by type, in designated areas prior to transfer to authorised facilities, locally or abroad.

³ Subject to the issue of an end-of-waste permit by ERA; in the interim such waste would be sent to a licensed facility

Figure 3.1: Scheme layout



- 3.19. The degassing procedure for certain equipment containing refrigerants is described in **Volume 5**.
- 3.20. Drainage of oil from heaters occurs by drilling a hole through a weak point in the radiator metal (using a drill or grinder), then tilting the heater so that the oil is received into a container. The contents of the container are then poured into a bunded IBC stored in the covered outdoor storage area.
- 3.21. Manual dismantling and segregation of most WEEE components will be carried out in the dismantling area identified in **Figure 3.1**. Dismantling of CRT monitors and TV sets will be carried out by first dismantling the casings and circuitry, then breaking the glass neck; the glass neck will then be broken in a purpose-built CRT breaking room. Manual dismantling of toners occurs inside specialised equipment (shown in **Figure 3.2**, and located inside the WEEE treatment building) which is fitted with a suction system that directs the toner powder released during dismantling into a receptacle at the bottom of the equipment; the equipment is also fitted with self-cleaning filters so that the exhaust air from the suction system is also cleaned. Specifications of the equipment are included in **Annex 4**.

Figure 3.2: Equipment used for toner dismantling



3.22. Three crushers are proposed:

- Main crusher: This crusher (**Figure 3.3**) will be used for non-hazardous waste, and is able to process a range of materials, including non-ferrous metals, plastic materials, composite materials, wood, etc. It will also be equipped with a conveyor belt equipped with a magnet to enable removal of unwanted materials (e.g. iron parts) before they enter the crusher;
- Cable crusher: This crusher will facilitate the recycling of electric cables through a process of grinding and separating the plastic from the copper / aluminium components (**Figure 3.4**); and
- Fluorescent tube crusher (**Figure 3.5**): Fluorescent tubes and lamps will be fed into the rotating drum and crushed. Glass fragments collected at the base of the drum will then be washed with water to remove mercury, and the clean glass will be collected in jumbo bags. This activity allows clean glass to be generated and the volume of the tubes to be significantly reduced, thus reducing storage space requirements and shipping costs. The crushing area has also been purposely designed to minimise air emissions and land / groundwater contamination – the crusher will be housed inside two rooms with extensive air treatment, wastewater from tube washing will be reused, and a wastewater treatment system will be in place based on sand and carbon filters. **Figure 3.6** provides details of the layout of the fluorescent tube crusher room.

Figure 3.3: Main crusher



Figure 3.4: Cable crusher



Figure 3.5: Fluorescent tube crusher



- 3.23. Certain WEEE streams will be stored on site prior to shipment, without any dismantling or processing, except for any packaging necessary for shipment. This option is planned for those categories of WEEE that the site will not be equipped to treat (at least initially), such as certain refrigeration equipment containing ozone-depleting substances. Similarly, waste batteries will also be accepted on site for temporary storage in a bunded area in the main building prior to shipment to an authorised facility abroad.



Wood Processing

- 3.24. Wood will be shredded using the main crusher (**Figure 3.3**), to generate a product that can be used for animal bedding or briquettes (once the required end-of-waste permit is obtained from ERA).
- 3.25. Until the required end-of-waste permit is obtained from ERA, such waste will be sent to an authorised waste management facility.

B2.2.2 Measures to Reduce Waste and Emissions

- 3.26. The former MEPA's application form included a requirement to:

Describe the proposed techniques and measures to prevent and reduce waste and emissions of substances and heat (including during periods of start-up or shut-down, momentary stoppage, leak or malfunction).

- 3.27. The Scheme is designed to maximise the reuse, recycling and recovery of waste. As described in section B3.1, over 99% of the incoming waste is reused, recycled or recovered. Procedures will also be in place for quarantining unauthorised waste.
- 3.28. An impermeable hardstanding surface will be installed over the entire site, and a surface water management system will be in place to collect rainwater in an underground reservoir for reuse, with prior treatment in an oil-water interceptor of rainwater that reaches the ground in outdoor areas. This ensures that emissions from any spills are contained and do not contaminate the underlying bedrock / aquifer or disperse beyond the site. Spill kits will also be available for use by staff. Further details are included in the Spill Prevention and Response Plan in section B2.8 and in section B3.5 on rainwater management.
- 3.29. Wastewater from washing of floors inside the WEEE treatment building will be received in an underground cesspit and treated before reuse. Wastewater from fluorescent tube crushing will be recirculated; this crushing room will also be linked to a sealed prefabricated tank connected to a treatment system that removes mercury from washwater and process effluent before reuse. The fluorescent tube room will also have sealed vinyl flooring. Further information on wastewater management is included in section B3.3.
- 3.30. The Scheme site will also include designated areas for the main site activities, including a building for waste reception, dismantling and crushing certain WEEE items and storing certain hazardous materials / waste, and a garage for maintenance of the Scheme's fleet. An outdoor covered storage area will also be used to store certain dismantled components, certain WEEE awaiting export (e.g. fridges / freezers), and wood. A containment system will be provided for hazardous substances and waste, as described in sections B2.3 and B3.1.

- 3.31. The Scheme will also have a Fire and Explosion Prevention and Response Plan (referred to in section B2.8 of this Application). Staff will also receive training on emergency prevention and response.
- 3.32. As described in section B3.6 of this Application, air emissions will be minimised through the use of specialised filters installed in the CRT breaking room and the fluorescent tube crushing room. Tubes / lamps that are received broken will be stored inside the fluorescent tube crushing room to reduce the risk of fugitive emissions; care will also be taken to reduce the risk of accidental fluorescent tube breaking outside this room.
- 3.33. A preventive maintenance programme has also been prepared to reduce the risk of breakdown and unforeseen emissions; this is included in section B2.5 of this Application. Corrective maintenance will also be carried out as needed to reduce the risk of abnormal emissions.
- 3.34. Training is also planned, as mentioned in section B2.9, to ensure that staff are aware of their responsibilities and the procedures they need to follow to protect the environment.

B2.2.3 Flow Diagrams

- 3.35. The IPPC Application form includes a requirement to “*submit a flow diagram summarising the proposed installation activities.*” In section B3.11 there is also a requirement to “*by means of a mass flow diagram, summarise the emissions and waste described in sections B3.1, B3.2, B3.3, B3.4, B3.6, and B3.8 of this application.*”
- 3.36. Mass flow diagrams have been submitted to ERA, but are deemed by the Applicant to be commercially confidential. Therefore ERA has accepted the Applicant’s request for confidentiality. However, sufficient information on the processes and emissions is already available elsewhere in this IPPC application.

B2.2.4 BAT Assessment

- 3.37. The ToR issued by the former MEPA included a requirement to:

Include a comparison of the proposed activities with relevant BAT conclusions published by the European Commission, where these have been published.

- 3.38. A comparison of the Scheme against the BAT conclusions for waste treatment established by Commission Implementing Decision (EU) 2018/1147 is included in **Annex 5**.

B2.2.5 Alternatives Considered

- 3.39. The former MEPA’s Application Form required the following:

Include an outline of the main alternatives considered to the proposed technology, techniques and measures.

- 3.40. The principal alternative to the proposed techniques would be to maintain the Applicant's current operations at Żabbar. The current site at Ta' Maġġi Industrial Zone in Żabbar is already authorised to carry out WEEE treatment under Environmental Permit number EP 009/10/K. However, limitations at the current site are such that expansion and upgrading is not possible. The Applicant intends to expand his operations to above the 50 tonne storage threshold in the Industrial Emissions (Integrated Pollution Prevention and Control) Regulations, Legal Notice 10 of 2013, and to meet the requirements of this legislation. However, installation of the proposed extensive air abatement and wastewater management systems is not possible at the current site due to lack of space.
- 3.41. The Applicant has been in discussion with the former MEPA over the relocation and expansion of his activities for the past few years, and from time to time had informally proposed to the former MEPA various alternative privately-owned sites that had become available for purchase. However, the former MEPA had consistently guided the applicant to seek a location in an industrial area. The Scheme site is the only site that has been made available to the Applicant by the Malta Industrial Parks (MIP).
- 3.42. Various alternative layout options for the site were considered by the Applicant, and a number of refinements in the layout and design have resulted in the current Scheme.
- 3.43. The original design did not include details of the various designated areas in the WEEE treatment building, including provisions for bunded storage, designated areas for dismantling and treatment, and a quarantine area. Additionally, the storage of all waste under cover, the installation of an impermeable membrane underlay beneath the entire site, and vinyl flooring for the fluorescent tube crusher room were not originally envisaged. The Scheme was amended to include these and other elements (including those identified in **Volume 5**) following discussions on the potential environmental and operational benefits.
- 3.44. In addition, the location of the main building on site has been shifted slightly southeastward from the original design following advice from the Civil Protection Department (CPD), to ensure that enough space is available for manoeuvring of fire trucks on site in case of a fire. The fire-fighting reservoir was also increased in size to 100 m³, which exceeds CPD's requirements. The fire-fighting system for the fluorescent tube crushing room was originally based on water, but was later redesigned as an automatic fire suppression system to avoid the potential for generation of fire-fighting water contaminated with mercury.
- 3.45. The cesspit for collecting wastewater from the fluorescent tube crushing room was originally designed to collect wastewater from the entire building, and also included a ventilation pipe. However, this was subsequently redesigned and the wastewater management system further defined to provide for segregation of the two wastewater streams, including space for the wastewater treatment equipment. The ventilation pipe connected to the fluorescent room wastewater

tank will also be directed in a way that avoids any unabated mercury vapour emissions.

- 3.46. A storage space for fluorescent tubes that are received broken was also designated inside the fluorescent tube crushing room.
- 3.47. An after-hours skip was initially included in the design on advice from the former MEPA to discourage illegal waste disposal elsewhere. This was subsequently removed from the Scheme due to concerns raised by the public during the EIA public consultation process regarding the potential for littering.
- 3.48. The original proposal also included a mobile incinerator; however, this element was later removed.
- 3.49. The Scheme site includes an area within the footprint that is earmarked for future expansion.

B2.3 Raw Materials

- 3.50. The ToR provided by the former MEPA in the IPPC application form in respect of raw materials were:

Identify the raw and auxiliary materials, and any other substances that you propose to use, including fuels.

Give details of quantities proposed to be used annually and submit respective MSDS sheets.

Identify the storage location of these materials on a site layout plan and give details on:

- *Maximum storage capacity;*
- *Containment measures (including bunding capacity, where applicable);*
- *Protective measures (including security).*

- 3.51. The principal raw materials during operation are identified in **Table 3.1**. Safety Data Sheets are included in **Annex 6**.

Table 3.1: Raw materials

Raw material	Associated activity	Maximum quantity stored on site	Storage location and containment
Diesel	Operation of on-site forklifts and trucks	50 L	Stored in the garage, which is connected to an oil-water separator.
Engine start formula	Operation of an older truck (assists with cold diesel engine start-up)	500 mL	Stored in the garage, which is connected to an oil-water separator.

Raw material	Associated activity	Maximum quantity stored on site	Storage location and containment
LPG	Operation of a forklift truck	25 kg	Cylinder inside the WEEE treatment building, against a wall.
Hydraulic oil	Maintenance of on-site forklifts and trucks	25 L	Stored in the garage, which is connected to an oil-water separator.

- 3.52. In addition to the containment measures identified in **Table 3.1**, the entire site will be constructed on a concrete hardstanding surface underlain by a geotextile membrane to ensure impermeability. The ground in outdoor areas of the site will be laid to fall towards an oil-water interceptor before being received in an underground reservoir.

B2.5 Maintenance

- 3.53. The ToR regarding maintenance in the IPPC application form are as follows:

Provide a proposed maintenance programme for the installation, and a template for keeping records of maintenance.

- 3.54. A maintenance programme is presented in **Table 3.2**; this includes the Scheme's vehicles, machinery, infrastructure, abatement systems and storage containers.

Table 3.2: Maintenance programme

Equipment	Type of maintenance	Frequency
Forklift trucks	Full service	Annual
	Replacement of parts	As required
	VRT testing	According to road licence requirements
Trucks	Full service	Annual
	Replacement of parts	As required
	VRT testing	According to road licence requirements
Air compressor	Checks for air leaks	Annual
Air filters for CRT breaking room	Replacement	As needed, depending on usage and the results of the air emissions monitoring
Air filters for fluorescent tube crushing room	Weighing	Weekly
	Replacement	As needed, depending on the weight of the carbon filter, indications from the pressure differential recorders and the results of the air emissions monitoring
Real-time mercury emissions monitor	External calibration	As recommended by the manufacturer
Air abatement system for main	Emptying of cyclone bin	As required

Equipment	Type of maintenance	Frequency
crusher and cable crusher	Cleaning / replacement of HEPA filter	Cleaning as required, replacement when damaged
Wastewater treatment systems	Backwash of filters	To be defined in accordance with manufacturer specifications and extent of usage
	Replacement of filter media	To be defined in accordance with manufacturer specifications and extent of usage
Toner cleaning equipment	Service and filter change	Every six months
Cable crusher	Service	Every six months
Main crusher	Service	Every six months
Fluorescent lamp crusher	Service	Every six months
Surface and waste water management system	Visual inspection of site surfacing, with repair where necessary	Annual
	Visual inspection of gutters, with removal of blockages where necessary	Monthly
	Visual inspection of interceptor, with removal of contents when necessary	Monthly, and after any major spill
	Impermeability testing (e.g. of cesspits)	Upon commissioning, repeated as required by the IPPC permit
Containers / bunds for liquid hazardous substances / waste	Visual inspection; repair / repackaging if necessary	Weekly
Fire detection and fighting system	Servicing of fire detection system and fire extinguishers	Annual servicing of fire extinguishers; servicing of fire detection system as required by the manufacturer.

- 3.55. Maintenance of vehicles that can be carried out in-house by the Scheme's personnel will be carried out in the garage, which is linked to an oil-water separator. Other maintenance of vehicles will be carried out at an external mechanical garage. Fixed equipment will be maintained in place by the Scheme's staff or third parties as required.
- 3.56. Repairs will be carried out on malfunctioning equipment / vehicles as soon as possible after a problem is identified.
- 3.57. Preventive and corrective maintenance records will be kept using the EMS maintenance template; a copy of the template is presented in **Table 3.3**.

Table 3.3: Maintenance records template

Equipment	Serial no.	Type of maintenance	Maintenance frequency	Date of last maintenance	Records

3.58. Additionally, the Technically Competent Person/s for the Scheme will be on site daily, and will ensure that the site is well-organised and free from litter. Site cleaning is scheduled once weekly (on Saturday afternoons); all areas will be swept, with indoor areas being washed afterwards.

3.59. Vehicles will be cleaned manually on site as needed, typically weekly.

B2.6 Energy

3.60. The ToR provided by the former MEPA in the Application form in respect of energy were:

***B2.6.1:** Provide a breakdown of the proposed annual energy consumption, highlighting the main energy-consuming equipment, and generation by source and end-use (including information on energy generated on site, if applicable).*

***B2.6.2:** Describe the proposed basic measures for improvement of energy efficiency.*

3.61. At the Scheme site, energy will be obtained from electricity, diesel fuel, and LPG.

3.62. No on-site electricity generation is currently proposed.

3.63. The estimated annual energy consumption is shown in **Table 3.4**, although these quantities will vary depending on demand for site activities.

Table 3.4: Energy consumption

Energy source	Estimated annual consumption
Electricity from mains power supply	2,000 kWh to 3,000 kWh
Diesel	1,000 L
LPG	600 kg

3.64. Electricity will be used for the following purposes:

- Machinery, notably the three crushers, the toner cleaning machine and a mobile air compressor (used to power pneumatic tools such as screwdrivers);
- Air and wastewater treatment systems;
- Security cameras; and
- Lighting and office equipment.

3.65. Diesel is used to power the scheme's forklifts and trucks. LPG is used to power one forklift truck.

- 3.66. In terms of energy efficiency, energy efficient lighting will be installed. Outdoor lighting will be downward angled and of the full cut-off type. At night, lighting will be motion activated.
- 3.67. In future, the Applicant may also explore the possibility of installing photovoltaic panels on site.

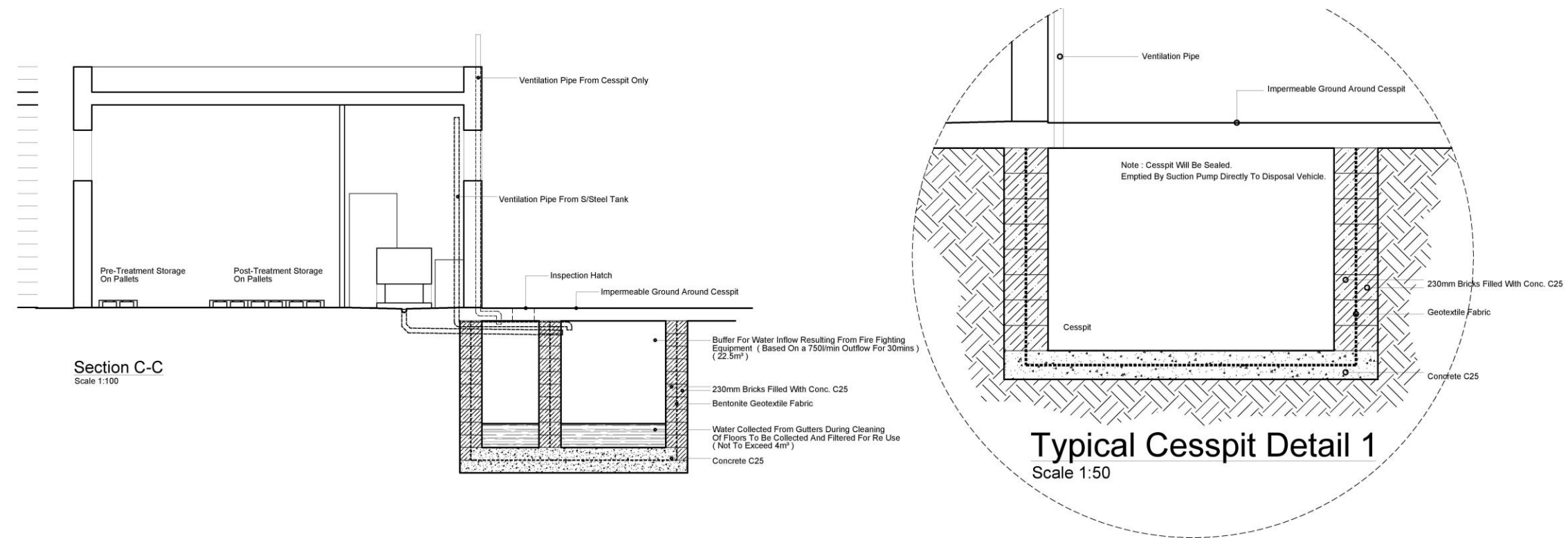
B2.7 Water

- 3.68. The former MEPA's ToR regarding water were:

Provide a breakdown of the proposed annual water consumption by source and end-use.

- 3.69. Rainwater will be collected in two underground reservoirs (please refer to section B3.5), and will be used for fire-fighting, cleaning of the site and in landscaping.
- 3.70. Inside the WEEE treatment building, floors will normally be swept rather than washed. Wastewater from any washing of floors will be collected in gutters, received in an impermeable underground cesspit (**Figure 3.7**) and treated using a sand filter, carbon filter and reverse osmosis system to remove trace contaminants. The treated water will then be reused for washing of the WEEE treatment building.
- 3.71. Wastewater from cleaning of the fluorescent tube crusher room will be received in a sealed prefabricated stainless steel tank housed inside a lined concrete chamber (**Figure 3.7**), and treated using sand and carbon filters to remove mercury.
- 3.72. Wastewater from washing of crushed tube glass will be received in a tank located directly beneath the fluorescent tube crusher, and automatically re-circulated to wash crushed glass. When this effluent needs to be treated, it will be pumped to the underground tank that services the fluorescent tube crusher room and similarly treated using sand and carbon filters to remove mercury. The treated water will be reused to wash crushed fluorescent tube glass and the fluorescent tube crusher room.
- 3.73. The available details regarding these wastewater treatment systems are included in section B3.3 of the IPPC application.
- 3.74. As a result, mains water will typically only be required in the office and sanitary facilities.

Figure 3.7: Sealed tank for the fluorescent tube crushing room and cesspit servicing the WEEE treatment building



B2.8 Risk Assessment

Terms of Reference

3.75. The ToR provided by the former MEPA in the IPPC application form in respect of risk assessment were:

Describe the documented system proposed to be used to identify, assess and minimise the environmental risks and hazards of accidents and their consequences.

Include:

(a) emergency plans in case of fire and other emergencies (e.g. explosions);

(b) plans for actions to be taken in case of failure of abatement equipment;

(c) plans for actions to be taken in case of other environmentally relevant incidents (e.g. spillages, gas leakage).

Provide certification from a competent company or engineer that the relevant fire safety procedures and equipment are in place.

Certification and fire plans shall include the presence of emergency firefighting water supplies for use by the Civil Protection Department.

Environmental Risk Assessment Methodology

Source-Pathway-Receptor Linkage

3.76. An environmental risk occurs when there is a means by which a hazard can result in a deleterious impact on the surrounding environment, i.e. receptors. The presence of a hazard alone does not constitute a risk. A risk is only present if there is a pathway which links the source (hazard) to the receptor. This is known as the source-pathway-receptor linkage.⁴

3.77. Environmental risk assessment is the process by which source-pathway-receptor linkages are identified and evaluated. If any of the three elements are absent then there is no complete linkage and thus no unacceptable risk.

⁴ Defra (2002) *Groundwater Protection Code: Petrol Stations and other Fuel Dispensing Facilities involving Underground Storage Tanks*
<http://archive.defra.gov.uk/environment/quality/water/waterquality/ground/documents/groundwater-petrol.pdf>.

Risk Assessment Criteria

- 3.78. If a source-pathway-receptor linkage is found, the magnitude of a risk is a function of the consequences of pollution and the likelihood that such pollution will occur.
- 3.79. The risk criteria being applied to this assessment are based on a matrix consistent with ISO 31010: *Risk management: Risk assessment techniques*.
- 3.80. **Table 3.5** presents criteria for assessing environmental consequences, whereas **Table 3.6** presents criteria for assessing the likelihood of the event occurring.
- 3.81. The overall risk level is then determined by combining the two factors, using the matrix in **Table 3.7**.

Table 3.5: Criteria for assessing environmental consequences

Severity level	Effects on natural environment
1: Insignificant	Limited damage to minimal area of low significance.
2: Minor	Minor effects on biological or physical environment. Minor short/medium-term damage to small area of limited significance.
3: Moderate	Moderate effects on biological or physical environment (e.g. air, water) but not affecting ecosystem function. Moderate short/medium-term widespread impacts (e.g. significant spills).
4: Major	Serious environmental effects with some impairment of ecosystem function. Relatively widespread medium-long term impacts.
5: Catastrophic	Very serious environmental effects with impairment of ecosystem function. Long term, widespread effects on significant environment (e.g. national park).

Table 3.6: Measure of likelihood

Level	Descriptor	Description	Guideline frequency
A	Almost Certain	Consequence is expected to occur in most circumstances	Occurs more than once per month
B	Likely	Consequence will probably occur in most circumstances	Occurs once every 1 month - 1 year
C	Occasional	Consequence should occur at some time	Occurs once every 1 year - 10 years
D	Unlikely	Consequence could occur at some time	Occurs once every 10 years - 100 years
E	Rare	Consequence may only occur in exceptional circumstances	Occurs less than once every 100 years

Table 3.7: Risk matrix

Likelihood	Environmental consequence					No pollutant linkage
	1: Insignificant	2: Minor	3: Moderate	4: Major	5: Catastrophic	
A: Almost Certain	Low	Moderate	Extreme	Extreme	Extreme	None
B: Likely	Low	Moderate	High	Extreme	Extreme	
C: Occasional	Very low	Moderate	High	High	Extreme	
D: Unlikely	Very low	Low	Moderate	High	High	
E: Rare	Very low	Low	Moderate	Moderate	High	

Environmental Risk Assessment

Overview

- 3.82. The Scheme's operations will include storage and processing of hazardous substances and waste which, without mitigation, could create a risk to the environment through underground, surface and airborne pollution.
- 3.83. **Table 3.8** summarises potential sources of pollution and the respective pathway to the relevant receptors. **Table 3.8** also includes the mitigation measures that will be adopted to mitigate such risks, distinguishing between fixed structural elements incorporated into the Scheme and procedural mitigation measures. It is to be noted that all the mitigation measures in the Table will be implemented in the Scheme.
- 3.84. **Table 3.9** identifies source-pathway-receptor linkages for major accident scenarios of fire / explosion, flooding and earthquakes.

Table 3.8: Pollution pathway identification and mitigation measures

Source	Pathway	Receptor	Mitigation measures	
			Structural mitigation measures	Procedural mitigation measures
Spillage of diesel / oils	Permeable strata above water table; rainwater runoff	Land Groundwater	<ul style="list-style-type: none"> Entire site surface covered in concrete underlain by a geotextile membrane. Building for temporary storage of incoming waste, having gutters leading to an impermeable cesspit. Garage floor laid to fall to an oil-water interceptor leading to a reservoir (which overflows to road; the overflow will only be installed when PA 6212/19 is granted). The ground in outdoor areas of the site will be laid to fall towards an oil-water interceptor before being received in a reservoir. 	<ul style="list-style-type: none"> Incoming waste sorted in WEEE treatment building. Diesel / oil raw materials stored in garage. WEEE motors stored in a bunded area inside the main building. Oily waste stored in a bund; oils from the interceptor are typically retained in the interceptor until collected. Unauthorised waste to be stored in quarantine area (closed skip or similar). An inspection and maintenance programme for storage and containment areas will be in place. Spill prevention and response plan and spill kits in place; staff training.
Metal emissions from manual dismantling of general WEEE and storage of separated components	Air dispersion (prevailing wind direction); wastewater from floor washing; rainwater runoff	Air sensitive receptors Land Groundwater	<ul style="list-style-type: none"> Entire site surface covered in concrete underlain by a geotextile membrane. Wastewater from any washing of floors in the WEEE treatment building will be collected in gutters, received in an underground impermeable cesspit and treated to remove trace contaminants before reuse. The ground in outdoor areas of the site will be laid to fall towards an oil-water interceptor before being received in a reservoir. 	<ul style="list-style-type: none"> Incoming waste sorted in WEEE treatment building. Dismantling will occur indoors in the main building; hazardous components will be stored in this building or in the outdoor area (covered). Unauthorised waste to be stored in quarantine area (closed skip or similar). Replacement of wastewater filters in accordance with maintenance schedule.

Source	Pathway	Receptor	Mitigation measures	
			Structural mitigation measures	Procedural mitigation measures
Mercury / phosphor emissions from fluorescent tube crushing	Air dispersion (prevailing wind direction); wastewater from floor washing; rainwater runoff; direct contamination of permeable strata above water table (from wastewater)	Air sensitive receptors Land Groundwater	<ul style="list-style-type: none"> Crusher installed inside a purposely built two-room system with double doors (cannot be opened simultaneously) and sealed windows. Negative pressure unit linked to a HEPA filter and two activated carbon filters. Sealed vinyl flooring inside crushing room. Wastewater will be received in a sealed prefabricated stainless steel tank housed inside a lined concrete chamber, and treated using sand and carbon to remove mercury before reuse. Tank will be fitted with level gauge to ensure no overfilling. Entire site surface covered in concrete underlain by a geotextile membrane. 	<ul style="list-style-type: none"> Operation of a water mister inside the crushing room. Storage of incoming broken fluorescent tubes / lamps inside crushing room. Replacement of air and wastewater filters in accordance with maintenance schedule. Monitoring of emissions as required by IPPC permit. Industrial vacuum cleaners equipped with mercury filters will be available to immediately clean up any accidental breakages of fluorescent tubes / lamps. Operators wear disposable overalls.
Metal / phosphor emissions from breaking of CRT neck	Air dispersion (prevailing wind direction); wastewater from floor washing; rainwater runoff	Air sensitive receptors Land Groundwater	<ul style="list-style-type: none"> CRT breaking room includes an air extraction unit equipped with a HEPA filter; room will be fitted with a thick HDPE curtain. Entire site surface covered in concrete underlain by a geotextile membrane. Wastewater from washing of floors will be collected in gutters, received in an underground impermeable cesspit and treated to remove trace contaminants before reuse. 	<ul style="list-style-type: none"> Broken CRT TVs / monitors stored in jumbo bags in designated area indoors. Only undamaged jumbo bags will be used for storage of broken CRTs; jumbo bags will be closed well when full. Replacement of air and wastewater filters in accordance with maintenance schedule. Operators wear disposable overalls.

Source	Pathway	Receptor	Mitigation measures	
			Structural mitigation measures	Procedural mitigation measures
Emissions / spills of toner powder	Air dispersion (prevailing wind direction); permeable strata above water table; wastewater from floor washing; rainwater runoff	Air sensitive receptors Land Groundwater	<ul style="list-style-type: none"> Entire site surface covered in concrete underlain by a geotextile membrane. Wastewater from any washing of floors in the WEEE treatment building will be collected in gutters, received in an underground impermeable cesspit and treated to remove trace contaminants before reuse. 	<ul style="list-style-type: none"> Toners dismantled inside WEEE treatment building, using specialised equipment fitted with a suction system to collect toner powder; exhaust air is also filtered. Collected toner powder stored in jumbo bags inside WEEE treatment building. Replacement of equipment filter in accordance with maintenance schedule.
Leakage of lead / acid from batteries	Permeable strata above water table; wastewater from floor washing; rainwater runoff	Land Groundwater	<ul style="list-style-type: none"> Entire site surface covered in concrete underlain by a geotextile membrane. Wastewater from any washing of floors in the WEEE treatment building will be collected in gutters, filtered to remove trace contaminants, and received in an underground cesspit for reuse. 	<ul style="list-style-type: none"> Batteries stored in a container inside the WEEE treatment building. Quantity of batteries stored limited to 1 tonne. An inspection and maintenance programme for storage and containment areas will be in place.

Source	Pathway	Receptor	Mitigation measures	
			Structural mitigation measures	Procedural mitigation measures
Used fire-fighting water (generated in case of a fire / explosion)	Permeable strata above water table; rainwater runoff	Land Groundwater	<ul style="list-style-type: none"> • Dedicated 100 m³ reservoir 1 (always kept full for fire-fighting purposes) to provide 2.5 hours of fire-fighting water • Used fire-fighting water will be received in different cesspits / reservoirs depending on the area on site, as follows: <ul style="list-style-type: none"> ○ WEEE treatment building: Received in underground cesspit with automatic level meter to ensure spare capacity of 22.5 m³; cesspit overflows to weighbridge pit (capacity of 50 m³; any spillover would be to the separator and then reservoir 2); ○ Outdoor areas, covered storage area and garage: Reservoir 2 (476 m³), after treatment in oil-water separator; any overflow to road will be of treated water (the overflow will only be installed when PA 6212/19 is granted). • Fluorescent tube crushing room equipped with automatic gas suppression system, based on argonite; no used water will be generated in this area. Room equipped with a fire resistant door. 	<ul style="list-style-type: none"> • A fire and explosion prevention and response plan will be commissioned by the Applicant once the Scheme has been constructed. • A competent fire expert has been engaged to advise on and install a fire detection system and any additional fire-fighting equipment required. • Fire safety procedures and equipment will be certified by a competent fire expert once they are in place. • Signage for safe operation will be installed (e.g. no smoking signs). • No storage of flammable substances in the fluorescent tube crushing room.

Table 3.9: Pollution pathway identification and mitigation measures for major accident scenarios

Scenario	Source	Pathway	Receptor	Mitigation Measures	
				Structural mitigation measures	Procedural mitigation measures
Fire / explosion	Combustible material (especially wood)	Air dispersion (prevailing wind direction)	Surrounding land users (predominantly industrial and agricultural)	<ul style="list-style-type: none"> Dedicated 100 m³ reservoir provides 2.5 hours of fire-fighting water. Fluorescent tube crushing room equipped with automatic gas suppression system. 	<ul style="list-style-type: none"> Fire and explosion prevention and response plan. Installation of a fire detection system and any additional fire-fighting equipment required. Fire safety procedures and equipment to be certified. Signage for safe operation. No storage of flammable substances in the fluorescent tube crushing room.
Flooding	Storage and use / processing of hazardous substances and waste	Permeable strata above water table	Land Groundwater	<ul style="list-style-type: none"> Entire site surface covered in concrete underlain by a geotextile membrane. The ground in outdoor areas of the site will be laid to fall towards an oil-water interceptor before being received in a reservoir. Impermeable cesspits. 	<ul style="list-style-type: none"> All hazardous waste stored in bunded areas. Waste processing occurs indoors. Diesel / oil raw materials stored in a bunded area in garage.
Earthquake	Storage and use / processing of hazardous substances and waste	Permeable strata above water table	Land Groundwater	<ul style="list-style-type: none"> Only clean / treated surface water will be received in the underground reservoirs. Cesspits constructed of concrete. Fluorescent room tank contained within impermeable concrete. Entire site surface covered in concrete underlain by a geotextile membrane. 	<ul style="list-style-type: none"> Wastewater received in the WEEE cesspit and fluorescent room tank will be treated; no long-term storage of contaminated wastewater on site. Secondary containment systems for storage of hazardous waste and raw materials, as above.

Identification of Potential Releases

- 3.85. Releases could occur from accidental spillages of diesel, oils and oily waste stored and handled on site, as well as leaks from vehicles / equipment and drips from maintenance activities. The substances released would be hydrocarbon-based, and if the largest container is spilt entirely the maximum quantity released would be limited to 50 L of diesel or hydraulic / engine oil, since storage beyond these quantities will not be required.
- 3.86. Dismantling of general WEEE could result in the release of hazardous metal components. However, most WEEE components (e.g. hard drives, printed circuit boards) are solids and significant metal leaching is not expected under normal conditions. This activity therefore presents a minimal pollution risk.
- 3.87. Air emissions containing hazardous metals will also be generated from fluorescent tube crushing and breaking of CRT monitors. Hazardous wastewater (contaminated with mercury) will also be generated from washing of crushed fluorescent tubes. Mitigation measures will, however, be in place to reduce air emissions and to treat the wastewater.
- 3.88. Toner powder could also be released during storage / dismantling of toner cartridges; however, dismantling will occur inside specialised equipment that collects the toner powder, and the toner powder will be stored inside jumbo bags indoors. Additionally, based on an assessment of safety data sheets for toner powders it is concluded that most (if not all) toner powders currently produced are not classified as hazardous waste.
- 3.89. Leaks of acid and lead could also result in a release; however, considering that battery storage will be limited to 1 tonne, the maximum release is estimated at less than 100 kg. It is to be noted that even a release of this magnitude would require a serious incident such as a forklift truck crashing into the battery container.
- 3.90. Used fire-fighting water will also be generated in some areas of the Site in the event of a fire / explosion, and without mitigation this may become contaminated with hazardous substances / waste being stored on site.
- 3.91. A fire / explosion may be caused by the storage and handling of flammable substances on site, notably wood. However, procedures will be in place to reduce the risk of fire / explosion, including having certified fire safety procedures and equipment in place at the Scheme.
- 3.92. The storage and use / processing of hazardous raw materials and waste could also result in a release of contaminants in the major accident scenarios of a flood or earthquake.

Identification of Migration Pathways

Without Mitigation

- 3.93. In the absence of mitigation, including site containment, spills and leaks of diesel, oils, hazardous wastewater from fluorescent tube washing, toner powder, and lead / acid from batteries could contaminate land directly and potentially also reach the groundwater through the permeable rock strata underlying the site, although some attenuation is expected due to the depth of rock above the groundwater. The same pathway would be followed in the event of flooding or an earthquake.
- 3.94. Wastewater from washing of indoor areas, including the fluorescent tube room and CRT breaking room, could also become contaminated and present a migration pathway.
- 3.95. Spills could also contaminate rainwater reaching the site, resulting in potential on-site and off-site contamination of land (and eventually groundwater) through rainwater runoff. A similar contamination scenario could occur if used fire-fighting water is generated.
- 3.96. The pathway for air emissions would be air dispersion, particularly in the prevailing wind direction, as well as contamination through precipitation of the pollutants in rainwater. The pathway for fire / explosion would also be air dispersion.

With Mitigation

- 3.97. A number of mitigation measures will be in place at the Scheme to prevent migration of contaminants towards land and groundwater, as described below and in **Table 3.8**.
- 3.98. The entire Scheme site will be concreted and lined with an underlying impermeable geotextile membrane. The ground in outdoor areas of the site will be laid to fall towards a 476 m³ rainwater reservoir, and surface water (and any spills) from these areas will be treated in an oil-water separator before being received in the reservoir. Spills can also be collected by trained site operators using spill kits.
- 3.99. Wastewater from washing of floors inside the WEEE treatment building (including the CRT breaking room) will be collected in gutters and received in an underground impermeable ventilated cesspit to remove trace contaminants before reuse. It is envisaged that the wastewater treatment system will consist of a sand and carbon filter followed by Reverse Osmosis.
- 3.100. The fluorescent tube crusher room will, however, have a separate wastewater management system. The crushing machine will have an underlying water tank, in which water used to wash the tubes is recirculated for reuse in a closed-loop system. The room will also be connected, through open floor drains, to a sealed 1 m³ prefabricated stainless steel tank designed to receive wastewater from floor

cleaning, any spills from the crusher's water tank, and used water from the same water tank (in the event that it needs to be replaced). Wastewater in the steel tank will be treated using a sand filter and an activated carbon filter, and returned to the same cesspit. The tank will be sealed,⁵ and housed inside a concreted and lined impermeable chamber. The treated wastewater generated will be reused for washing of fluorescent tubes during crushing and cleaning of this room, and a level gauge will be installed with an alarm to ensure that the tank's capacity is not reached. This room will also have sealed vinyl flooring.

- 3.101. These wastewater treatment systems will also reduce the risk of transfer of pollutants to land and groundwater in the event of an earthquake.
- 3.102. Hazardous waste and raw materials will also be stored in designated areas; liquid waste / raw materials will be banded, while solid waste will be stored under cover or inside a building.
- 3.103. Crushing of fluorescent tubes / lamps will be carried out inside a purposely built internal room located within a second outer room. These rooms will be equipped with a double-door system, where an automatic system will be installed such that the internal door can only be opened once the external door has been closed (and vice-versa); both doors will be kept closed except when personnel are entering / exiting the area, and will be kept closed during the crusher's operation. The outer room's windows will be sealed to prevent unauthorised opening. In the internal room, a water mister will be in continual operation to encourage wet precipitation of dust, and the room will be equipped with a negative pressure unit, thus creating a seal. The exhaust air from the negative pressure unit will include three filters in series, as follows:
- Two activated carbon filters: The first filter (F-55) will be inside the crushing room, while the second filter (Dorex) will be installed outside the crushing room. The first filter will be impregnated with sulphur to capture mercury;
 - A HEPA filter, having up to 99.97% filtration efficiency on particles $\geq 0.3 \mu\text{m}$.
- 3.104. This abatement system is expected to ensure that mercury emissions from fluorescent tube crushing are lower than 0.001 ppb ($0.008 \mu\text{g}/\text{m}^3$); correspondence in this regard from the supplier is included as part of section B3.6 of the IPPC application. Additionally, broken incoming fluorescent tubes will be stored immediately inside the internal fluorescent tube room, awaiting processing. Care will also be taken during storage and handling to reduce the risk of breakage outside the fluorescent tube room; nonetheless, industrial vacuum cleaners equipped with mercury filters will be available to immediately clean up any accidental breakages of fluorescent tubes / lamps.

⁵ The ventilation pipe will emit to the tube crushing room, which will have air filtration.

- 3.105. Breaking of the CRT neck will take place in a CRT breaking room that includes a thick HDPE curtain with 1 – 2 inch overlapping panels, equipped with an air extraction pressure unit connected to a HEPA filter. Additionally, site operatives will ensure that broken CRTs are only stored in undamaged jumbo bags; the integrity of jumbo bags will be inspected prior to use, and jumbo bags will be closed well when full.
- 3.106. Filters will be replaced at intervals in accordance with the maintenance plan, and an air monitoring programme will be in place. Additionally, disposable overalls will be worn by employees working in the CRT / fluorescent tube crushing areas to ensure that any particles that adhere to clothing / shoes are not taken outside.
- 3.107. In the event of a fire / explosion, a 100 m³ dedicated underground reservoir will provide fire-fighting water to contain and put out the fire as soon as possible. This reservoir will always be kept full for fire-fighting purposes.
- 3.108. Used fire-fighting water from the WEEE treatment building will be received in the underground 26.5 m³ cesspit; a level gauge will be installed to ensure there is always at least 22.5 m³ spare capacity in this cesspit, which corresponds to 30 minutes of fire-fighting activity. This cesspit overflows to the 50 m³ weighbridge pit; any spillover would be through the outdoor area to reservoir 2, located beneath the maintenance garage (after treatment in an oil-water separator). Reservoir 2, which has a capacity of 476 m³, overflows to road (the overflow will only be installed when PA 6212/19 is granted); however, given that the capacity of this reservoir is far in excess of the fire-fighting water capacity of the site, an overflow of used fire-fighting water from this reservoir is a remote scenario.
- 3.109. Used fire-fighting water from the outdoor areas and the garage will be collected in a 476 m³ reservoir (reservoir 2) after treatment in an oil-water separator; this reservoir overflows to the road (the overflow will only be installed when PA 6212/19 is granted). Any overflows to the road surface will therefore be of treated water, however, as mentioned the likelihood of an overflow is remote.
- 3.110. Used fire-fighting water will not be generated in the fluorescent tube crushing room. This room will be equipped with an automatic gas suppression system that uses aragonite rather than water. In order to reduce the likelihood and spread of fire inside this room, it will be equipped with a fire resisting door providing two hours of fire resistance, and there will be no storage of flammable substances inside the room.

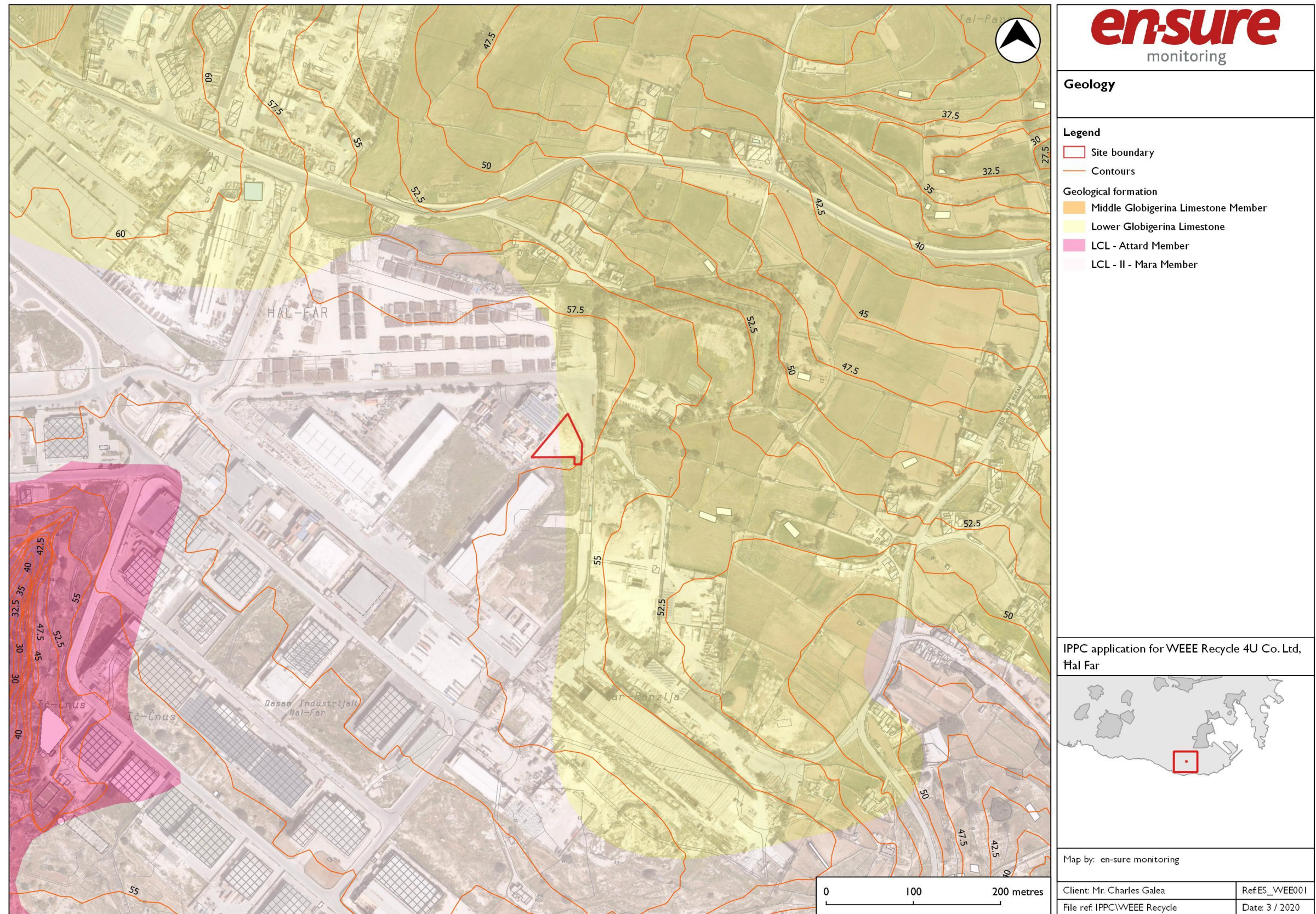
Identification of Potential Receptors

- 3.111. In the event of a spill or leak, in the unmitigated scenario the main receptor is the underlying land. The geology of the site and its immediate surroundings are as shown in **Figure 3.8**. At the Scheme site, the exposed rock formation is Lower Globigerina Limestone and Lower Coralline Limestone.
- 3.112. Contaminants could also eventually reach the groundwater in the unmitigated scenario. The mean sea level aquifer is the principal hydrogeological feature in

the area (**Figure 3.9**), and the groundwater at the Scheme site is found at a depth of around 56 to 60 m below the land surface. The site is located outside the Groundwater Safeguard Zone; however, there are seven groundwater boreholes (six private, one public) located within around 400 m of the site. However, in the event of a spill, some attenuation of contaminants is expected even in the unmitigated scenario, considering that there is a considerable depth of rock before the material is able to reach the groundwater (provided there are no direct routes to groundwater, such as fissures).

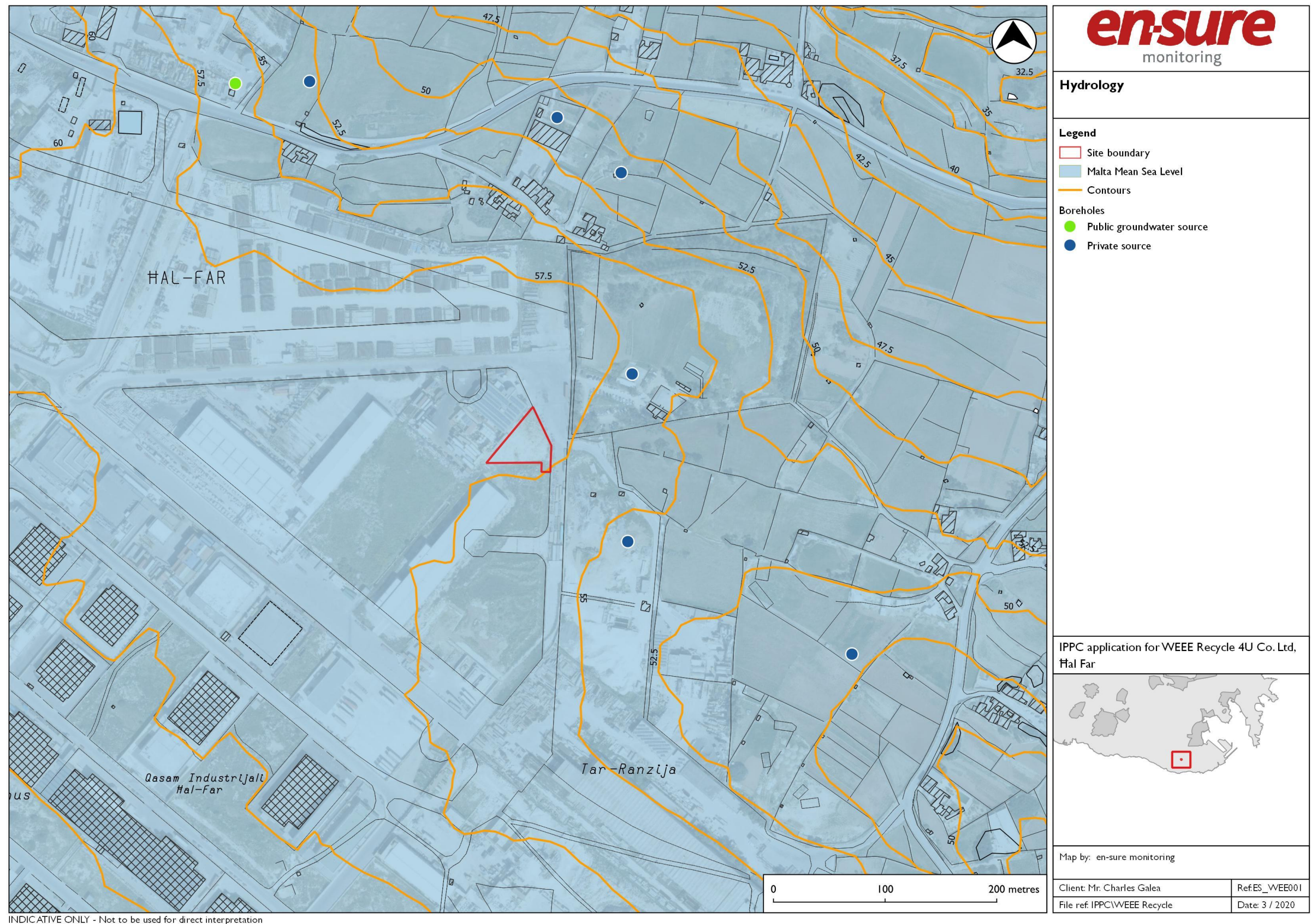
- 3.113. The closest receptors sensitive to emissions to air from the Scheme are the residences located approximately 175 m north of the Scheme site. Without mitigation, air emissions may also be deposited onto land and eventually find their way to the groundwater (although significant attenuation is expected before contaminants reach groundwater).
- 3.114. The relevant receptors for a fire / explosion are the surrounding land users in the immediate vicinity of the site, which are predominantly industrial and agricultural users.
- 3.115. Additionally, in the unmitigated scenario the relevant receptors for used fire-fighting water are the land and, to a lesser extent due to attenuation, the groundwater. With mitigation, the risk to receptors is reduced since:
- Used fire-fighting water from the outdoor areas and the garage will be treated in the oil-water interceptor before being received in a 476 m³ reservoir, and any overflows to the road surface will be of treated water (the overflow will only be installed when PA 6212/19 is granted), although the chances of this being required are remote;
 - Used fire-fighting water from the WEEE treatment building will be received in an impermeable concreted cesspit with a capacity for at least 30 minutes of fire-fighting water, and which overflows to the weighbridge pit and then reservoir 2 if this fills up (526 m³ capacity in total); the chances of an overflow to road being required is remote;
 - No used fire-fighting water will be generated in the fluorescent tube crushing room.
- 3.116. There are no protected areas in the immediate vicinity of the site that could act as receptors. The nearest protected site is located just over 200 m away, and is an area designated as a Special Protected Area (SPA), Special Area of Conservation (SAC) – Candidate Site of International Importance, and scheduled as an Area of Ecological Importance / Site of Scientific Importance (AEI / SSI). The cliffs making up this part of the SPA / SAC are home to protected seabird breeding colonies, including the Scopoli's and Yelkouan Shearwaters. The blue rock thrush (*il-merill*), which is a species of conservation importance, also frequents and breeds in the area.

Figure 3.8: Geology of the Scheme site and its surroundings



INDICATIVE ONLY - Not to be used for direct interpretation

Figure 3.9: Hydrology of the Scheme site and its surroundings



Risk Evaluation

3.117. The risks to land and groundwater will be assessed using the evaluation criteria described earlier.

3.118. The risks associated with both the unmitigated and mitigated scenarios are evaluated. It should be noted that the Scheme proposes to include all the mitigation measures described.

Without Mitigation

3.119. **Table 3.10** presents risk levels for each source in the scenario without mitigation.

Table 3.10: Risk levels without mitigation

Source	Environmental consequence	Likelihood of consequence	Resultant risk level
Spillage of diesel / oils	Minor	Likely	Moderate
Metal emissions from manual dismantling of general WEEE and storage of separated components	Minor	Likely	Moderate
Mercury / phosphor emissions from fluorescent tube crushing	Major	Almost certain	Extreme
Metal / phosphor emissions from breaking of CRT neck	Moderate	Almost certain	Extreme
Emissions / spills of toner powder	Moderate	Almost certain	Extreme
Leakage of lead / acid from batteries	Moderate	Likely	High
Used fire-fighting water	Major	Occasional	High
Fire / explosion	Major	Occasional	High
Contamination from flooding	Major	Unlikely	High
Contamination from an earthquake	Major	Unlikely	High

3.120. Leaks of diesel / oils from vehicles are rather common, although failure of storage containers is less so. The environmental consequence is being considered as minor, due to the small quantities in use / storage. The extent of any leak / spill would be quite limited and localised.

3.121. Metal emissions from manual dismantling of general WEEE and storage of separated components are being classified as minor, since most WEEE components are solids and significant metal leaching is not expected under normal conditions. This scenario is being classified as likely, since while dismantling is a routine operation at the Scheme, not all WEEE contain hazardous metals.

3.122. The environmental consequences of air emissions and discharge of contaminated wastewater from fluorescent tube crushing are considered major in the unmitigated scenario, due to the particular hazards of mercury and the fact that the glass will be finely crushed. The likelihood is almost certain since such emissions are routinely expected from fluorescent tube crushing.

- 3.123. Emissions from breaking of the neck of CRT monitors / screens are considered to have moderate consequences, since there is no fine crushing of the monitor, thus limiting the generation and dispersal of fine particles, and the potential for contamination of wash water by these particles. However, as such emissions are routinely generated the likelihood has been classified as almost certain.
- 3.124. Assuming a worst-case scenario of all the toner powder on site being hazardous (which as mentioned is highly unlikely), the environmental consequences of a spill or airborne release is classified as moderate. Without mitigation such emissions will routinely be released during dismantling.
- 3.125. The environmental consequences of lead / acid emissions from batteries, if the mitigation measures planned (including limiting the quantity stored) are not implemented, are considered to be moderate. If batteries are not stored properly, leakages to land / groundwater are routinely expected (typically in small quantities but over a prolonged period), and therefore this scenario has been classified as likely.
- 3.126. Without mitigation, used fire-fighting water could result in major environmental consequences if contaminated with hazardous substances, including mercury. The likelihood of a major fire is occasional considering the flammability of the substances in storage (e.g. wood).
- 3.127. The probability of a severe flood causing contamination has been classified as unlikely following a review of Malta's Preliminary Flood Risk Assessment,⁶ in which the area surrounding the Scheme site was not identified as being particularly susceptible to flash flooding. Without mitigation, the environmental consequences of a flood could be major, as contaminants could travel outside the site and contaminate the surrounding land and underlying groundwater.
- 3.128. While a severe earthquake is also considered unlikely, the environmental consequences could also be major in the unmitigated scenario.

With Mitigation

- 3.129. **Table 3.11** presents risk levels for each source in the scenario with mitigation as planned.

Table 3.11: Risk levels with mitigation

Source	Environmental consequence	Likelihood of consequence	Resultant risk level
Spillage of diesel / oils	No pollutant linkage		None
Metal emissions from manual dismantling of general WEEE and storage of separated components	Insignificant	Occasional	Very low
Mercury / phosphor emissions from fluorescent tube crushing	Insignificant	Almost certain	Low

⁶ Malta Resources Authority (2013) *Preliminary Flood Risk Assessment* <http://mra.org.mt/wp-content/uploads/2013/06/Preliminary-Flood-Risk-Assessment.pdf>.

Source	Environmental consequence	Likelihood of consequence	Resultant risk level
Metal / phosphor emissions from breaking of CRT neck	Insignificant	Almost certain	Low
Emissions / spills of toner powder	Insignificant	Occasional	Very low
Leakage of lead / acid from batteries	Insignificant	Occasional	Very low
Used fire-fighting water from outdoor areas and garage	Minor	Rare	Very low
Used fire-fighting water from WEEE treatment building	Minor	Rare	Very low
Used fire-fighting water from fluorescent tube crushing room	No pollutant linkage		None
Fire / explosion (immediate response)	Minor	Rare	Very low
Fire / explosion (delayed response)	Moderate	Rare	Moderate
Contamination from flooding	Minor	Unlikely	Low
Contamination from an earthquake	Minor	Unlikely	Low

- 3.130. Considering that the Scheme will have an impermeable hardstanding and oil-water interceptor leading to a concreted reservoir, together with specific bunding for oily waste, any spills / leaks would not be able to contaminate the underlying land / groundwater as the pathway to the receptor would have been removed. As the pollutant linkage in this scenario has been removed, the resultant risk is reduced to none.
- 3.131. Since WEEE dismantling will be undertaken indoors, and storage of WEEE / WEEE components will take place either indoors or under cover, with wastewater from washing of floors being received in an impermeable cesspit and treated, with testing being carried out before any discharge to sewer or disposal, no significant metal emissions are expected from these activities. The likelihood of metal emissions being generated is classified as occasional, taking into account that the fact that significant metal leaching is not expected even without abatement, and that not all WEEE contain hazardous metals; however, air from the dismantling area is not specifically treated.
- 3.132. Emissions to air of mercury from fluorescent tube crushing are expected to be lower than $0.008 \mu\text{g}/\text{m}^3$, which is well below the tolerable concentration of $0.2 \mu\text{g}/\text{m}^3$ for long-term inhalation exposure to elemental mercury vapour estimated by the World Health Organisation (WHO)⁷. Cumulative impacts are also not expected since baseline monitoring has shown that existing mercury levels are below detection limits. Additionally, wastewater from this activity will be received in a sealed impermeable tank located within concrete containment, and will be treated, with testing being carried out before any discharge to sewer or disposal. As a result, the environmental consequences of this activity can be classified as insignificant. The frequency has been retained as almost certain, since emissions to air and wastewater are routinely generated during crushing.

⁷ World Health Organisation (2007) *Exposure to Mercury: A Major Public Health Concern*
www.who.int/phe/news/Mercury-flyer.pdf.

- 3.133. With mitigation, the environmental effects of CRT neck breaking are expected to be insignificant, since the HEPA filter has a 99.97% filtration efficiency on particles $\geq 0.3 \mu\text{m}$. Additionally, wastewater from this area will be collected in an impermeable cesspit and treated, with testing being carried out before any discharge to sewer or disposal. Emissions to air are routinely generated during dismantling and thus the frequency has been retained as almost certain.
- 3.134. With mitigation, which includes dismantling of toners using specialised equipment and indoor storage of the toner powder, the environmental effects of toner processing and storage are reduced to insignificant. The likelihood of a release is reduced to occasional.
- 3.135. Considering that the quantity of batteries stored will be limited and that the entire site will be impermeable, with wastewater from floor washing being received in an impermeable underground cesspit, treated and analysed for compliance with the applicable limit values before any discharge, the environmental consequences of a lead / acid leakage will also be insignificant. The occurrence of leaks will also be reduced through proper storage in a secondary container, which will be checked regularly to ensure that its integrity is maintained.
- 3.136. The environmental consequences of used fire-fighting water from the outdoor areas and garage are reduced to minor with mitigation, since used water will be treated in the interceptor; thus any overflow would be of treated water (the overflow will only be installed when PA 6212/19 is granted). The likelihood of a fire is reduced to rare, due to the operational procedures that will be in place to limit the quantity of flammable waste stored and risk of fire. Similarly, used fire-fighting water from the WEEE treatment building will be received in an impermeable concreted cesspit; this cesspit will have a spare capacity for at least 30 minutes of fire-fighting water and will overflow to a weighbridge pit and reservoir having a total capacity of 526 m³; therefore the possibility of overflow of used water to the road surface is remote. Additionally, as no used fire-fighting water will be generated in the fluorescent tube crushing room, there is no environmental risk from this scenario.
- 3.137. In the mitigated scenario, the environmental consequences of a fire / explosion would be minor to moderate, depending on how quickly the fire is tackled (since the response might be delayed if the fire occurs outside operating hours). This rating is reduced from the unmitigated scenario due to the procedures and equipment that will be in place to tackle a fire as soon as possible and thus reduce the risk of it spreading beyond the site. It is to be noted that the fluorescent tube crushing room will be equipped with an automated gas suppression system, thus a fire in this room would be tackled immediately. Additionally, while the design of the fire detection and fire-fighting equipment has not been finalised yet, it is likely that an automatic fire alarm system will be in place, which would reduce the response time if the fire occurs outside operating hours.

3.138. The probability of a severe flood or earthquake remain unlikely; however the environmental consequences are expected to be reduced to minor with mitigation measures in place.

Conclusion

3.139. As a result of the planned mitigation measures, environmental risks have been reduced to very low to moderate.

Fire and Explosion Prevention and Response Plan

3.140. A fire and explosion prevention and response plan will be commissioned by the Applicant once the Scheme has been constructed.

3.141. The Applicant has also engaged a competent fire expert to advise on and install a fire detection system and any additional fire-fighting equipment that may be required. Additionally, approval by the Civil Protection Department will be obtained before construction, and the site layout includes a clear buffer for fire truck access, and provision of a 100 m³ reservoir which will always be kept full for fire-fighting purposes.

3.142. The fire safety procedures and equipment will be certified by a competent fire expert once they are in place.

Spill Prevention and Response Plan

Spill Risks

3.143. Liquid hazardous substances and wastes will be handled at the Scheme. These will largely be limited to those identified in **Table 3.12**. Toners powder will also be stored, which being a fine powder may also spill and disperse; however, it is noted that most toner powders are classified as non-hazardous waste.

Table 3.12: Liquid hazardous substances and waste

Item	Associated activity	Maximum quantity stored on site
Diesel	Operation of on-site forklifts and trucks	50 L
Engine start formula	Operation of an older truck (assists with cold diesel engine start-up)	500 mL
Oils including hydraulic oil, waste oil, oils from interceptor	Maintenance of on-site vehicles and machinery, oil-water interceptor	2,050 L
Batteries (contain acid)	WEEE processing	1 tonne

3.144. Spillages may arise from accidental damage / wear and tear of a container, tipping over of a container, or due to poor operational practices (such as careless dispensing of fuel, or storage of hazardous materials outside designated areas). Leaks may also arise from the machinery used on site.

3.145. If hazardous materials / waste are spilled, without proper safeguards they can contaminate the land and groundwater in the surroundings.

Spill Precautions

- 3.146. The entire site surface will be covered in concrete underlain by a geotextile membrane to ensure impermeability.
- 3.147. Hazardous raw materials will be stored in the garage, which is connected to an oil-water separator.
- 3.148. Hazardous waste will be stored in the principal central building or in the outdoor covered area. Bunding will be provided for liquid waste or waste containing liquid components, and batteries will be stored in dedicated containers inside this building.
- 3.149. Surface water from outside areas will be treated in an oil-water interceptor. Additionally, wastewater from fluorescent tube crushing will be treated and stored in an impermeable closed cesspit before reuse.
- 3.150. The following procedural precautions will also be followed to minimise the risk of a spill:
- Store all liquid hazardous substances and waste in labelled and closed containers within a contained area or using temporary containment;
 - Use drip trays when dispensing fuel or filling up the diesel container;
 - Dismantle toner cartridges using specialised equipment;
 - Inspect containers / drums containing liquid hazardous substances / waste according to the maintenance schedule, and repair / repackage as necessary; and
 - Inspect the site surfacing, and surface and waste water management system according to the maintenance programme and carry out repairs / clean-up as required.
- 3.151. Any minor drips, for example from vehicles, are to be seen to quickly before they increase.
- 3.152. Staff will also receive training on spill prevention and response to minimise the likelihood of a spill, and the environmental consequences of a spill if it occurs.

Spill Kit

- 3.153. A sand barrel will be available on site to act as a spill kit for liquid spills. An industrial vacuum cleaner will be available to collect spills of fine powder such as toner powder.

Spill Response Procedure

- 3.154. In the event of a spill being detected, the following procedure must be followed. This is based on the 3C programme, i.e.:

- Control the spill;
- Contain the spill; and
- Clean up the spill.

Control the Spill

3.155. Attempt to identify the nature (e.g. fuel) and source of the spill (e.g. a damaged drum).

3.156. If you can identify the source of the spill and can control the flow of the material being spilled, do so quickly (e.g. put a drip tray beneath the container). The aim of this step is to stop any further release of the substance.

Contain the Spill

3.157. The aim of this step is to avoid the further spread of spilled material.

3.158. In the case of liquid spills, first place the sand around the spill. Then place sand on top of the spill, allowing it to absorb the spilled material.

3.159. In the case of spills of fine powder, the vacuum cleaner is to be used to collect the spill.

Clean up the Spill

3.160. Collect and place the used sand in a heavy-duty plastic disposal bag, and close the bag. Ensure no visible residue is left on the ground.

After the Spill

3.161. The used sand is to be considered hazardous waste (EWC 15 02 02*) and disposed of at a facility licensed to receive such waste. The consignment note procedure for transfer of hazardous waste is to be followed.

3.162. The contents of the vacuum cleaner are to be classified according to the EWC code of the waste collected, and discarded accordingly.

3.163. Any use of spill kit contents is to be reported to TCP, who will make arrangements for purchasing material to replenish the spill kit as necessary.

3.164. The oil-water separator is to be inspected following any large oily spill that reaches the separator, to establish whether it needs to be emptied.

3.165. All spills will be recorded in the site diary. Significant spills will also be reported to ERA.

B2.9 Training

3.166. The ToR regarding training in the IPPC application form are as follows:

Please submit a proposal for a training programme and a proposed template for keeping training records. Please submit

the name of the technically competent person on site who will be responsible for such training.

- 3.167. The company's Environmental Management System recognises the importance of training employees, since their performance can significantly impact the environment.
- 3.168. Each employee is trained on environmental issues in at least one training session that, as a minimum, covers the following topics:
- The importance of conformity with the environmental policy, procedures and requirements of the EMS;
 - Significant positive and negative aspects and impacts associated with their work;
 - Their roles and responsibilities in achieving conformity with the EMS; and
 - The potential consequences of deviation from specified procedures
- 3.169. An employee induction programme is included as part of the EMS (**Annex 7**); this includes training on environmental issues, energy saving methods and operational procedures.
- 3.170. On the job training and specialised training is also provided when necessary, depending on the employee's role within the company. One employee is trained on basic fire-fighting, whereas employees carrying out carriage of dangerous goods receive ADR driver training. All employees will receive basic training on fire / explosion prevention and response and spill prevention and response.
- 3.171. General training is typically provided by the Managing Director, who is the Technically Competent Person for the Scheme. Specialised training, such as on fire fighting and ADR, is outsourced to competent experts.
- 3.172. Once the IPPC permit has been issued, employees will also be trained on the aspects of the IPPC permit that are relevant to their duties.
- 3.173. Training is recorded using the form presented in **Annex 8**.

B2.10 Cessation

- 3.174. The former MEPA's ToR in respect of cessation were:

Submit an outline decommissioning plan describing the draft proposed measures upon definitive cessation of activities, to avoid any pollution risk and return the site of the installation to a satisfactory state (including relevant measures for the design and construction of the installation).

This plan shall include:

- *A qualitative assessment of the potential for contamination of land and groundwater pollution which might arise from the historical and current processes carried out at the installation.*
- *A draft waste management strategy including:*
 - *The identification and characterisation of sources, types of wastes (including equipment, tanks, fuels and by-products);*
 - *Criteria for segregation of wastes;*
 - *Proposed treatment, conditioning, transport, storage and disposal/recovery methods;*
 - *Potential reuse/recycling of such wastes.*

3.175. The potential for land and groundwater contamination from the Scheme has been assessed in section B1.4 and B2.8 of this Application. The risk assessments conclude that, with the proposed mitigation measures, risks to land and groundwater from the Scheme are low and very low, with no risk being detected in the case of spillages of hydrocarbon-based products and a fire in fluorescent tube crushing room. As mentioned, this risk level is contingent on mitigation systems, including air emissions abatement, wastewater treatment and site containment being implemented, monitored and maintained to ensure their continued effectiveness.

3.176. Therefore, provided that the mitigation measures proposed are implemented effectively, land and groundwater monitoring should not be necessary upon cessation, unless specifically required by ERA. It is to be noted that this assessment may need to be updated at the decommissioning stage if new categories of relevant hazardous substances / waste are proposed to be used or processed in significant quantities, or if the implementation / effectiveness of the planned mitigation measures is reduced. It would also need to be revised in case of major incidents (such as spills) that breach containment measures.

3.177. Upon cessation of activities, a Waste Management Plan will be prepared. The Waste Management Plan will identify the types and approximate quantities of wastes on site at the decommissioning stage. These are likely to include the various wastes accepted and generated by the Scheme (described in section B2.2.1, B2.2.3 and B3.1), machinery and vehicles (described in section B2.6) and raw materials (as described in section B2.3).

3.178. Since the Scheme is a waste management facility, existing site procedures will be used to process any remaining wastes on site and deliver them to authorised facilities via licensed waste carriers – waste will be delivered for recovery as far as possible.

- 3.179. The state of machinery and vehicles used on site will be assessed. Depending on their condition, they will either be either sold as second-hand equipment, or else sent for recycling.
- 3.180. Any unused raw materials will be returned to the suppliers or sent to an appropriate licensed facility for recovery / disposal.
- 3.181. Cesspits and the fluorescent tube tank will be cleaned and the wastewater tested in accordance with the requirements of the Water Services Corporation. Wastewater will be discharged to the sewerage network if found to be below the WSC discharge limit/s, or exported to an authorised facility if not.
- 3.182. The oil-water separator will also be cleaned out and the sludge delivered to an authorised facility.
- 3.183. Records of waste movements will also be kept during decommissioning.

4. EMISSIONS

B3.1 Waste

4.1. The former MEPA's ToR regarding waste were:

B3.1.1: *Characterise (using the European Waste Catalogue code, in accordance with LN 184 of 2011 as amended) and quantify each waste stream from the installation. (For installations carrying out waste management activities (activities listed in "Section 5: Waste management" of Annex I of the Industrial Emissions Directive), please use this section to document both incoming and outgoing waste.)*

B3.1.2: *Describe the proposed measures for waste management, storage and handling. Indicate the storage location of wastes on a site layout plan and give details on:*

- *Maximum storage capacity;*
- *Containment measures (including bunding capacity, where applicable);*
- *Protective measures (including security).*

B3.1.3: *Describe how each waste stream is, in order of priority and in accordance with Directive 2008/98/EC, prepared for re use, recycled, recovered or disposed of. If you propose any disposal, explain why recovery is technically and economically impossible and describe the measures planned to avoid or reduce any impact on the environment.*

Give details on authorised disposal/recovery facilities proposed to be used for each waste. If any on-site recovery of waste is proposed, provide details.

For each waste, give details on off-site transportation, including registered waste carriers/brokers to be used.

4.2. Since the Scheme is a waste management facility, both incoming and outgoing waste will be described in this section.

Incoming Waste

4.3. **Table 4.1** identifies the incoming waste and the treatment applied on site. Further details regarding how the various waste types will be treated are included in section B2.2.1 of the Application.

Table 4.1: Incoming waste

EWC code	HP code ⁸	Description	Estimated annual quantities	Estimated maximum quantity stored	Treatment
16 02 13* 16 02 14 16 02 15* 16 02 16 08 03 17* ⁹ 08 13 18 ⁹ 09 01 10 09 01 11* 09 01 12 20 01 35* 20 01 36	HP 5, HP 14	WEEE and WEEE components / parts	1,600 tonnes	13 tonnes ¹⁰	Manual dismantling, crushing of cables and non-hazardous components
16 02 13* 20 01 35*	HP 5, HP 14	CRT televisions and monitors	300 tonnes	13 tonnes ¹⁰	Dismantled and broken in CRT breaking room, shredding of wooden components (e.g. from old TVs)
16 02 13* 20 01 21*	HP 5, HP 6, HP 14	Fluorescent tubes and bulbs	30 tonnes	2 tonnes	Crushed in crusher room (after removing from housing, where applicable)
16 02 11* 16 02 13* 20 01 23*	HP 5, HP 14	Fridges / freezers	200 tonnes	8 tonnes	Storage prior to export
16 02 11* 20 01 23*	HP 5, HP 14	Discarded equipment containing refrigerants (e.g. air-conditioning / water dispensing equipment)	10 tonnes	8 tonnes	Degassing, followed by manual dismantling of equipment
16 06 01* 16 06 02* 16 06 03* 16 06 04	HP 5, HP 6, HP 8, HP 14	Batteries	50 tonnes	1 tonne	Storage prior to export

⁸ According to EU Regulation 1357/2014; HP codes only apply when the waste is hazardous.

⁹ Referring to toner cartridges.

¹⁰ Approximate total capacity of the “pre-treatment storage on pallets” area, shown in **Figure 4.2**.

EWC code	HP code ⁸	Description	Estimated annual quantities	Estimated maximum quantity stored	Treatment
20 01 33* 20 01 34					
15 01 01 15 01 02 15 01 06	-	WEEE-related packaging	25 tonnes	13 tonnes ¹⁰	Segregated from WEEE and sent to an authorised recycling facility
03 01 05 15 01 03 17 02 01 19 12 07 20 01 38	-	Wood items (e.g. pallets, offcuts, wood from old TVs ¹¹)	100 tonnes	13 tonnes ¹⁰	Once end-of-waste application is approved by ERA: Shredding for production of animal bedding / briquettes; in the interim such waste will be sent to a licensed facility.

¹¹ Confirmed to be non-hazardous through testing; please refer to **Annex 9**. However, in light of recent test results indicating contamination by lead of a tested sample of wood from old TVs, retesting will be carried out once the IPPC permit is issued and the new site is operational. The Applicant expects that the improved operational controls at the new site will reduce the risk of contamination.

Waste Acceptance Procedures

- 4.4. Waste will be delivered to the site using waste carriers registered for that type of waste. The Applicant already has a number of vehicles authorised to transport waste, including those listed in **Table 4.2**; however, waste may also be received from other facilities / brokers using their own registered waste carriers.

Table 4.2: WEEE Recycle 4U Company Ltd registered waste carriers¹²

Registration number	Vehicle number plate	Waste class	Waste description
GBR12/04150/19	CBZ 053	D2	WEEE, including white goods
GBR12/04153/19	FGV 229	D2	
GBR12/02979/19	ECF 186	D2	
GBR12/02169/19	BCE 757	D2	
GBR12/01847/19	ACI 791	D2	

- 4.5. All hazardous waste transferred to and from the site will be accompanied by a valid hazardous waste consignment permit issued by ERA (except drop-ins delivered by private individuals). Each consignment under the consignment permit will also be accompanied by a consignment note.
- 4.6. Relevant permits will be inspected at the weighbridge area (shown in **Figure 4.1**), and trucks will be weighed upon entry and exit at the weighbridge to ensure accurate records are kept. The Scheme also issues delivery receipts to clients.
- 4.7. Data from the weighbridge will be stored in a computer database, which will allow for tracking of incoming and outgoing waste. The database will be backed up regularly.
- 4.8. In the event of any waste appearing not to fall within the list of authorised waste after the truck has been unloaded, such waste will be placed in the quarantine area (**Figure 4.1**) and removed from the site to an authorised facility as soon as practicable.

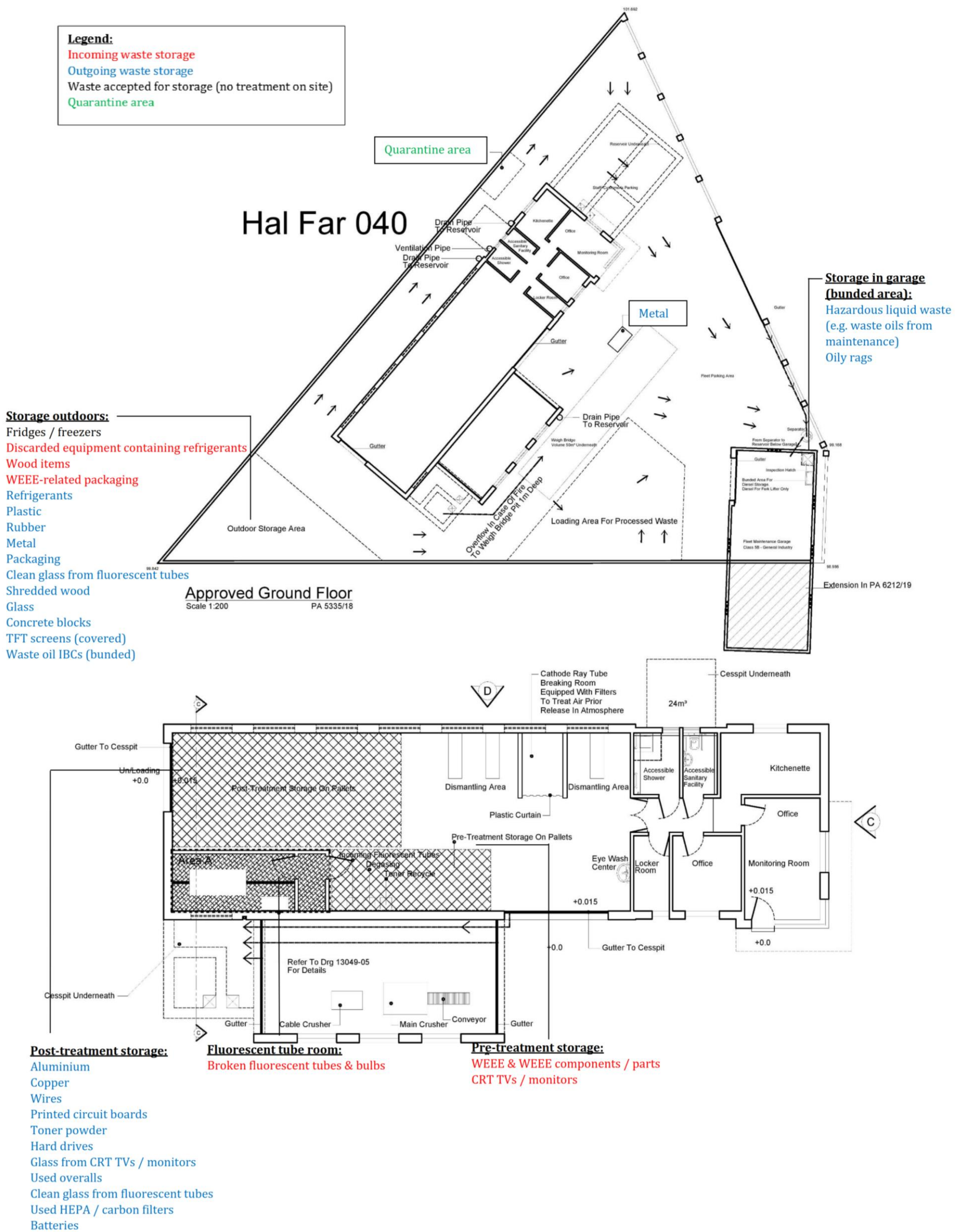
Waste Storage

- 4.9. Incoming waste will be received in the WEEE treatment building, where it is sorted for storage in the appropriate area as described below.
- 4.10. Waste designated for dismantling will be stored indoors, in the area designated as “pre-treatment storage on pallets” in **Figure 4.1**.
- 4.11. Fluorescent tubes will be stored carefully in one of two boxes dedicated for incoming fluorescent tubes (**Figure 4.1**) before processing. Containers having tubes / lamps that are received broken will be stored inside the fluorescent tube crushing room to reduce the risk of fugitive mercury emissions.
- 4.12. Batteries will be stored in storage bins inside the main building.

¹² Data is correct as at 20th May 2020 and is subject to change.

- 4.13. Fridges / freezers, WEEE-related packaging, certain WEEE components, waste oils from WEEE, and wood items will be stored in the outdoor area under cover (as shown in **Figure 4.1**). Waste oils will be placed on a prefabricated bund.
- 4.14. Any unauthorised waste that may enter the site will be stored in the quarantine area (inside a closed skip or similar) prior to removal to authorised facilities.
- 4.15. The entire site surface will be covered in concrete underlain by a geotextile membrane to ensure impermeability.
- 4.16. The ground in outdoor areas of the site will be laid to fall towards an underground reservoir, and surface water from outdoor areas will be treated in an oil-water separator before being received in the reservoir.
- 4.17. Wastewater from washing of floors in the WEEE treatment building will be collected in gutters, received in an underground impermeable cesspit and treated before reuse. Wastewater from the fluorescent tube crushing room will be received in an underground prefabricated tank and also treated before reuse. Details regarding these treatment systems are included in section B3.3 of the IPPC application.
- 4.18. Bunding will be provided for waste containing hazardous liquid components (e.g. batteries). Waste oils generated from maintenance of site vehicles will be stored in the garage, which is linked to an oil-water separator.
- 4.19. The maximum quantities of each wastes stored will not exceed the site's capacity, and wastes will be removed as frequently as necessary to ensure the quantities on site remain within the site's capacity.

Figure 4.1: Scheme layout



Outgoing Waste

- 4.20. **Table 4.3** lists the principal wastes to be generated during the operation of the Scheme, together with storage and containment measures.
- 4.21. Authorised receiving facilities will be used.
- 4.22. As shown in **Table 4.3**, over 99% of the incoming waste will be reused, recycled or recovered. Disposal is only used when it is the only practicable option.
- 4.23. All hazardous waste transferred from the site will be accompanied by a valid hazardous waste consignment permit issued by ERA. Each consignment under the consignment permit will also be accompanied by a consignment note.
- 4.24. The Applicant will also be applying with ERA to export the waste directly at a later stage. Exports of waste will be in accordance with Regulations (EC) 1013/2006, 1379/2007 and 1418/2007 on shipments of waste. Shipments of non-hazardous waste will follow the Annex VII procedure, and hazardous waste shipments will be covered by a transfrontier shipment permit from ERA.
- 4.25. Waste will also be removed from site using waste carriers registered for that type of waste, or collected by authorised waste brokers.
- 4.26. The quantity of each type of waste removed from site will be measured using the site's weighbridge and recorded. Recycling certificates provided by the receiving facilities will also be retained.
- 4.27. Waste is considered to have reached end-of-waste status if a number of criteria are met. Legal Notice 184 of 2011 states that:

6. (1) Waste shall cease to be waste within the meaning of regulation 4 when it has undergone a recovery, including recycling, operation and complies with the following conditions:

(a) the substance or object is commonly used for specific purposes;

(b) a market or demand exists for such a substance or object;

(c) the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products;

(d) the use of the substance or object will not lead to overall adverse environmental or human health impacts; and

(e) the substance or object shall be accompanied by a declaration as set out in Schedule 10.

- 4.28. Since non-hazardous shredded wood will be sold for use as animal bedding / briquettes, the Applicant had previously obtained MEPA approval to consider this material as having reached end-of-waste status for use as animal bedding / absorbent. A copy of the former MEPA's permit is included in **Annex 10**. However, in light of recent test results indicating contamination by lead of a tested sample of wood from old TVs, retesting will be carried out once the IPPC permit is issued and the new site is operational. The Applicant expects that the improved operational controls at the new site will reduce the risk of contamination, and will apply for an end-of-waste permit with ERA at that stage. Wood will be stored in the outdoor storage area (covered) prior to removal from site. Additionally, before any sale of shredded wood for use as briquettes is carried out, an application will also be submitted to ERA using Schedule 10 of Legal Notice 184 of 2011 and the relevant permit obtained.

Table 4.3: Outgoing waste

Activity	EWC code	HP code ¹³	Description	Estimated annual quantity	Storage and containment	Estimated maximum quantity stored	Destination
WEEE degassing, dismantling, and crushing of non-hazardous components and cables	14 06 01*	HP 5, HP 14	Refrigerants	1 tonne	Gas cylinders in designated area indoors or in outdoor storage area	1 tonne	<ul style="list-style-type: none"> • Ozone-depleting substances: Exported to an authorised facility for destruction • Other refrigerants: Sold for reuse
	16 02 15* 16 02 16	HP 5, HP 14	Printed circuit boards / TFT screens	250 tonnes	In jumbo bags ¹⁴ on pallets indoors / covered outdoor storage area	24 tonnes	Exported to authorised recycling facility
	19 12 04	-	Plastic	200 tonnes	Covered outdoor storage area	2 tonnes	Sent to authorised facility for recycling
	19 12 02	-	Ferrous metal	400 tonnes	Covered outdoor storage area / shipping container	10 tonnes	Sent to authorised facility for recycling
	19 10 02 19 12 03	-	Non-ferrous metal	100 tonnes	In jumbo bags on pallets indoors	3 tonnes	Sent to authorised facility for recycling
	17 04 01	-	Copper wire	50 tonnes		3 tonnes	
	19 12 05	-	Glass	50 tonnes	Covered outdoor storage area	20 tonnes	Sent to authorised facility for recycling
	17 01 01	-	Concrete block from washing machines	100 tonnes	Covered outdoor storage area	10 tonnes	Sent to authorised facility for recycling
	13 03 06* 13 03 07* 13 03 08* 13 03 09*	HP 5, HP 6, HP 7, HP 14	Waste oils (e.g. from oil heaters)	3,000 L	In an IBC on a prefabricated bund in the outdoor storage area	2,000 L	Sent to authorised facility for recovery

¹³ According to EU Regulation 1357/2014; HP codes only apply when the waste is hazardous.

¹⁴ Jumbo bags are typically stacked two high.

Activity	EWC code	HP code ¹³	Description	Estimated annual quantity	Storage and containment	Estimated maximum quantity stored	Destination
	08 03 17*	HP14 (if hazardous)	Toner powder	2 tonnes	In jumbo bags on pallets indoors	20 tonnes	Sent to authorised facility for recycling
	08 03 18						
	16 02 15*	HP 5, HP 14	Hard drives	15 tonnes	In jumbo bags on pallets indoors	1 tonne	Exported to authorised recycling facility
	16 02 16						
	16 06 01* 16 06 02* 16 06 03* 16 06 04		Batteries	50 tonnes	In battery storage bins indoors	1 tonne	
Removal of waste packaging from WEEE	15 01 01	-	Paper / cardboard packaging	10 tonnes	Covered outdoor storage area	2 tonnes	Sent to authorised facility for recycling
	15 01 02	-	Plastic packaging	5 tonnes		500 kg	
	15 01 06	-	Mixed packaging	10 tonnes		2 tonnes	Sent to authorised facility for disposal
Breaking of CRT televisions and monitors	16 02 15*	HP 5, HP 7, HP 14	Glass	180 tonnes	In jumbo bags on pallets indoors	24 tonnes	Exported to authorised recycling facility
	15 02 02* 15 02 03	HP 5, HP 6, HP 7, HP 14	Used disposable overalls	10 m ³	In jumbo bags on pallets indoors	<1 m ³	Sent to authorised facility for incineration
Crushing of fluorescent tubes / lamps	19 12 05 ¹⁵	-	Clean glass from crushing of fluorescent tubes	25 tonnes	In jumbo bags on pallets indoors / in covered outdoor storage area	5 tonnes	Exported to authorised recycling facility
	15 02 02* 15 02 03	HP 5, HP 6, HP 7, HP 14	Used disposable overalls	5 m ³	In jumbo bags on pallets indoors	<1 m ³	Sent to authorised facility for incineration
Storage of fridges / freezers	16 02 11* 16 02 13* 20 01 23*	HP 5, HP 14	Fridges / freezers	200 tonnes	Covered outdoor storage area	8 tonnes	Exported to authorised facility for recovery (and destruction / recovery of refrigerant)

¹⁵ Test results (**Annex 11**) on crushed glass generated by the existing installation at Ta' Maggi Industrial Estate confirm that the glass is non-hazardous even without washing; the mercury content is lower than 0.5 mg/kg.

Activity	EWC code	HP code ¹³	Description	Estimated annual quantity	Storage and containment	Estimated maximum quantity stored	Destination
Storage of batteries	16 06 01* 16 06 02* 16 06 03* 16 06 04 20 01 33* 20 01 34	HP 5, HP 6, HP 8, HP 14	Batteries	50 tonnes	In battery storage bins indoors	1 tonne	Exported to authorised facility for recovery
Air treatment	15 02 02*	HP 5, HP 6, HP 7, HP 14	Used HEPA filters	6 filters (estimate)	Designated area indoors	6 filters	Exported to authorised facility for disposal
	15 02 02*	HP 5, HP 6, HP 7, HP 14	Used carbon filters	As required	Designated area indoors	200 kg	Exported to authorised facility for disposal
	19 12 11* (or 19 12 12 if testing shows the waste is not hazardous)	HP 5 (potentially, if hazardous)	Dust from cyclone bin (linked to main crusher and cable crusher)	As required	Designated area indoors	As required	Sent to authorised facility for disposal
Wastewater treatment	15 02 02*	HP 5, HP 14	Used filters	<3 filters	Waste water treatment room	3 filters	Exported to authorised facility for disposal
	19 08 08* 19 08 99*	HP 5, HP 14	Filter backwash / concentrate from RO unit	<3 m ³	Bunded containers in wastewater treatment room	<1 m ³	Exported to authorised facility for disposal

Activity	EWC code	HP code ¹³	Description	Estimated annual quantity	Storage and containment	Estimated maximum quantity stored	Destination
	16 10 01* 16 10 02	HP 5, HP 14 (only if hazardous)	Wastewater from fluorescent tube crushing room and WEEE treatment building	<5 m ³	Fluorescent tube crushing room: Sealed tank within impermeable concrete bund; WEEE treatment building: Impermeable underground cesspit	1 m ³ 4 m ³	Normally reused after treatment; however, if discharge is required the wastewater will be tested and either: (a) discharged to the sewerage network if found to be below the WSC discharge limit; or (b) exported to an authorised facility if not.
Surface water management	13 05 07*	HP 3, HP 5, HP 6, HP 7, HP 14	Oils collected by interceptor	5 L	Designated banded waste oils drum indoors	5 L	Sent to authorised facility for recovery
Maintenance of on-site vehicles and machinery	15 02 02*	HP 3, HP 7, HP 14	Oily rags	5 kg	Garage (connected to oil-water separator)	5 kg	Sent to authorised facility for recovery
	13 02 06* 13 01 11*	HP 5, HP 6, HP 7, HP 14	Engine oils Hydraulic oils	50 L	Garage (connected to oil-water separator)	50 L	Sent to authorised facility for recovery
	15 02 02* 15 02 03	HP14 (if hazardous)	Toner machine filters	2 filters	WEEE treatment building	2 filters	Sent to authorised facility for disposal / recycling
Administration facilities	20 03 01	-	Mixed domestic waste	800 kg	Offices	5 kg	Sent to authorised facility for disposal
	20 01 01 20 01 02 20 01 39 20 01 40	-	Recyclable domestic waste	1,000 kg	Offices	10 kg	Sent to authorised facility for recycling

B3.3 Emissions to Sewer

4.29. The former MEPA's ToR regarding emissions to sewer were:

***B3.3.1:** Does the installation have (or is proposing to have) a sewer connection? Please submit a block plan of the site, showing the proposed layout of sewer connections and any other drains (colour-coded), as well as the proposed discharge point(s).*

***B3.3.2:** Does the installation have (or is proposing to have) a cesspit? Please provide certification by an independent, warranted engineer showing that the cesspit is in line with the requirements of Schedule 1 Activity 43 of LN 106 of 2007 (as may be amended).*

***B3.3.3:** Does the installation have a Sewer Discharge Permit? Please submit a copy of the permit, or of the submitted application if the permit has not yet been issued.*

***B3.3.4:** Could the installation involve the release of any Schedule A or Schedule B substance into the sewers? If yes, explain how the requirements of LN 139 of 2002 have been addressed.*

4.30. This section considers the management of all wastewater streams from the Scheme. The site will not be connected to the mains sewer, therefore discharges to sewer will occur indirectly.

Sanitary Waste

4.31. An appropriately ventilated and impermeable 24 m³ cesspit (cesspit 1 in **Figure 4.2**; section shown in **Figure 4.3**) will be built to receive wastewater from sanitary facilities on site. This will be emptied by bowser to a Water Services Corporation (WSC)-authorised discharge point as needed. Testing of this wastewater will also be carried out prior to removal as required by the WSC.

Process Wastewater

WEEE Treatment Building

4.32. Wastewater from washing of floors inside the WEEE treatment building, including the CRT breaking room and area used for crushing, but excluding the fluorescent tube crushing room, will be collected in gutters and received in an underground impermeable and ventilated cesspit (cesspit 2 in **Figure 4.2**; section shown in **Figure 4.3**).

4.33. This cesspit will have a capacity of 26.5 m³ and will be constructed of concrete lined with a geotextile membrane to ensure its impermeability. An automatic level gauge will be installed to ensure that the water level does not exceed 4 m³; the purpose of this gauge is to ensure there is always spare capacity to receive at least 30 minutes of used fire-fighting water.

- 4.34. The wastewater in the cesspit will be treated before reuse. It is envisaged that this treatment system will consist of the following three systems in series;
- A sand filter, to capture particulates that could compromise the following filters;
 - An activated carbon filter, principally to absorb any mercury (this is a precautionary measure, since mercury vapour should not be generated in the WEEE treatment building); and
 - A reverse osmosis unit, to remove any residual dissolved metals.

Fluorescent Tube Crusher Room

- 4.35. Wastewater from washing of crushed glass will be collected in a container located directly beneath the fluorescent tube crusher and recirculated for reuse, thus creating a closed-loop system.
- 4.36. Wastewater from washing of the fluorescent tube crusher room, which will have sealed vinyl flooring, will be discharged through open floor drains into a dedicated 1m³ prefabricated stainless steel tank (**Figure 4.3** and **Figure 4.4**). Used wastewater from cleaning of crushed glass will also be discharged to this tank at intervals.
- 4.37. The tank will be impermeable, and housed inside a lined concrete chamber to provide a second layer of containment.
- 4.38. In order to avoid release of mercury vapour to ambient air, the ventilation pipe from this tank (required for air displacement) will discharge to the inside of the fluorescent tube crusher room, where an air treatment system will be in place as described in section B3.6 of the IPPC application.
- 4.39. The wastewater in this tank will be treated before reuse. It is envisaged that this treatment system will consist of the following two filters in series;
- A sand filter, to capture particulates that could compromise the following filters; and
 - An activated carbon filter, to absorb mercury.
- 4.40. An automatic level gauge will be installed to ensure that the water level in this tank does not exceed the tank's capacity. Since the room will be fitted with an automatic gas suppression system (rather than a water-based fire-fighting system), there is no need to ensure spare capacity for collection of used fire-fighting water.
- 4.41. All the filters used for effluent treatment will be located in the wastewater treatment room (shown in **Figure 4.2**), and the effluent will be pumped from the cesspit / tank through these filters as soon as it is generated. The treated wastewater will be returned to the same cesspit / tank for reuse.

- 4.42. The exact specifications of the filters are currently under investigation; examples of the models being considered are included in **Annex 12**. Activated carbon filters typically allow the mercury levels in **Table 4.4** to be reached, while the Reverse Osmosis unit is expected to remove at least 95% of total dissolved solids.

Table 4.4: Typical emission levels after activated carbon filter treatment

Parameter	Typical levels
Inorganic mercury (Hg^{2+})	0.05 mg/L
Organic mercury complexes	0.002 mg/L

- 4.43. While treated process effluent will normally be reused in the same process, if any discharge is required, the treated wastewater will first be tested in accordance with WSC requirements and:
- Discharged to the sewerage network if found to be below the WSC discharge limit/s; or
 - Exported to an authorised facility if not.
- 4.44. It is to be noted that the levels achieved after treatment are contingent on both the treatment system selected and the starting levels of contaminants before treatment; the latter information is not currently available, since the Scheme is not yet operational, however, the treatment system will be selected and communicated to ERA before the Scheme starts operation.
- 4.45. Additionally, the treatment system can be optimised if more effective filtration is found to be needed, such as by reducing the flow rate of the pumps in order to increase the contact time with the filter.
- 4.46. In any event, discharges to sewer will only occur after testing has confirmed that the applicable limits are met. If the limit values are not reached, the treated effluent will be sent to an authorised facility for further treatment or disposal.
- 4.47. The underground tank and cesspits will be certified as required by ERA once they have been constructed. Impermeability testing will be repeated as required by ERA as part of the maintenance programme for the Scheme (section B2.5 of the IPPC application).
- 4.48. An application for a permit for off-site discharge to sewer has been submitted to the WSC; a copy of the application is included in **Volume 1**.

Figure 4.2: Cesspits

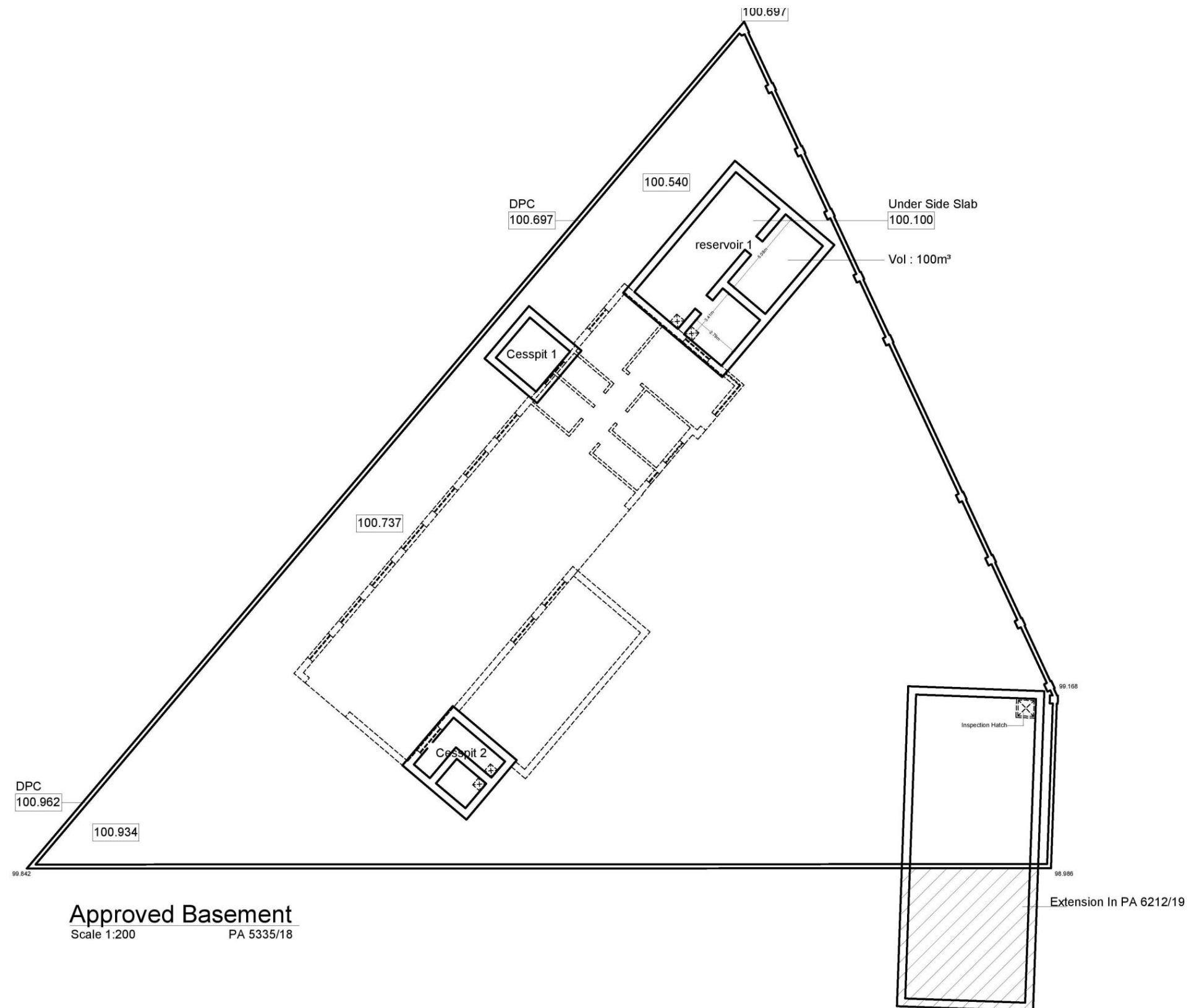


Figure 4.3: Cesspits and fluorescent room tank

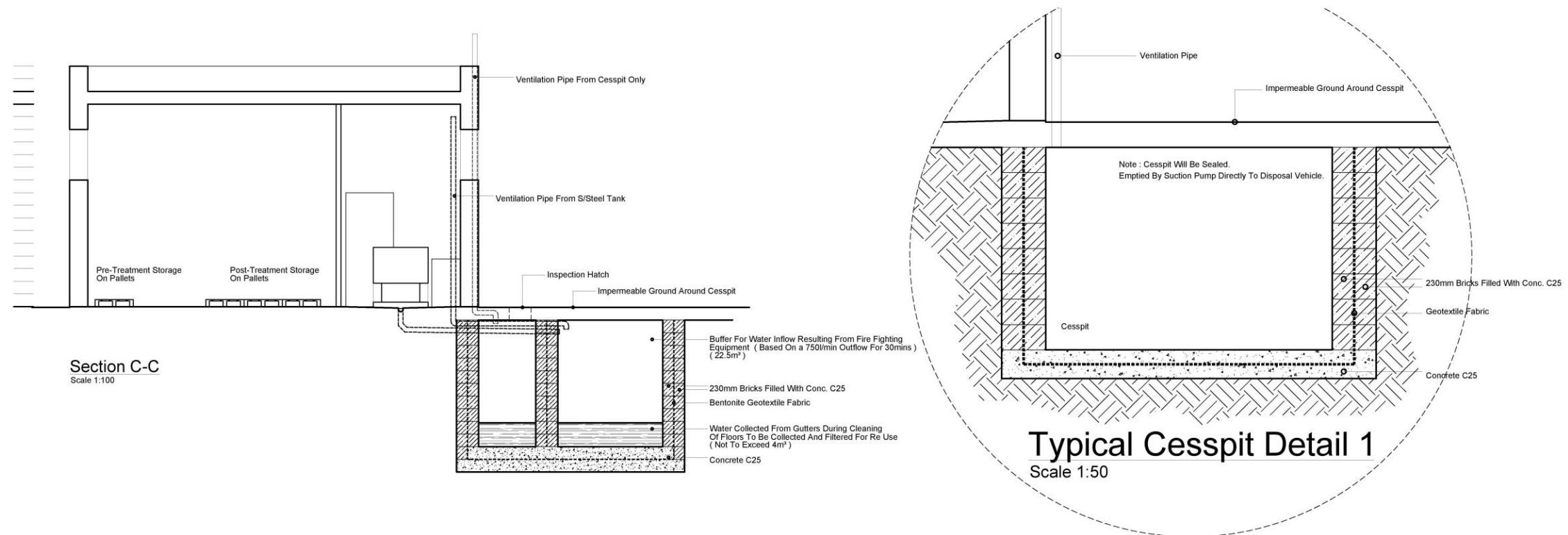
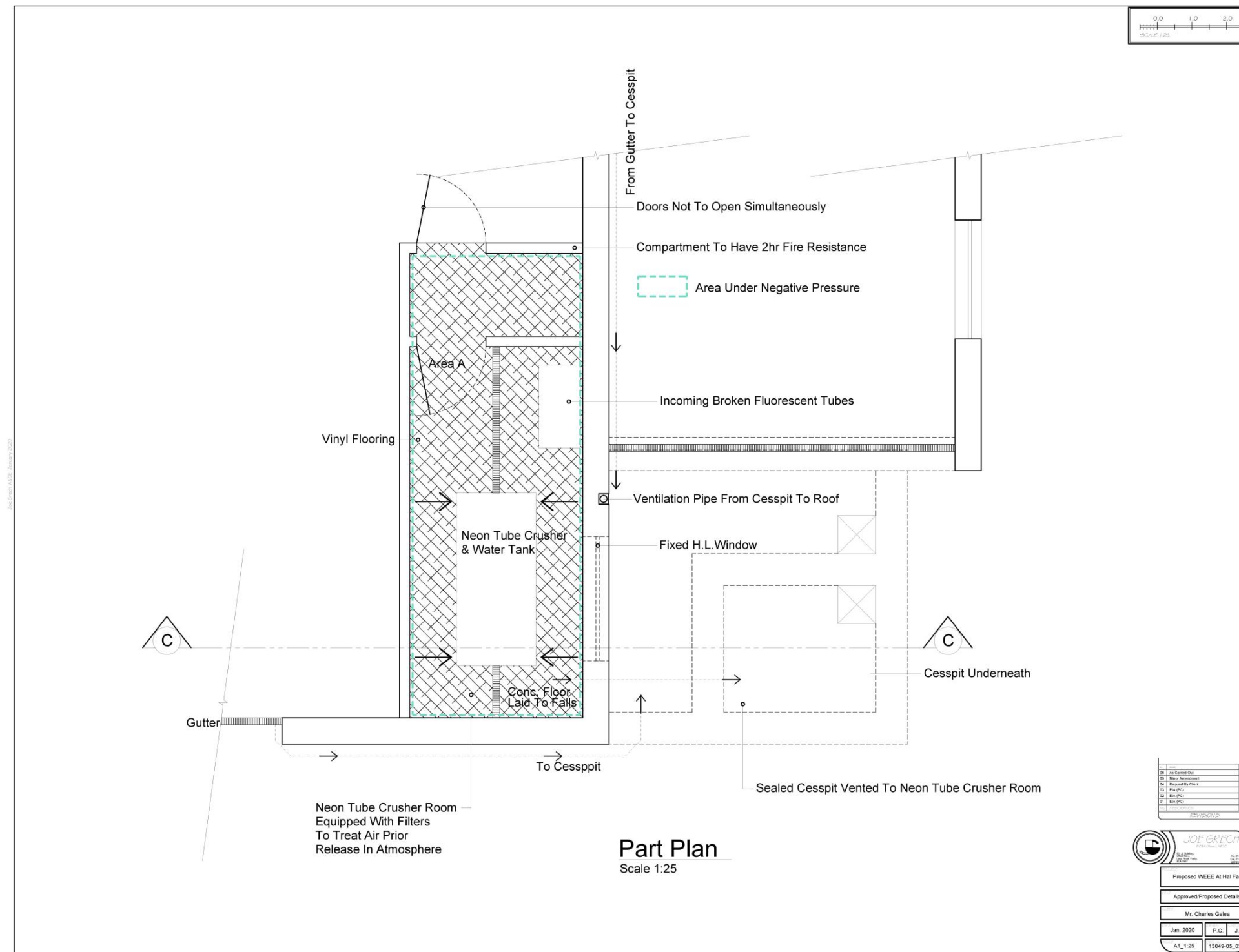


Figure 4.4: Fluorescent tube crushing room



B3.5 Rainwater

4.49. The former MEPA's ToR regarding rainwater management were:

Describe how rainwater is handled on site. Attach a site drainage map indicating rainwater capture and harvesting/discharge.

- 4.50. All rainwater reaching the roofs (**Figure 4.5**) will be collected through down pipes and diverted to an underground reservoir (reservoir 1, having a capacity of 100 m³). This reservoir will be exclusively reserved for fire-fighting purposes. There is no treatment of this water since it is clean rain water.
- 4.51. As shown in **Figure 4.6**, road surface water (and any spills in the outdoor areas) will first be treated in the oil-water separator located in front of the garage before being received in reservoir 2, which has a capacity of 476 m³.
- 4.52. The collected, cleaned water in reservoir 2 will be reused for cleaning of the site and in landscaping. Reservoir 2 will overflow to the road surface (the overflow will only be installed when PA 6212/19 is granted); however, any overflow during normal operations will be of treated rainwater.
- 4.53. The reservoirs are shown in **Figure 4.7**.

Figure 4.5: Roof rainwater collection

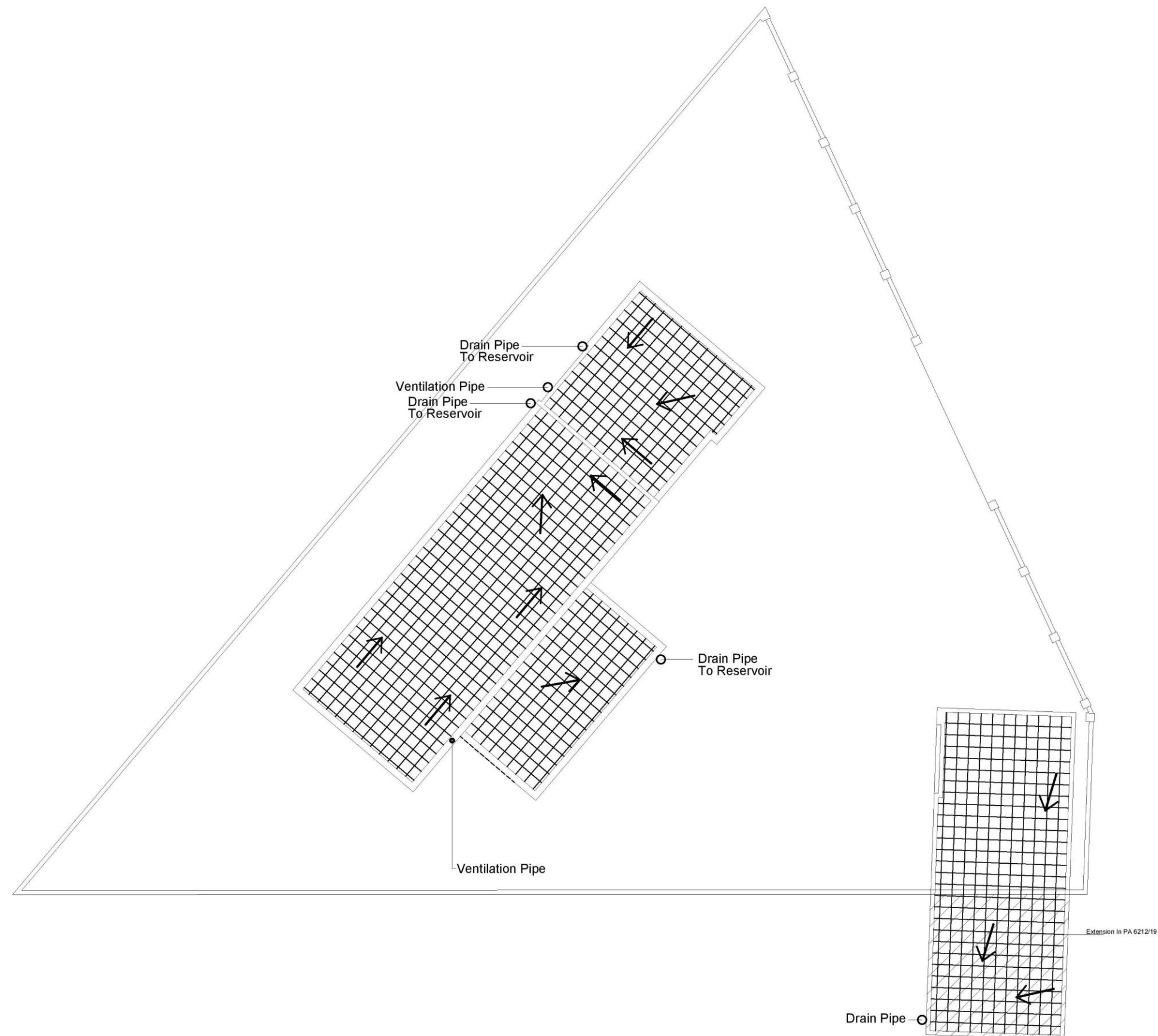


Figure 4.6: Surface water treatment and collection

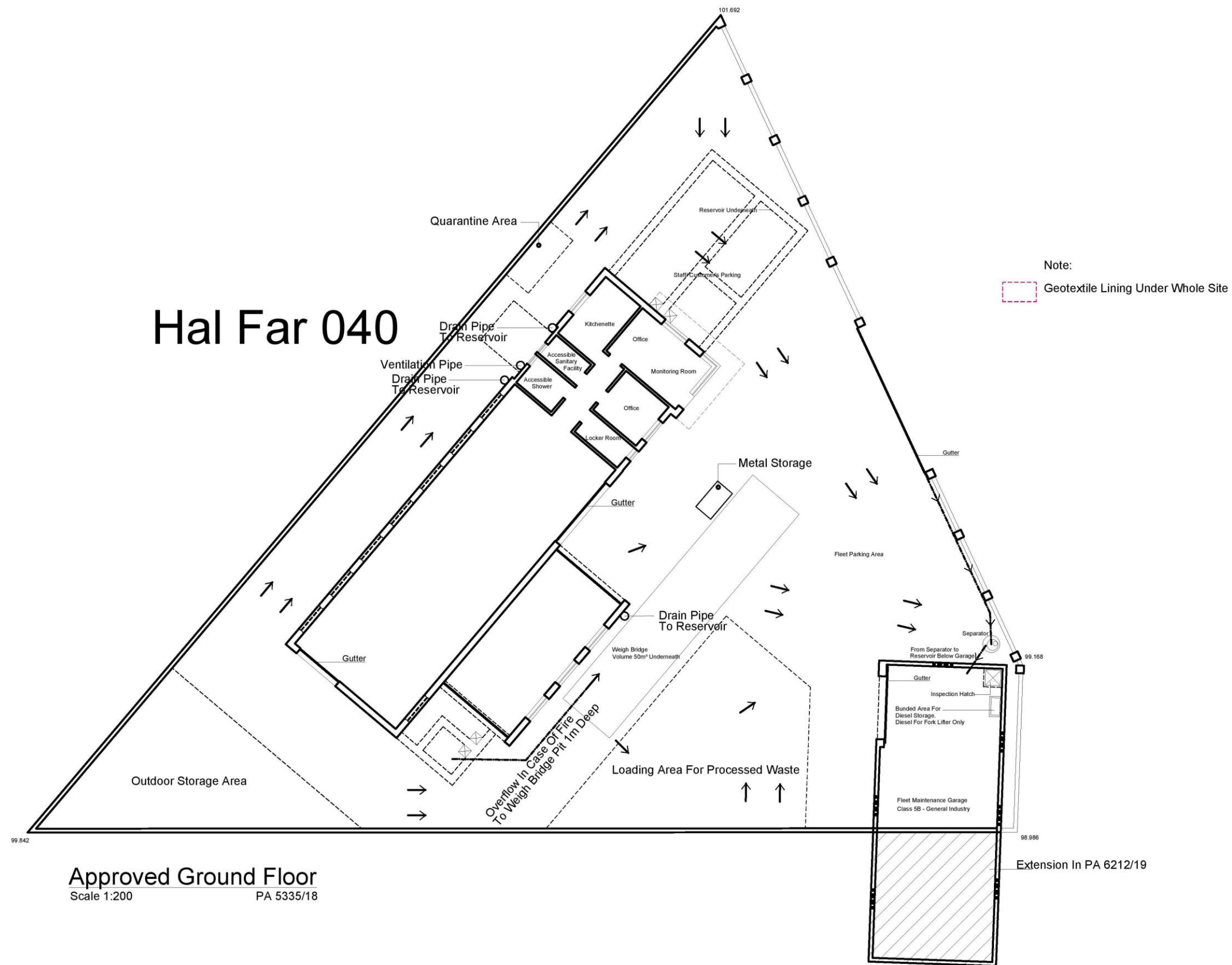
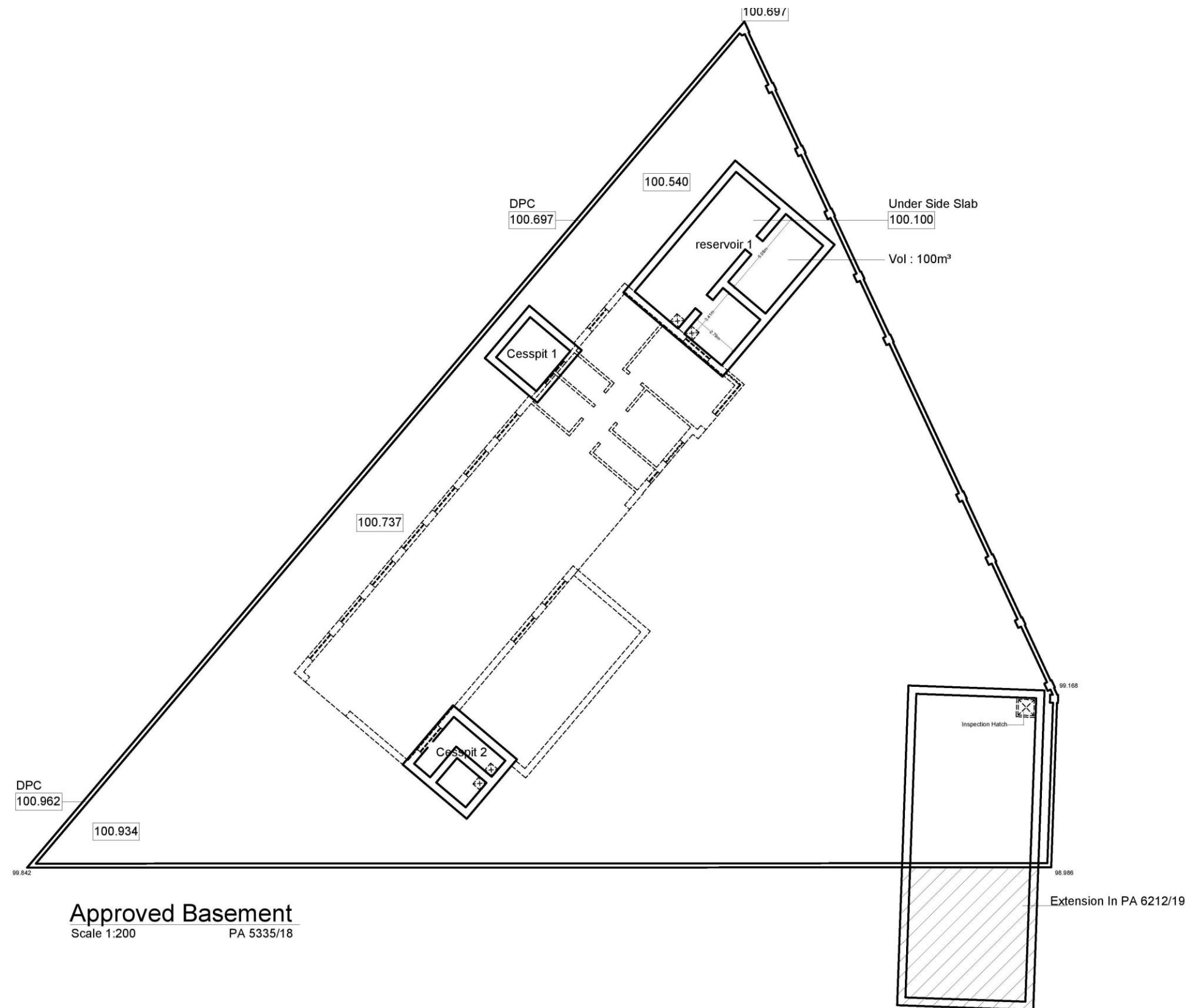


Figure 4.7: Reservoirs



B3.6 Emissions to Air

- 4.54. The requirements prescribed by the IPPC Application form in respect of air emissions are:

Identify if there may be emissions of substances to air.

If any are identified, submit details of each emission point, the nature and the proposed quantities of substances emitted from each point and treatment/abatement measures. A block plan of the site showing each emission point should be submitted.

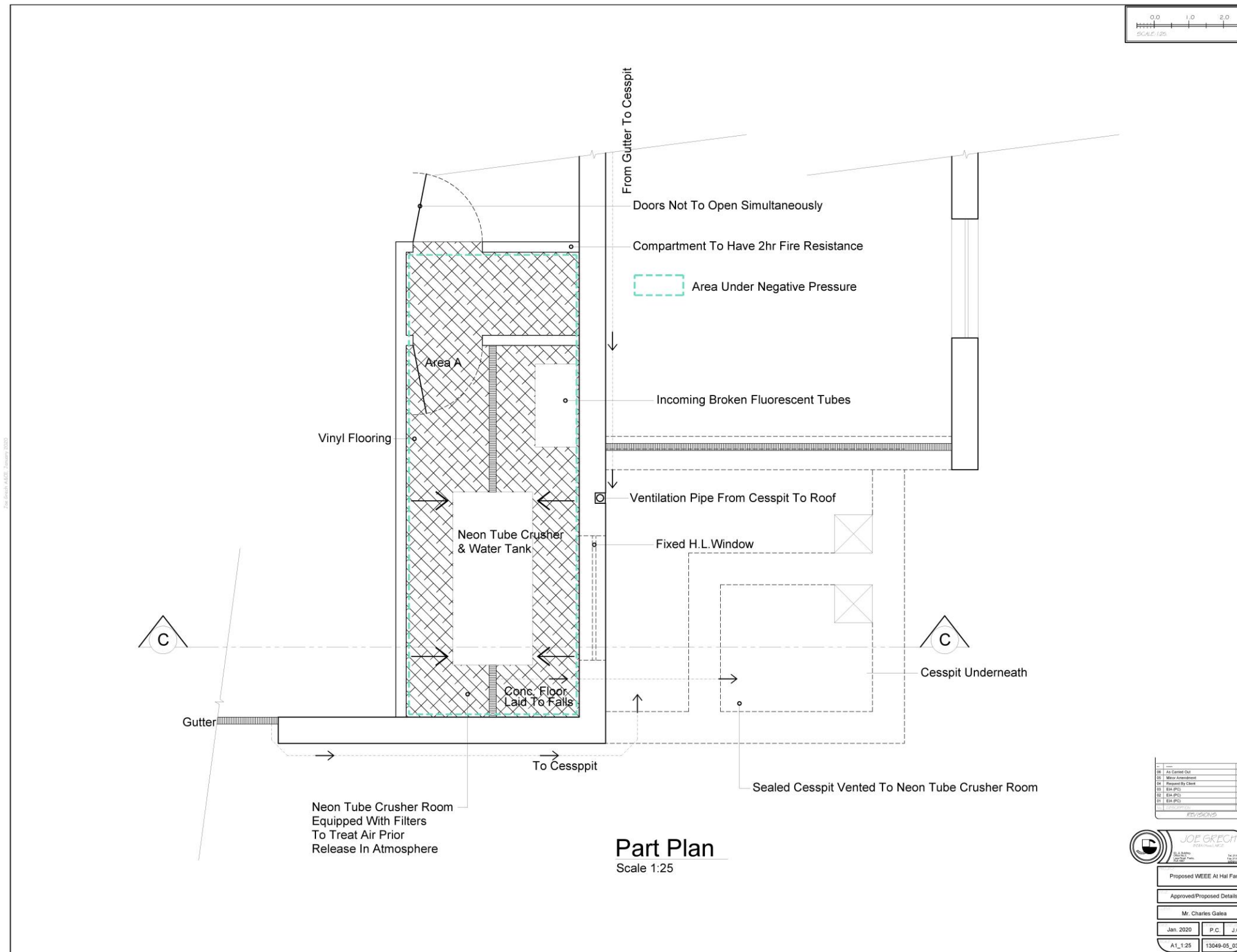
For each boiler/generator, submit the following details: rated thermal input, energy output, date of manufacture, stack height, fuel type and annual fuel consumption.

Fluorescent Tube Crushing Room – PS1

- 4.55. Crushing of fluorescent tubes / lamps has the potential to release mercury vapour and phosphor¹⁶ / glass dust. To reduce the risk of emissions to air, the crusher will be located inside a purposely built internal room located within a second outer room (**Figure 4.8**). These rooms will be equipped with a double-door system, where an automatic system will be installed such that the internal door can only be opened once the external door has been closed (and vice-versa); both doors will be kept closed except when personnel are entering / exiting the area, and will be kept closed during the crusher's operation. The outer room's windows will also be sealed to prevent unauthorised opening.
- 4.56. In the internal room, a water mister will be in continual operation during operation of the crusher to encourage wet precipitation of dust. The room will be equipped with a negative pressure unit, which will be kept on whenever the crusher is in operation and for a set time before and after the crusher is operated (depending on the time needed for a complete air change in the room), thus creating a seal.
- 4.57. The exhaust air from the negative pressure unit will include three filters in series, as follows:
- Two activated carbon filters: The first filter (F-55) will be inside the crushing room, while the second filter (Dorex) will be installed outside the crushing room. The first filter will be impregnated with sulphur to capture mercury;
 - A HEPA filter (Sentry Air Model SS-400-PFS), having up to 99.97% filtration efficiency on particles $\geq 0.3 \mu\text{m}$; this filter will be the third and last filter in the series.

¹⁶ The phosphor in fluorescent tubes is typically either calcium halophosphate (in older lamps), or a mix of rare earth compounds and barium / aluminium oxide (in newer triphosphate lamps).

Figure 4.8: Fluorescent tube crushing room



- 4.58. This abatement system is expected to ensure that mercury emissions from fluorescent tube crushing are lower than 0.001 ppb (0.008 µg/m³); correspondence in this regard from the supplier is included in **Annex 13**.
- 4.59. Fluorescent tubes and lamps will be stored in designated containers; containers having tubes / lamps that are received broken will be stored immediately inside the internal fluorescent tube crushing room to reduce the risk of fugitive emissions. Care will be taken during storage and handling to reduce the risk of breakage outside the fluorescent tube room; nonetheless, industrial vacuum cleaners equipped with mercury filters will be available to immediately clean up any accidental breakages of fluorescent tubes / lamps.
- 4.60. Wastewater generated as part of the tube treatment process will also be filtered and received into a sealed cesspit that vents to the inside of the fluorescent tube room.

CRT Breaking Room – PS2

- 4.61. CRTs include components such as lead oxide, barium, strontium and zirconium oxide and fluorescent coatings. Fluorescent coatings are commonly referred to as 'phosphors' and in CRTs these can include zinc, cadmium and yttrium sulphides, copper or silver chloride and occasionally arsenic. While no crushing of CRTs is proposed, breaking of the CRT neck could result in the release of dusts containing these components. To minimise the risk of emissions, the entrance to the CRT breaking room will include a thick HDPE curtain with 1 – 2 inch overlapping panels.
- 4.62. The CRT breaking room will also include an air extraction unit equipped with a HEPA filter (Sentry Air Model SS-400-PFS) having up to 99.97% filtration efficiency on particles ≥0.3 µm. The unit will be switched on whenever the room is in use, and for a set time before and after (depending on the time needed for a complete air change in the room). This design facilitates frequent entry and exit by site operators, while ensuring that a seal is quickly recreated and that dust is filtered. Additionally, site operatives will ensure that broken CRTs are only stored in undamaged jumbo bags; the integrity of jumbo bags will be inspected prior to use, and jumbo bags will be closed well when full.
- 4.63. Specification sheets for the air emissions abatement system components of the fluorescent tube crushing room and the CRT breaking room, as described above, are included in **Annex 14**.

Main Crusher and Cable Crusher – PS3

- 4.64. Commission Implementing Decision (EU) 2018/11747 establishing best available techniques (BAT) conclusions for waste treatment is applicable to the Scheme. BAT 14d requires containment, collection and treatment of diffuse emissions, whereas BAT 25 defines the techniques that may be applied for such treatment.

- 4.65. Hoods will be installed on top of the main crusher and the cable crusher, each hood then leading to an air treatment system servicing both crushers. The system will be composed of two elements:
- A cyclone to pre-treat the dust emissions; this separates up to 99% of bulk debris and fine dusts from the airstream, and collects it in a bin; and
 - A HEPA filter media rated as 99.97% efficient at 0.3 μm .
- 4.66. Details about the system are included in **Annex 5**. Treated exhaust air will be released from an emission point on the roof, the approximate location of which is labelled as PS3 in **Figure 4.9**. It is envisaged that this system will be sufficient to meet the upper end of the BAT-AEL range for dust (5 mg/Nm³).
- 4.67. The cyclone bin will be emptied periodically, and the HEPA filter will be cleaned as required (typically once per year, depending on use and whether a drop in suction performance is noted), and replaced when damaged.

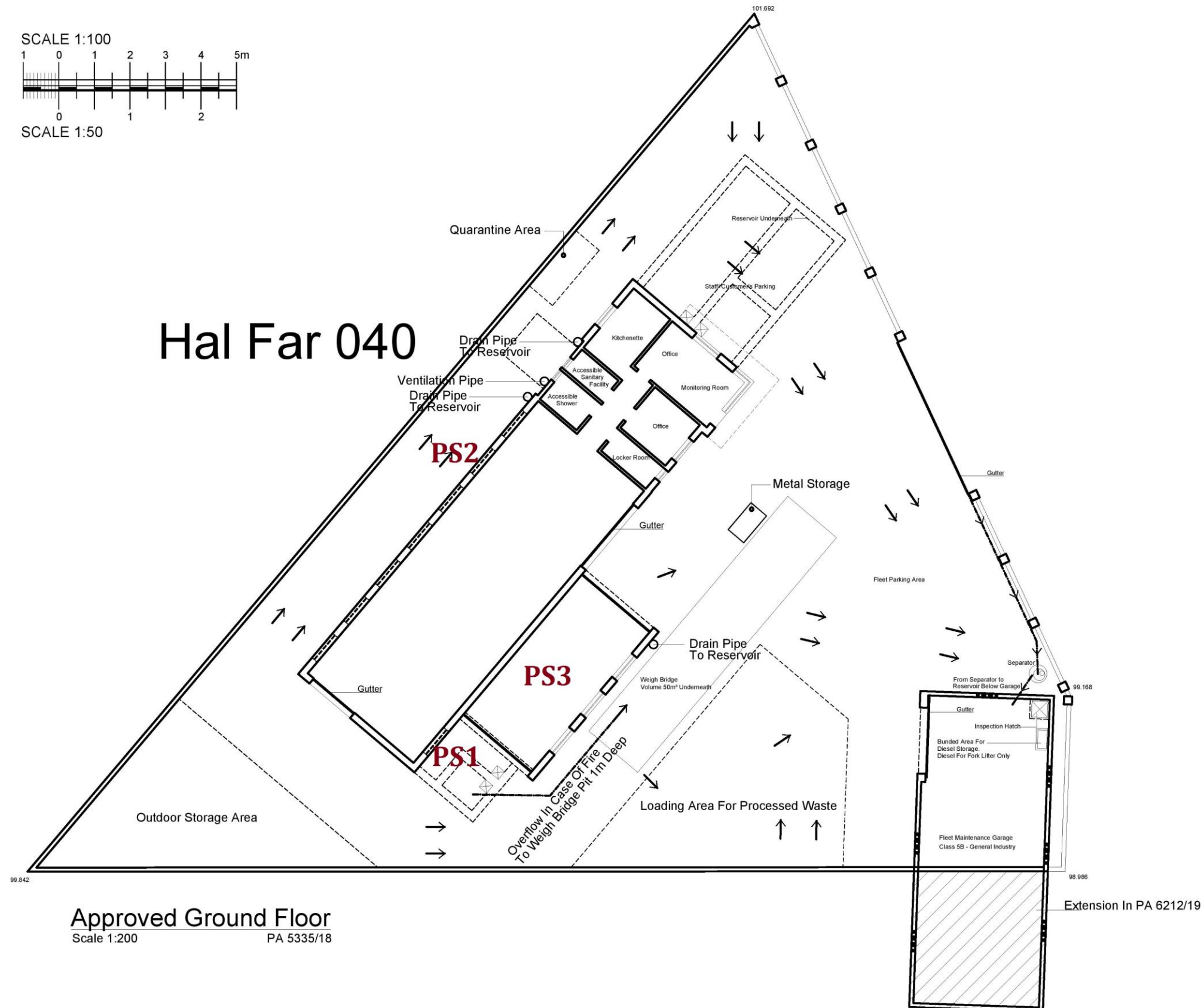
PS1 to PS3: Additional Provisions

- 4.68. Filters will be maintained / replaced regularly, as indicated in section B2.5 of the IPPC application, and a monitoring programme will be in place as outlined in section B3.10 of the IPPC application to ensure that the required emissions performance is reached and maintained.
- 4.69. Additionally, the fluorescent tube breaking room will be equipped with a pressure differential recorder (magnehelic gauge or similar), to indicate whether the filtration system is working effectively. The recorder will be visible to operators such that an out of range incident can be easily and immediately identified. When filters are found to have reached the pressure alert limit indicated by filter manufacturer, these will be replaced immediately.
- 4.70. Disposable overalls will also be worn by employees working in the CRT dismantling and fluorescent tube crushing areas to ensure that any particles that adhere to clothing / shoes are not taken outside; overalls will be discarded as hazardous waste after use.
- 4.71. The approximate locations of the emission points from the fluorescent tube crushing room, the CRT breaking room and the crushers are labelled as PS1, PS2 and PS3 respectively in **Figure 4.9**.

Combustion Plant

- 4.72. No boilers or emergency electricity generators are proposed on site.

Figure 4.9: Emissions to air



B3.9 Noise

Introduction

- 4.73. This section considers the potential noise impacts arising from the operation of the Scheme. The Scheme is not expected to be a significant source of vibration.

Terms of Reference

- 4.74. The requirements for the noise assessment were described in the former MEPA's application form; these are reproduced below:

Describe:

B3.9.1: *The main sources of noise and vibration (including infrequent sources) of the proposed installation;*

B3.9.2: *The proposed techniques and measures for control of noise;*

B3.9.3: *The nearest noise sensitive locations and distance away from the site (a site map shall also be submitted for this purpose); and*

B3.9.4: *Relevant environmental noise measurement surveys which have been undertaken (monitoring shall be according to the latest revisions of ISO1996 and the rating of industrial noise affecting residential areas shall be according to BS 4142; monitoring shall be carried out exclusively using type 1 sound level meter).*

Standards and Guidance

- 4.75. At the time of the noise study there was no specific guidance in Malta on noise in the context of land use planning¹⁷. In situations where standards are not available, the former MEPA generally made reference to equivalent guidance from the United Kingdom (UK) and International Organisation for Standardisation (ISO) standards. Accordingly, the baseline noise survey was undertaken with reference to British Standard (BS) 4142:2014¹⁸. In predicting the noise levels arising from operation of the Scheme, reference was made to BS

¹⁷ Malta transposed the Environmental Noise Directive (Directive 2002/49/EC) into national legislation through Legal Notice 426 of 2007. The Regulations designate MEPA as the competent authority for the generation of strategic noise maps, the publication of information on environmental noise, and the drawing up of action plans.

¹⁸ BS 4142:2014, *Methods for rating and assessing industrial and commercial sound*, British Standards Institution.

4142:2014. Reference was also made to ISO 1996¹⁹, in accordance with Annex II of the Environmental Noise Directive (2002/49/EC).

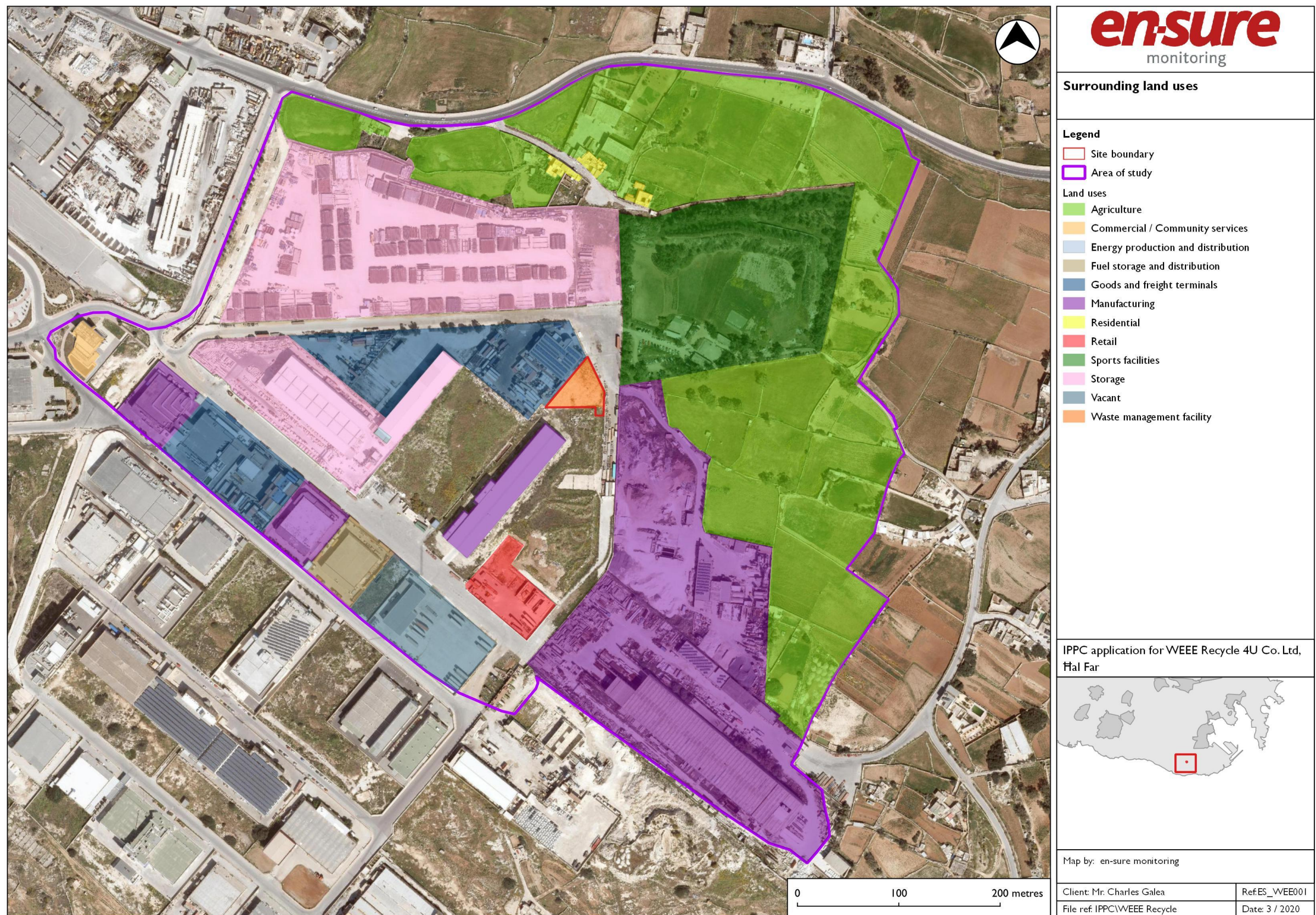
Baseline Noise Survey

Description of the Site and the Surroundings

- 4.76. The Scheme site is located within and on the eastern boundary of the Hal Far Industrial Estate. A detailed land use survey of the area 250 m around the Scheme site was conducted on 17th October 2014. A land use map of the area is illustrated in **Figure 4.10**, and a description of the area is available in section B1.4.1 of the IPPC application.
- 4.77. The Scheme site is currently vacant and is disturbed land; the site was formerly part of the taxiway / park of the Hal Far airfield, which ceased operations in the 1970s.
- 4.78. The primary land uses in the surrounding area are industrial – a range of activities including pharmaceuticals, transportation, manufacturing and oil-related businesses. The activities immediately surrounding the Scheme site are a goods and freights terminal (adjoining site to the west), a steel manufacturing facility (located to the south), and a batching plant (located to the east and southeast).
- 4.79. Immediately to the northeast of the Scheme site, adjoining the industrial estate, there is an open-air shooting range. This activity operates weekends only (Saturday 13:00 - 19:30 and Sunday 8:00 - 19:00).
- 4.80. The area beyond the industrial estate, to the north and east of the Scheme site, is predominantly agricultural, with fields still under cultivation. The rural hamlet of Bnghisa is located approximately 380 m from the eastern boundary of the Scheme site. The northern end of the batching plant site lies between the Scheme site and the hamlet.
- 4.81. The nearest residential property to the Scheme site is a farmhouse located to approximately 175 m to the north. The intervening area is occupied by the goods and freight terminal (immediately adjoining the site) and beyond this a large open storage yard (buildings supplies).

¹⁹ ISO 1996, *Acoustics - Description, measurement and assessment of environmental noise*, International Organisation for Standardization.

Figure 4.10: Surrounding land uses



- 4.82. Noise sources / noise-generating activities observed in the area surrounding the Scheme site, having the potential to contribute to the noise climate at the sensitive receptors, include:
- Vehicular traffic;
 - Industrial activity (from facilities within the Hal Far Industrial Estate, the Malta Freeport Terminals, and other individual industrial businesses); and
 - Leisure uses, in the form of a shooting range.

Baseline Survey Methodology

Noise Sensitive Receptors and Noise Monitoring Locations

- 4.83. The survey concerned the measurement of noise levels at two monitoring locations (monitoring points - MP); these MPs were identified as the most appropriate to establish the baseline noise climate at the nearest identified residential sensitive receptors. The location of the MPs is identified in **Table 4.5** and **Figure 4.11**; **Figure 4.11** also shows the location of the sensitive receptors.

Table 4.5: Location of noise monitoring points

MP	Location	Eastings	Northings	Distance from Scheme site (plan distance in metres)
A	Residential properties on Triq il-Mitjar l-Qadim, off Triq Hal Far	456491.22	3963473.50	163 m
B	Western edge of Benghisa rural hamlet	456853.08	3963172.87	367 m

Sound Level Measurements

- 4.84. The sound level measurements were taken so as to establish the day time baseline noise climate (the background sound level) at the sensitive receptors, having regard to the operational hours envisaged for the Scheme. The Scheme will operate Monday to Friday (7:00 – 5:00) and Saturday (7:00 – 13:00).
- 4.85. Specifically, the sound level measurements were taken on a week day; the date and time of the surveys are illustrated in **Table 4.6**. Having considered the noise context, the noise climate at the sensitive receptors on a week day was considered to be representative of the noise climate at the receptors on Saturday between 7:00 and 13:00. The noise environment at the sensitive receptors during the week and on Saturday mornings is primarily influenced by noises arising from the industrial facilities in the area and traffic noise. The industrial facilities generally also operate on Saturday mornings, and traffic volumes are not significantly different on Saturday mornings during the week, both along Triq Hal Far and through Benghisa rural hamlet.

Figure 4.11: Noise monitoring point and noise sensitive receptors

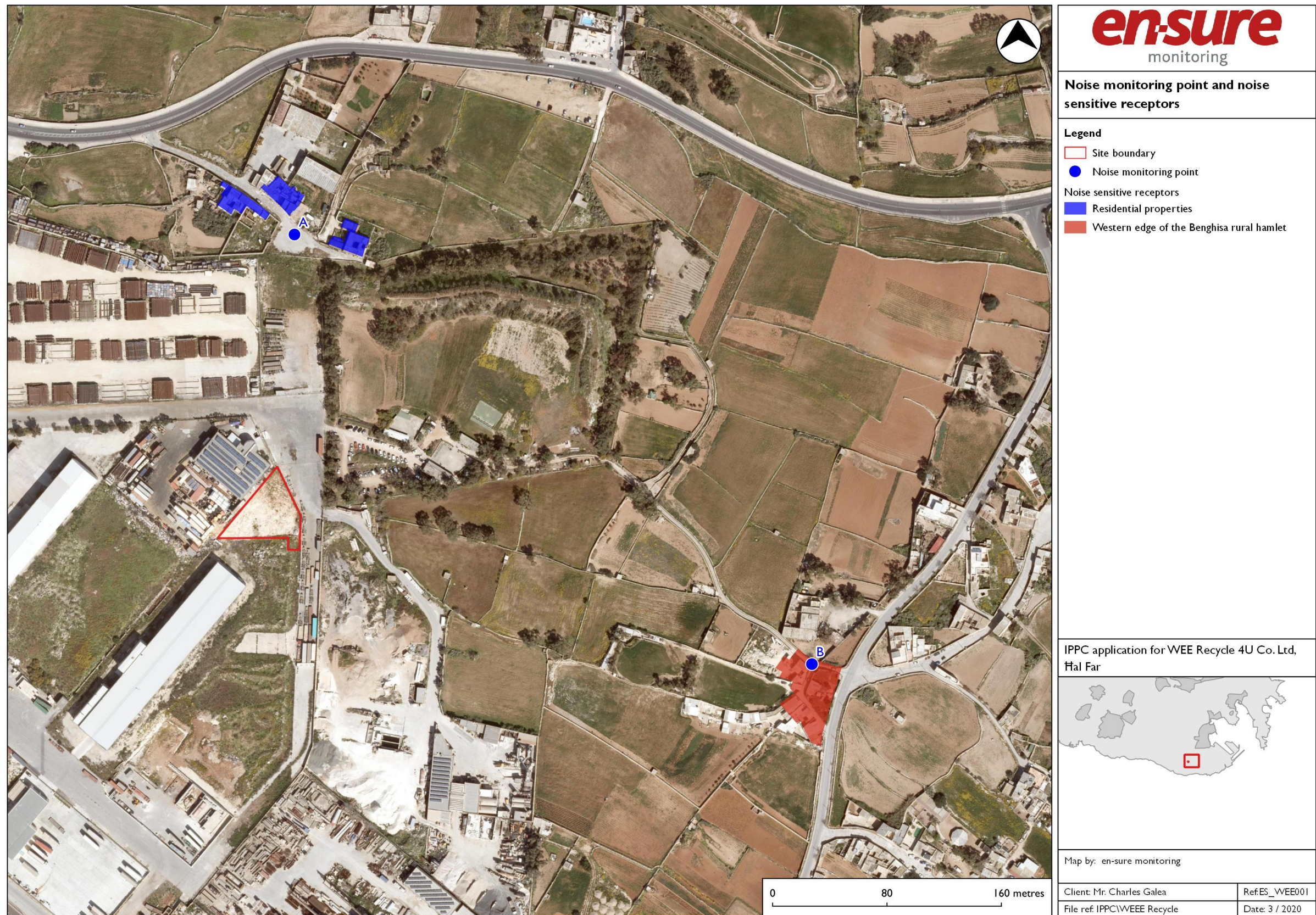


Table 4.6: Sound level surveys

Survey date	Survey time interval
Tuesday 19 th May 2015	09:25 - 10:25
Tuesday 19 th May 2015	10:55 - 11:55

- 4.86. Both sound level measurements were based on a 60 minute recording. This time interval was considered sufficient to obtain a representative value of the day time background sound level at the sensitive receptors both during the week.

Measurement Protocols

- 4.87. A Class 1 Norsonic 140 Precision Sound Analyser (serial no. 1406005) with a Norsonic Type 1225 Microphone (serial no. 208101) was used to take the sound level measurements. A type 1251 Sound Calibrator (serial no. 34129) was used to calibrate the sound analyser in the field.
- 4.88. The Sound Analyser and Sound Calibrator were calibrated on 10 June 2014 and 1 July 2014, respectively; the calibration certificates are included in **Annex 15**. The Sound Analyser was field calibrated before and after each measurement (113.8 dBA) in order to eliminate the potential for drift. A Norsonic 1434 windshield was used to minimize the effects of turbulence at the microphone.
- 4.89. The sound level measurement at MP A was taken at a distance of at least 3.5 m from the nearest reflective surface (excluding the ground). At MP B however, it wasn't possible to secure a distance of at least 3.5 m from the nearest reflective surface (excluding the ground), essentially given the narrow width of the road; in this case, the microphone was at a distance of 2.7 m from the two-storey facade of a building. For all the measurements, the Sound Analyser was mounted on the tripod at a height of 1.27 m above ground level. Details of the measurement position (distance from reflective surfaces and height above ground level) were recorded for all measurements.
- 4.90. The weather conditions prevailing during all of the sound level measurements were also recorded. In all cases, the conditions were dry and wind speeds were less than 18 km/h throughout the measurements. It is unlikely that there was any significant effect by reason of temperature inversion during any of the measurements. There was also observed to be no potential for electrical interference to the measurements.
- 4.91. During the measurements, observations of all predominant noise sources were recorded and efforts were made to identify / describe acoustic events and the phenomena attributable to these noises.

Measurement Parameters

- 4.92. The following parameters were measured and recorded:

- $L_{Aeq(T)}$ (equivalent continuous A-weighted sound pressure level recorded over the relevant time interval of interest, in this case one hour);
- L_{AFmax} (maximum A-weighted sound pressure level recorded over the time interval of interest, with fast time weighting);
- L_{AF10} (A-weighted sound pressure level exceeded for 10% of the time interval of interest, with fast time weighting); and
- L_{AF90} (A-weighted sound pressure level exceeded for 90% of the time interval of interest, with fast time weighting).

Baseline Noise Survey Results

- 4.93. The background sound level measurements and the predominant noise sources recorded during the baseline surveys are shown in **Table 4.7**. In accordance with BS 4142:2014, the recorded sound levels are quoted to the nearest whole number of decibels. The climatic conditions experienced during the surveys are also identified.
- 4.94. The average background sound level recorded at MP A was 52 dBA L_{Aeq} ; the maximum sound level recorded was 74 dBA L_{Amax} . The average background sound level recorded at MP B was 50 dBA L_{Aeq} ; the maximum sound level recorded was 83 dBA L_{Amax} .

Table 4.7: Baseline sound level measurements

MP	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	Predominant noise sources	Climatic conditions
A	52	74	46	53	<ul style="list-style-type: none"> • Vehicles and activities at goods and freights terminal adjacent to Scheme site (regular and significant); • Vehicular traffic on Triq Hal Far (occasional and significant); • Works from adjacent garage (occasional and not significant); • Radio from adjacent garage (continuous for large stretches but not significant); • Birds chirping (continuous but not significant); • Dogs barking (occasional and significant when present). 	Wind direction N Wind speed: 7.9 km/h Air temperature: 24 °C Rainfall: 0 mm Relative humidity: 57%

MP	L_{Aeq}	L_{Amax}	L_{A90}	L_{A10}	Predominant noise sources	Climatic conditions
B	50	83	42	51	<ul style="list-style-type: none"> Vehicles and activities at goods and freights terminal adjacent to Scheme site (occasional but not significant); Vehicular traffic on Triq Ghar Hasan (occasional to regular and significant when present); Birds chirping (continuous but not significant). 	Wind direction: N/NW Wind speed: 4.3 km/h Air temperature: 25 °C Rainfall: 0 mm Relative humidity: 61%

Operational Noise

Description of Noise Sources

- 4.95. The Scheme is described in detail in sections B2.2.1 and B3.1 of the IPPC application. In terms of potential noise- generating activities, the Scheme will operate three crushers: a main crusher (for non-hazardous wastes), an electric cable crusher, and a crusher for fluorescent tubes. In addition, there will be a compressor plant. Importantly, not all of these noise generating sources / activities will be in operation / occurring at the same time; the Applicant has explained that the likelihood is that only one machine will be operating at any one time. Other potential noise-generating activities will be the dump trucks which will relay waste and material to / from the site. There will also be a fork lifter on site to handle materials internally.
- 4.96. The sound levels of the machinery and plant envisaged to be used in operation are given in **Table 4.8**. The applicant has clarified the model of the main crusher, the cable crusher and the compressor; hence the sound levels for these machines were derived from the supplier's specifications. In the case of the fluorescent tube crusher, there is still uncertainty as to the precise model to be installed. It is envisaged however that the fluorescent tube crusher will have a sound output similar to that of the main crusher as measured at a similar distance. The sound levels of the fork lifter and dump trucks were derived from BS 5228:2009 Part 1 Annex C.
- 4.97. In order to demonstrate the operational noise impacts of the Scheme, the scenario was assumed whereby the noisiest machine (the cable crusher) is operating together with a forklift and a dump truck. This scenario will potentially be the noisiest the Scheme will be during operation.²⁰

²⁰ This scenario was selected for the noise assessment as the crushers are expected to operate intermittently. However, even in a scenario where the noisiest crusher (cable crusher) is operating at the same time as the compressor, the fork lift and a dump truck, the range of 'All plant / machinery potentially operating simultaneously' in **Table 4.9** would be 85 – 88 dBA, and the 'Estimated L_{Aeq} sound levels' at MPs A and B would be 41 – 44 dBA and 34 – 37 dBA, respectively. Since the rating level remains below the

Table 4.8: Operational plant / equipment and relevant sound levels

Plant / machinery	A-weighted sound pressure level at 1m (dB)
Main crusher	72
Cable crusher	84
Fluorescent tube crusher	72
Compressor	65
Fork lifter	67
Dump truck	77 – 86 ²¹

- 4.98. The combined noise generated from the different noise sources arising in this scenario was calculated using the following logarithmic addition formula:

$$L_{Total} = 10 \lg(10^{L1/10} + 10^{L2/10}) \text{ dB}$$
A distance adjustment was made taking account of the distances to the sensitive receptors. In both cases, the distance to the sensitive receptors was determined from the Scheme site boundary at its closest point. Plan distance was used in both cases. No allowance was made for screening or for reflection.

Predicted Noise Levels arising from the Scheme in Operation

- 4.99. The predicted noise levels at the sensitive receptors during the operation of the Scheme assuming that the cable crusher is in operation simultaneously with a fork lifter and a dump truck are illustrated in **Table 4.9**.
- 4.100. In this scenario, the noise sensitive receptors likely to be most affected by operational noise are those in the vicinity of MP A. Located a distance of approximately 163 m from the Scheme site, the assessment predicts that these receptors could potentially experience noise levels in the range of 44 dB. Operational noise will be lower at the receptors in the vicinity of MP B; the assessment predicts that these receptors could potentially experience noise levels in the range of 37 dB.

background sound level for both monitoring points even in this scenario, the predicted impacts on noise sensitive receptors would be unchanged.

²¹ Range taking account of 3 t – 9 t dump truck.

Table 4.9: Predicted noise generated from the Scheme in operation

Noise source	A-weighted sound pressure level at 1m (dB)	Estimated L _{Aeq} sound levels at closest sensitive receptors	
		MP A (163 m from source) dB(A)	MP B (367 m from source) dB(A)
Cable crusher	84	41 – 44	34 – 37
Fork lifter	67		
Dump truck	77 – 86		
All plant / machinery potentially operating simultaneously = 85 – 88 dBA			

Assessment of Impacts

Significance Criteria

- 4.101. BS 4142:2014 provides a methodology for rating and assessing sound of an industrial and/or commercial nature and the likely effects of this sound. The significance of the sound depends upon both the margin by which the specific sound level (operational noise arising from the Scheme) at the sensitive receptors exceeds the background sound level (baseline), and the context in which the sound occurs.
- 4.102. The assessment methodology outlined on BS 4142:2014 is based on obtaining an initial estimate of the impact of the Scheme by subtracting the measured background sound level from the rating level (the specific sound level which has been corrected for character, such as tonality, impulsiveness, or intermittency, as necessary) and using the difference to assess the magnitude of the impact. Typically, the greater the difference, the greater the magnitude of the impact, as shown in **Table 4.10**.

Table 4.10: BS 4142:2014 assessment criteria

Difference	Assessment
Around +10 dB or higher	Likely to be an indication of a significant adverse impact, depending on the context.
Around +5 dB	Likely to be an indication of an adverse impact, depending on the context.
The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or significant adverse impact. Where the rating level does not exceed the background sound, this is an indication that the specific sound source will have a low impact, depending on the context.	

- 4.103. Based on the above, the following significance criteria were used in the initial assessment of the significance of impacts of the noise arising from the operation of the Scheme on the sensitive receptors:

- **Not significant** (e.g. no material change in noise climate, a change of less than +3 dB to the background noise level at the sensitive receptor);
- **Minor significance** (e.g. a change of between +3 dB and +5 dB to the background noise level at the sensitive receptor);
- **Moderate significance** (e.g. a change of between +6 and +9 dB to the measured background noise level at the sensitive receptor); and
- **Major significance** (e.g. a change of +10 dB or higher to the measured background sound level at the sensitive receptor level at the sensitive receptor).

4.104. In accordance with BS 4142 (Section 11), the initial estimate of the magnitude of the impact was then considered in relation to the noise context at the sensitive receptors. Based on the initial estimate of the impact and this consideration of the context, a final assessment was made of the significance of impacts of noise arising from the operation of the Scheme, in terms of whether the impact is considered to be not significant, of minor significance, of moderate significance or of major significance.

Prediction and Significance of Impacts

4.105. In determining the rating level, as mentioned, BS 4142 (Section 9) advocates the application of a penalty to the specific sound level, taking account of the acoustic character of the specific sound (for example, tonality, impulsivity and intermittency), where determination of the penalty is dependent on the degree to which these features are present at the assessment location (in this case at the sensitive receptors). The noises arising from the cable crusher, and from the fork lifter and dump truck, are considered to be predominantly tonal, but also with potentially impulsive character. However, it is considered unlikely that these features that are present in the noise from the cable crusher, fork lifter or dump truck reaching either MP A or MP B because the specific noise level at both MPs does not exceed the measured background sound level, and the noises which were observed to be contributing to the noise environment (background sound level) at both monitoring locations (noise from industrial activity and traffic noise) themselves have a tonal and impulsive character. Hence, in the case of both MP A and MP B, the rating level has been taken to be the specific sound level (44 dBA at MP A and 37 dBA at MP B).

4.106. In the case of MP A, the rating level (44 dBA) is 8 dB below the background sound level (52 dBA). In the case of MP B, the rating level (37 dBA) is 13 dB below the background sound level (50 dBA). As mentioned, the lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or significant adverse impact. Based on the assessment criteria outlined above, it is predicted that there will be no significant impact from the Scheme in operation at the sensitive receptors in the vicinity of MP A and MP B.

B3.10 Monitoring

4.107. The former MEPA's ToR regarding monitoring were prescribed in the IPPC application form:

Describe the proposed measures for monitoring emissions including any environmental monitoring. The following must be specified:

B3.10.1: *The location of each proposed monitoring point (plotted on a suitably-labelled block plan of the site);*

B3.10.2: *The substances (in each environmental medium) which are proposed to be monitored;*

B3.10.3: *The frequency with which monitoring is proposed to take place;*

B3.10.4: *The proposed measurement methodology, which should be a standard methodology, such as EN or ISO standard, or equivalent;*

B3.10.5: *The proposed procedure for evaluation of the results.*

4.108. The emissions identified in this Chapter are:

- Wastewater discharges (section B3.3);
- Emissions to air (section B3.6); and
- Noise emissions (section B3.9).

4.109. Emissions will be monitored as described below, or as required by the IPPC permit (if different).

Wastewater Discharges

4.110. Testing will be carried out of the following wastewater streams:

- Sanitary waste, if required by the WSC; and
- Wastewater from the WEEE building cesspit and the fluorescent tube crusher tank, if any is generated.

4.111. Testing will follow the requirements of the WSC, and as described in section B3.3 of the IPPC application wastewater will only be discharged to the sewerage network if the results show that WSC's discharge limits are not exceeded.

Emissions to Air

Mercury Emissions (PS1)

4.112. The carbon filters servicing the fluorescent tube crushing room will be weighed weekly to check whether they are approaching the saturation threshold set by the supplier.

4.113. Additionally, it is proposed that mercury emissions from the fluorescent tube crushing room be measured according to the following frequency:

- Three consecutive monitoring sessions as soon as the crusher is commissioned;
- Provided these results confirm that ERA's limit value is not exceeded, monthly thereafter for the first year; and
- If the results are consistently below the limit value, the frequency can be adjusted to quarterly in subsequent years.

4.114. The method used will be based on EN 13211:2001. The principle of measurement is as follows:

- **Sampling:** A sample stream of flue gas is extracted representatively from a duct or chimney over a certain period of time with a controlled flow and known volume. Dust in the sampled gas stream is collected on a filter. The dust-free gas stream continues and is passed through a series of absorbers, which contain an appropriate absorption solution for collecting gaseous mercury. At the end of the sampling period the filter and absorption solution are collected to be taken to the laboratory.
- **Laboratory analysis:** The collected dust on the filter is digested in such a way that the mercury contained in the dust fraction is dissolved in a liquid. This liquid is then analysed. The absorption solution from the absorbers is also prepared for analysis and analysed. The data from the sampling and analysis are combined and the results are expressed in milligrams of total mercury per cubic meter (mg/m³) of flue gas. The analysis of mercury is performed using atomic absorption spectrometry (AAS) according to BS EN ISO 12846:2012.

4.115. The physical characteristics of the flue gas flow will be measured during sampling, in accordance with EN ISO 16911-1:2013.

4.116. Three replicate samples will be collected in each sampling session.

4.117. Additionally, mercury levels inside the fluorescent tube room and at the exhaust point after the abatement system will be measured once a week to detect potential mercury leaks.

Particulate Emissions (PS1 and PS2)

- 4.118. As mentioned in section B3.6 of the IPPC application, the fluorescent tube breaking room and CRT dismantling room will be equipped with a pressure differential recorder, to indicate whether the filtration system is working effectively. The recorder will be visible to operators such that an out of range incident can be immediately identified.
- 4.119. Dust monitoring will start being carried out from the fluorescent tube crusher room exhaust (PS1) once every six months.
- 4.120. Measurement of particulates (total dust) from the CRT breaking room (PS2) can be carried out quarterly in the first year, with the frequency reduced to annual if emissions are shown to be consistently below the limit value set in the IPPC permit.
- 4.121. The method used will be based on EN 13284-1:2001. The principle of measurement is as follows: A sample stream of the gas is extracted from the main gas stream at representative sampling points for a measured period of time, with an isokinetically controlled flow rate and a measured volume. The dust entrained in the gas sample is separated by a pre-weighed plane filter, which is then dried and re-weighed. Deposits upstream of the filter in the sampling equipment are also recovered and weighed. The increase of mass of the filter and the deposited mass upstream the filter are attributed to dust collected from the sampled gas, which allows the dust concentration to be calculated.
- 4.122. The physical characteristics of the flue gas flow will also be measured during sampling, in accordance with EN ISO 16911-1:2013.
- 4.123. Three replicate samples will be collected in each sampling session.

Emissions from the Main Crusher and Cable Crusher (PS3)

- 4.124. A monitoring proposal for emissions from this source is presented in **Table 4.11**.

Table 4.11: Monitoring proposal for PS3

Parameter	Standard(s)	Monitoring frequency
Brominated flame retardants	In-house method (no EN standard available)	Once every year
Dioxin-like PCBs	EN 1948-1, -2, and -4 or CEN/TS 1948-5	Once every year
Dust	EN 13284-1	Once every six months (three consecutive measurements each time)
Metals and metalloids (e.g. As, Cd, Co, Cr, Cu, Mn, Ni, Pb, Sb, Se, Tl, V)	EN 14385	Once every year (three consecutive measurements each time)
PCDD/F	EN 1948-1, -2, and -4 or CEN/TS 1948-5	Once every year

- 4.125. The monitoring frequency may be reduced if emission levels of certain substances are proven to be consistently low, provided no new sources of these substances are introduced; this would be done with prior agreement with ERA.

Noise

- 4.126. The noise assessment (section B3.9 of the Application) concludes that there will be no significant impact from the Scheme during operation at the sensitive receptors. Therefore, it is proposed that further noise measurements are only undertaken if complaints are received from noise-sensitive receptors. Monitoring would be carried out in accordance with a Method Statement to be submitted to ERA for approval, if required.

Land and Groundwater

- 4.127. The land and groundwater risk assessment submitted as part of section B.1.4.1 of this IPPC application concludes that, as a result of the planned mitigation measures, risks to land and groundwater from the Scheme are low and very low, with no risk to land / groundwater being detected in the case of spillages of hydrocarbon-based products and a fire in fluorescent tube crushing room.
- 4.128. The Industrial Emissions (IPPC) Regulations allow a risk-based approach to be adopted for land and groundwater monitoring. Considering the low risk levels identified, it is considered that land / groundwater monitoring at the Scheme site during operation is not necessary and may even increase risk levels, since the underlying impermeable membrane would be ruptured if land cores are taken.
- 4.129. This recommendation is subject to implementation of the planned mitigation measures and monitoring of their effectiveness. The risk assessment may also need to be reviewed in future if new categories of relevant hazardous substances / waste are proposed to be used or processed in significant quantities, or if the implementation / effectiveness of the planned mitigation measures is reduced.

5. IMPACT ON THE ENVIRONMENT

B4.1 Environmental Effects

5.1. The ToR provided by the former MEPA in the IPPC application form were:

Provide an assessment of the potential significant environmental effects (including transboundary effects) of the foreseeable emissions.

5.2. As described in this Application, the potential emissions arising from the Scheme are:

- Wastewater discharges;
- Emissions to air;
- Noise emissions; and
- Emissions to land and groundwater.

5.3. Wastewater discharges are described in section B3.3 of the application, and are also assessed in the Environmental Risk Assessment prepared for the Scheme (section B2.8). Discharges of process wastewater to the sewerage network (off-site, as the site will not be connected to the mains sewer) will only be carried out if the WSC's discharge limits are not exceeded, thus no significant environmental effects are expected.

5.4. Emissions to air during operation are described in section B3.6 of this Application, and are also assessed in the Environmental Risk Assessment prepared for the Scheme (section B2.8). Air emissions are mainly expected from WEEE treatment, but will be minimised through the use of appropriate filtration systems, checked through monitoring. Therefore the environmental impacts of air emissions from the Scheme are expected to be low.

5.5. Noise emissions are assessed in section B3.9 of this Application. The assessment concludes that there will be no significant impact from the Scheme during operation at the sensitive receptors.

5.6. With regard to emissions to land and groundwater, the Environmental Risk Assessment prepared for the Scheme (sections B1.4.1 and B2.8 of this Application) concludes that, with mitigation, the risk of contamination of land or groundwater is low and very low, with no risk being detected in the case of spillages of hydrocarbon-based products and a fire in fluorescent tube crushing room. This assessment takes into account the planned mitigation, including site containment and air emissions abatement.

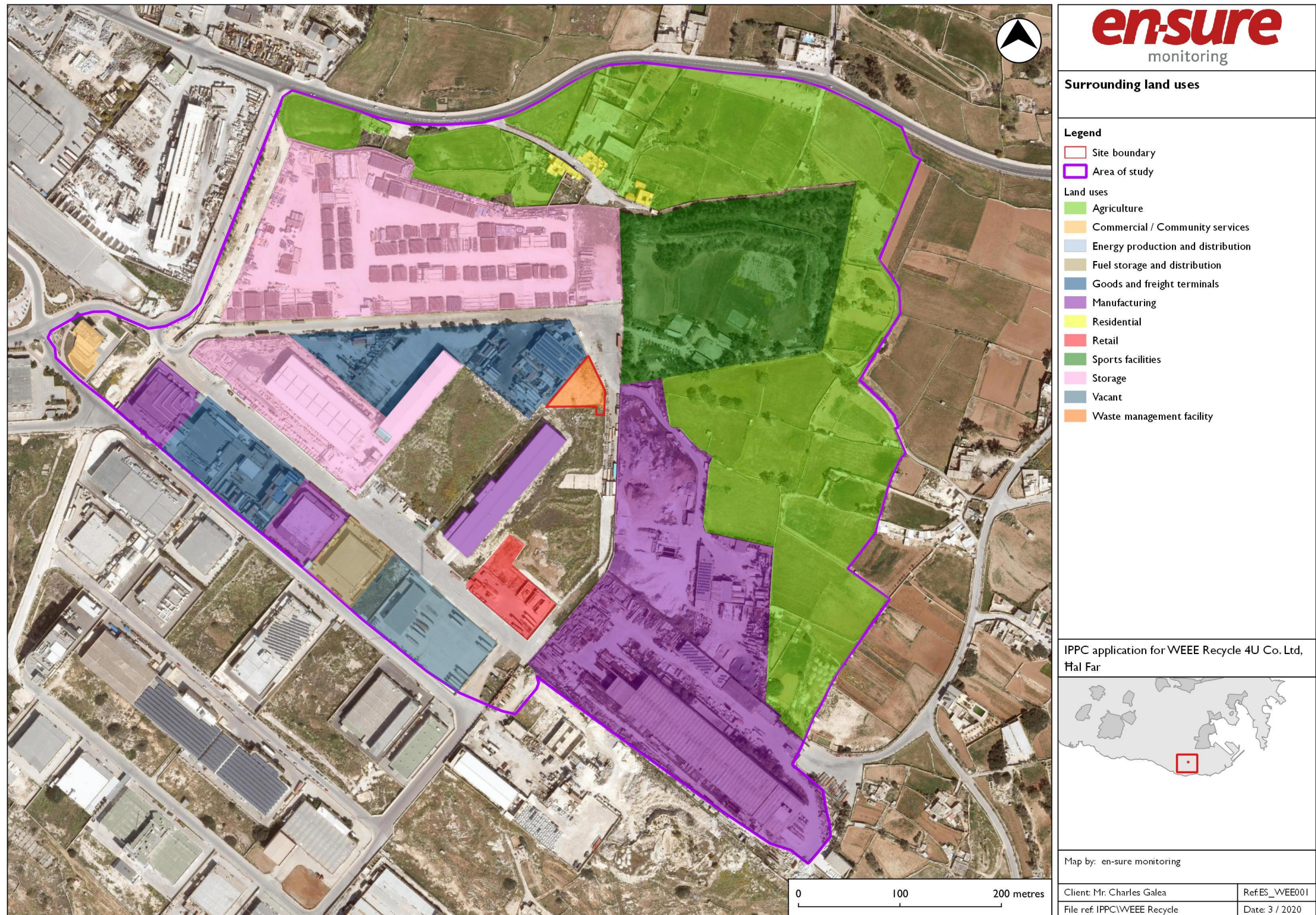
B4.2 Effects on Other Sites

5.7. The former MEPA's ToR required:

Provide an assessment of whether the installation is likely to have a significant effect on another site in Malta and, if it is, provide an assessment of the implications of the installation for that site.

- 5.8. **Figure 5.1** shows the land uses surrounding the Scheme site. The uses surrounding the Scheme site are industrial and agricultural.
- 5.9. The primary land uses in the surrounding area are industrial – a range of activities including pharmaceuticals, transportation, manufacturing and oil-related businesses. The activities immediately surrounding the Scheme site are a goods and freights terminal (adjoining site to the west), a steel manufacturing facility (located to the south), and a batching plant (located to the east). Immediately to the northeast of the Scheme site, adjoining the industrial estate, there is an open-air shooting range.
- 5.10. The area beyond the industrial estate, to the north and east of the Scheme site, is predominantly agricultural, with fields under cultivation.
- 5.11. As stated in section B3.6 of this Application, emissions to air from the Scheme will mainly arise from WEEE treatment. However, the Scheme includes mitigation measures to reduce these emissions, including filtration systems. As a result, the impact on nearby sites is not expected to be significant.
- 5.12. With regard to noise, the majority of sites adjoining the Scheme are industrial, and some nearby sites also generate noise (as described in section B3.9 of this Application). It is therefore considered that the Scheme is compatible with the surrounding industrial activities and will not generate a significant noise impact on the nearby industrial sites.
- 5.13. The Environmental Risk Assessment prepared for the Scheme (section B2.8), also identified a risk of fire / explosion, which could also spread to other nearby sites. However, the Scheme will include a number of mitigation measures to minimise both the likelihood and severity of a fire / explosion, including limiting the quantity of combustible material on site, and having procedures and equipment in place to tackle a fire as soon as possible and thus reduce the risk of it spreading beyond the site.

Figure 5.1: Surrounding land uses



Annex 1: ISO 14001 Certificate

Certificate of Registration
Environmental Management System
MSA EN ISO 14001:2004

MSA EN ISO 14001:2004

Reg. No. E012

This is to certify that:

Electronic Products Ltd.
Trading as WEEE Recycle Ltd

Electronic Products Ltd,
Omron House, 47,
Old railway track,
St Venera
Malta

WEEE Recycle Ltd

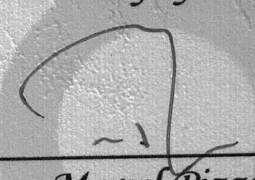
Ta' Maggi Ind Est
Zabbar
Malta.

are holders of **Certificate No. E012** and operate an
Environmental Management System which complies with the
requirements of MSA EN ISO 14001:2004.

The **scope** covered by the Environmental Management System
includes:

The management of waste of electrical and electronic equipment
including waste collection to dismantling, and transfer of waste
streams to end facilities.

For and on behalf of MCCAA


Marcel Pizzuto
Chairman

01 November 2013

Initial Registration

01 November 2013

Current Registration

31 October 2016

Expiry Date

This certificate is the property of Malta Competition and Consumer Affairs Authority (MCCAA) trading as Standards and Metrology Institute (SMI). It shall be returned upon request.

Address: Malta Competition and Consumer Affairs Authority, Standards and Metrology Institute, Mizzi House, National Road,
Blata l-Bajda HMR 9010, Malta.

Tel: +356 2395 2000, Fax: +356 21 242 406; e-mail: certification@mccaa.org.mt; url: www.mccaa.org.mt

SMI-F12/Rev. 6/June2011



MCCAA

CERTIFICATE OF REGISTRATION



ENVIRONMENTAL MANAGEMENT SYSTEM

SM EN ISO 14001:2015

This is to certify that:

WEEE Recycle 4U Ltd

Omron House, 93,
Old railway track,
St Venera, SVR 9014, Malta

are holders of **Certificate No: E012** and operate a

ENVIRONMENTAL MANAGEMENT SYSTEM

which complies with the requirements of SM EN ISO 14001:2015

The scope covered by the ENVIRONMENTAL MANAGEMENT SYSTEM

includes:

The management of waste of electrical and electronic equipment including waste collection to dismantling and transfer of waste streams to end facilities.

Other sites covered by the scope:

- HHF 040, Hal Far Industrial Estate, Hal Far, Malta

FRANCIS FARRUGIA

DIRECTOR GENERAL

Standards and Metrology Institute

01 November 2013

INITIAL REGISTRATION

10 October 2019

CURRENT REGISTRATION

09 October 2022

EXPIRY DATE

This certificate is the property of Malta Competition and Consumer Affairs Authority (MCCAA) trading as Standards and Metrology Institute (SMI). It shall be returned upon request.

MALTA COMPETITION AND CONSUMER AFFAIRS AUTHORITY, STANDARDS AND METROLOGY INSTITUTE
MIZZI HOUSE, NATIONAL ROAD, BLATA L-BAJDA. HMR9010, MALTA

T +356 2395 2000

E certification@mccaa.org.mt

W www.mccaa.org.mt

SMIC(EMS)-F09/REV.3/May2018

Annex 2: Environmental Policy



WEEE Recycle 4U Environmental Policy

*Electronic Products Ltd trading as **WEEE Recycle 4U** Management and Staff recognize that our activities have a direct impact on the national obligations and targets. We are committed to continually improve our operations in order to minimize our environmental impact and prevent pollution.*

To meet this commitment, we will:

- *Comply with Environmental Permits EP 009/10, EP 033/18, EP 17/15 & EP 07/19 and all applicable environmental laws and regulations that relate to our environmental aspects and impacts;*
- *Strive to meet the requirements of the Solid Waste Management Strategy for the Maltese Islands*
- *Reduce the waste going to landfill through our separation facilities;*
- *Monitor and control the waste received at the plant until final destruction/re-use;*
- *Motivate and educate employees through training (formal and on-the-job).*
- *Protect the environment, prevent pollution and reduce the impact of the significant aspects of its operations.*

To implement this policy we have adopted an Environment Management System, based on the requirements of ISO 14001:2015.

The Environmental Policy is endorsed and approved by the Managing Director and reviewed for suitability yearly during the MRM. Signed copies of the Environmental Policy are available at site and at our administrative office in St Venera.

Charles Galea

Date: 10/03/20209

Version: 03

93 Old Railway Track, St. Venera SVR 9014

Tel: 2144 5190 email: info@weeerecycleltd.com

www.weeerecycleltd.com

Annex 3: EMS Manual

WEEE Recycle

Waste Management Operations

Environment Management System Manual

Issue: 4

04.07.14

Written and Approved by: _____
Managing Director

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Change History

PAGE NO.	REASON FOR CHANGE	DATE	Issue No.	AUTHORISED BY
	Original draft	3 rd May 2013	0	
16	Updated Procedures WMP 1 and WMP4 Rev nos.	1 st July 2013	1	
	Updated Section 4.5.1 and Rev No for procedure WMP3	2 nd July 2013	2	
12, 16	Change frequency of compressor air monitoring & updates to WMP2, WMP3 and WMF006	5 th February 2014	3	
	Removed reference to rev no of EP permit and updated section 4.5.4 back up methodology	7 th July 2014	4	

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1 Scope

WEEE Recycle, a division of Electronic Products Limited specialising in Waste Management Operations is implementing its Environmental Management System in line with the requirements of ISO14001:2004.

This document, the WEEE Recycle EMS Manual describes how our company applies these requirements in its day to day operations related to waste management of electric and electronic equipment.

The scope of this Environmental Management System covers the **Management of Waste of Electrical and Electronic Equipment including Waste Collection to Dismantling and Separation of waste streams and Transfer to End Facilities.**

Sections 4.1 through 4.6 of this document are modelled on the ISO14001:2004 standard and the number scheme adopted therein. These sections provide specific information or instructions necessary for complying with the requirements specified in the Standard and relate to the documentation necessary for guidance and instruction. More details can be found by following the links to the documentation section. Where possible, documents are stored electronically, controlled by one master list.

The Waste Management Operations take place at:

Garages 12, 27 & 28

Ta' Maggi Industrial Zone

Zabbar

2 Normative References

ISO 14001:2004 Environmental Management Systems – Requirements with Guidance for Use

3 Terms and Definitions

The terms and definitions highlighted in section 3 of the ISO 14001:2004 standard are applicable for WEEE Recycle's EMS.

Other definitions:

Organisation – WEEE Recycle (division of WEEE Recycle Ltd)

MD – Managing Director

MEPA – Malta Environment and Planning Authority

WEEE – Waste of Electric and Electronic Equipment

4 Environmental Management System Requirements

4.1 General Requirements

As highlighted in Section 1, this EMS is based on the ISO 14001:2004 standard and is documented in this manual. The Scope of the EMS covers the **Management of Waste of Electrical and Electronic Equipment including Waste Collection to Dismantling and Separation of waste streams and Transfer to End Facilities.**

The flow chart in Figure 1 shows the sequence and interactions of the Waste Management processes and operations.

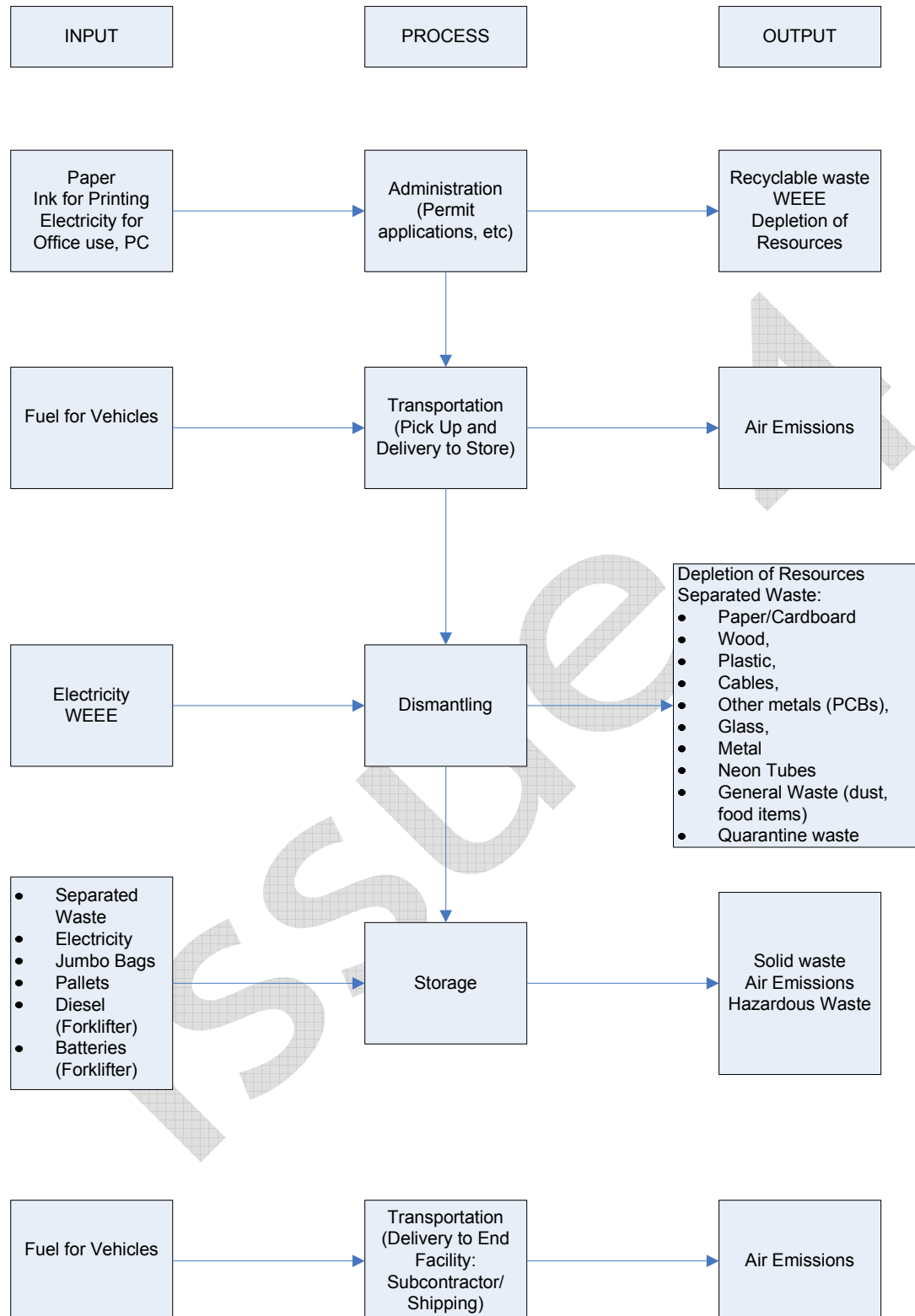


Figure 1: Process Interaction

4.2 Environmental Policy

The Environmental Policy hereunder, outlines the Organisation's commitment to the environment. It is communicated to all employees and subcontractors and is available to the public upon request.

WEEE Recycle Environmental Policy

The Management and Staff at WEEE Recycle recognise that our activities have a direct impact on the national obligations and targets. We are committed to continually improve our operations in order to minimise our environmental impact and prevent pollution.

To meet this commitment, we will:

- *Comply with Environmental Permit EP 009/10 and all applicable environmental laws and regulations that relate to our environmental aspects and impacts;*
- *Strive to meet the requirements of the Solid Waste Management Strategy for the Maltese Islands*
- *Reduce the waste going to landfill through our separation facilities;*
- *Monitor and control the waste received at the plant until final destruction/re-use;*
- *Motivate and educate employees through training (formal and on-the-job).*

To implement this policy we have adopted an Environment Management System, based on the requirements of ISO 14001:2004.

The Environmental Policy is endorsed and approved by the Managing Director and reviewed for suitability yearly during the MRM. Signed copies of the Environmental Policy are available at on site and at our administrative office is St Venera.

4.3 Planning

4.3.1 Environmental Aspects

The positive and negative environmental aspects generated through the waste management operations are evaluated using form WMF 001 Environmental Aspects Evaluation Chart.

The positive aspects identified are namely:

- The provision of a service and means to dispose off WEEE in a controlled manner which, if disposed otherwise, may lead to severe health and environmental problems;

- The reduction of landfill waste through recovery of recyclable materials (from separation of waste)

Although minimal, the negative aspects are mainly related to abnormal situations (rWEEE Recycleplacement of vehicles/ batteries) or emergency situations (such as fires).

Using the Evaluation chart as a guideline, WEEE Recycle has decided to consider those aspects that obtain a rating of 65¹ or more as significant. Through the implementation of the EMS, procedures and operational controls, WEEE Recycle will continue to ensure controls of the significant aspects and wherever possible, mitigation to reduce the environmental impact.

This evaluation shall be reviewed on an annual basis or whenever any operational changes occur.

4.3.2 Legal And Other Requirements

The services offered by WEEE Recycle address Policy Objective 2 (Improve Capacity to Manage Industrial Solid Waste and Hazardous Waste) of the Solid Waste Management Strategy for the Maltese Islands (2010). As highlighted in Appendix A of the same document, this policy is linked to Policy Objective 6 (Promote good waste management practices through Education and Communication), Policy Objective 7 (Increased levels of recycling) and Policy Objective 8 (Reducing Reliance on Land filling).

The Managing Director is responsible to ensure that applicable legal and other requirements related to WEEE RECYCLE's EMS are identified. This is done through continuous communication with the environmental regulatory body, namely MEPA. Whenever a new legislation/requirement that applies to the waste management operations of WEEE Recycle is issued, it is recorded in the Legal Register WMF 002. A copy of the document (legal notice/strategy/etc) is downloaded and kept for reference.

The MD shall review and communicate the new requirements to his employees and implement the necessary action to ensure that the operations are in line with the requirements.

4.3.3 Objectives, Targets and Programme(s)

Environmental Objectives and Targets for the EMS of the WEEE Recycle have been established and documented in WMF005 Environmental Objectives and Targets, which is in itself a programme highlighting the:

¹ Maximum significant rating (SR) for an aspect is 130. The Managing Director has decided to implement action to mitigate those aspects that have a rating of more than half the maximum SR, therefore 65.

- Objectives and Targets set for the Facility
- Person responsible to implement the objective
- Time frame for the implementation
- Follow up of the progress in implementing the Objectives.

Objectives are communicated to personnel via the notice board and informal meetings held by the MD during site visits.

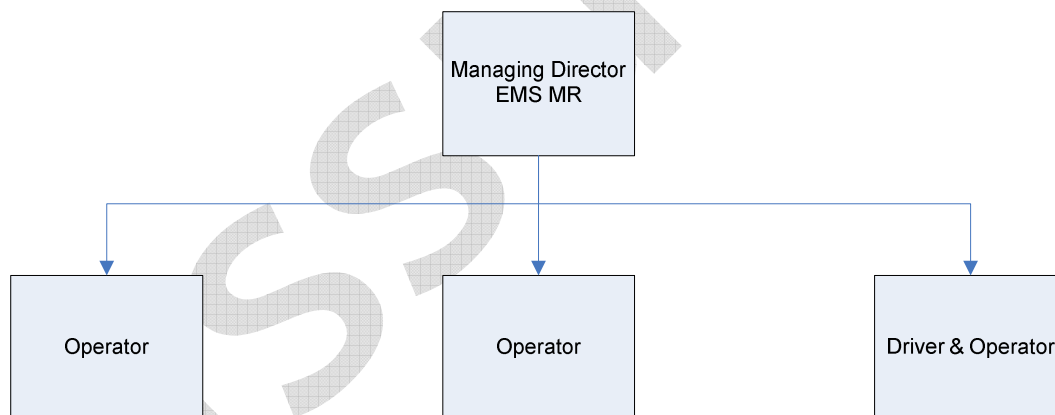
4.4 Implementation and Operation

4.4.1 Resources, Roles, Responsibility and Authority

The MD is committed to the effective implementation of this EMS.

This is achieved by providing the necessary human resources, equipment and facilities for the operations.

Figure 2 defines the Organisation structure and responsibilities of each employee. Job descriptions are established for the key roles in the organisation and are communicated to the employees through formal Job Description forms given to each employee.



The appointed EMS Management Representative for the TTF is the Managing Director. He is responsible for:

- Ensuring that the Environmental Management System is established and maintained effectively, in line with ISO14001 requirements in all its aspects

- Reporting (upon request or as required by legal obligations) to the environmental authorities on the performance EMS including planned recommendations for improvement.

4.4.2 Competence, Training and Awareness

The role of employees is critical for the maintenance of the EMS, since their performance can significantly impact the environment. For this reason, the MD ensures that employees are informed about the EMS through at least one training session, covering as a minimum:

- The importance of conformity with the environmental policy, procedures and requirements of the EMS
- Significant positive and negative aspects and impacts associated with their work
- Their roles and responsibilities in achieving conformity with the EMS
- The potential consequences of deviation from specified procedures

On the job training and specialised training shall be provided wherever necessary. Training is recorded in form EPL F14.

4.4.3 Communication

At WEEE Recycle Limited, is a small organisation with open door management policies thus enabling continuous internal communication through informal dialogue. The MD visits the facilities on a daily basis and can be reached on the phone during the day.

Unless requested by a legal obligation, WEEE Recycle shall not communicate externally about its significant environmental aspects.

Reporting related to the operations and/or environmental incidents shall be communicated to Malta Environment and Planning Authority as specified in the Environmental Permit EP 009/10. In case of a query or reporting of unannounced visits received from MEPA, the MD is informed.

Third party complaints shall be recorded in the Complaints Log WMF 003 as specified in Environmental Permit EP 009/10.

4.4.4 Documentation

The EMS documentation for WEEE Recycle consists of the:

- environmental policy, objectives and targets (recorded on WMF 005)

- description of the scope of the EMS as highlighted in Section 1 of this manual
- environmental manual (this document)
- environmental procedures that are applicable for the EMS
- forms, records and any other documents including those of external origin

4.4.5 Control of Documents

The control of documents shall take place as follows:

- a. All internally generated controlled documents are approved by the MD. EMS Procedures are marked with the letters WMP and a sequential number, whilst EMS forms are marked with the letters WMF and a sequential number. All documents have a unique identification number and a revision number. Whenever changes are affected, the revision number is updated.
- b. When changes are required, the originator of the change, requests a change to the MD. The latter reviews this with the users, if there is agreement, the particular document is modified, re-approved and re-issued.
- c. Master lists of procedures and forms are found in Appendix I of this manual.
- d. The MD ensures that all documents are available at point of use.
- e. One hard copy of system documentation is kept with the MD. All system documents are available electronically in 'read-only' format. The electronic version is considered as the Master Copy.
- f. Documents of external origin that are necessary for the operations of the EMS are recorded in Appendix II of this manual.

4.4.6 Operational Control

Waste management operations that are associated with the identified environmental aspects and require to be carried out under specified conditions have been defined as:

- WMP 1 – WEEE Pick up and Delivery to Dismantling Facility
- WMP 2 – Transfer of Waste to Local Facility
- WMP 3 – Transfer of Waste Overseas
- WMP 4 – Dismantling of WEEE

4.4.7 Emergency Preparedness and Response

A risk assessment for the site has been developed by an external consultant and the corrective action necessary shall be implemented by the MD.

Although minimal, environmental incidents that may arise at the dismantling facility are highlighted in the table below, which also indicates the implemented facilities to mitigate such risks.

RISK	MITIGATION
Fire	Fire Extinguishers, Basic Fire Fighting Training (for one employee)
Spills (Compressor Oil, Diesel)	Secondary containment for storage, Sand barrel, Basic Spill training

MSDS for chemicals found at the facility are made available to the employees. As required by the Environmental Permit EP009/10, any significant incidents shall be reported to MEPA and the Civil Protection Department within 24hrs. These are also recorded in the site diary.

4. 5 Checking

4.5.1 Monitoring and Measurement

Monitoring and measurement takes place for the following parameters:

- WEEE brought in for dismantling (in kg) – Upon Occurrence
- Separated waste streams (in kg) - Upon Occurrence
- Air leaks (from compressor) – every 4 months (3 times/yr)
- Electricity consumption – monthly

Waste brought in for dismantling and waste delivered to end facilities is recorded. The quantity of (in kg) hazardous waste transfers (in/out) are accompanied by CN forms whereas non hazardous waste quantities (in kg) are recorded in delivery receipts or certificates provided by the end facility. Electricity consumption and air leaks are recorded in WMF 006 Electricity Log.

4.5.2 Evaluation of Compliance

The evaluation of compliance to legal and other requirements is maintained through a quarterly gap analysis of a sample of the legal requirements and the requirements of the Environmental Permit. In 1 year all the applicable legal notices and the clauses of the EP would be reviewed. Such gap analysis shall be carried out by the MD and findings shall be recorded. Where non compliance is noted, a corrective action request is issued on EPL F6.

4.5.3 Nonconformity, Corrective Action and Preventive Action

A nonconformity may arise at any time during the course of the day, during the evaluation of compliance or during internal audits. In such situations, a Corrective action request form EPL F6 is compiled by the person identifying the nonconformity. The nonconformity is discussed with the person responsible for corrective action and the root cause together with the appropriate corrective action are identified and recorded.

The MD or Internal Auditor are responsible to verify that corrective action was effective and close off the corrective action request form.

In instances where a potential nonconformity may occur, a request for preventive action is recorded on the same EPL F6.

4.5.4 Control of Records

The responsibility for the control of records lies with the MD.

The key quality records at EP are:

- Compiled CP and CN forms for WEEE pick ups
- Delivery receipts and documentation related to shipping of waste
- Reports issued to the Competent Authorities as required
- Environmental system related records

Electronic records are stored on a twin pack external hard drive located in the server cabinet at the Head Office whilst hard copy records are maintained in the respective files at the Head Office in St Venera.

Adequate fire fighting equipment is found at the premises.

Environmental records are retained for at least 5 years unless otherwise specified.

4.5.5 Internal Audit

Audits are periodically carried out in order to maintain and improve on the EMS and to check for non-conformities. These audits help implement corrective actions and better design preventive techniques employed throughout the operations.

An audit plan covering all the EMS procedures and the EMS Manual is prepared yearly and approved during the last Management Review Meeting of the previous year. It ensures that the minimum interval between audits of the individual system elements does not exceed one year.

The Managing Director selects the Internal Auditor(s). It is ensured that the Internal Auditor is an objective and impartial individual who has had training on how to conduct Internal Audits. Internal Auditors will not audit their own work.

The yearly Audit Plan is outlined in an XL sheet and held on the network for access to all on read-only basis. The Management representative can make authorised changes to the plan and keeps it updated.

During the audit, the Auditor uses the prepared checklist of questions EPL F8 and notes all findings (observations) on the right hand side of the checklist. At the end of the audit, after reviewing the findings, the auditor will identify and record and non-conforming situations on Corrective Action request EPL F6. A report with the findings, together with the Corrective Action requests and the checklists, is passed on to the Management Representative.

If required, a date for a re-audit, to ensure that corrective actions have been taken is agreed. The re-audit then ensures that the system is fully compliant with the elements audited and the requirements of the standard. Verification must ensure that the fix proposed in the corrective action was effective and has eliminated or reduce the incidents of the origin of the problem. The Audit is closed only once implementation has taken place.

Audit results are discussed during Management Review meeting to ensure effectiveness of the EMS. Opportunities for improvement from Internal Audits are tackled immediately.

4.6 Management Review

A Management Review Meeting (MRM) is held on a bi-annual basis to ensure the continuing suitability, adequacy and effectiveness of the facility's EMS.

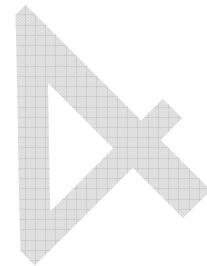
The agenda includes the following key issues:

1. Follow-up from previous meetings
2. Results of Internal Audit and Third Party Audit
3. Status of Preventive and Corrective Actions
4. Status of objectives and targets
5. Environmental performance of WEEE RECYCLE
6. Communication from external interested parties including complaints
7. Evaluations of Compliance with legal and other requirements

8. Changing circumstances including developments in legal and other requirements related to WEEE RECYCLE's environmental aspects
9. Review of the Environmental Policy
10. Potential improvement opportunities including changes that could affect the EMS

The resultant points of discussion, decisions and action agreed on the above issues are recorded as minutes using form EPL F9.

Issue



Appendix I – List of EMS Processes and Forms

Proc. No.	Title	Rev. status	Date of rev.
WMP 1	WEEE Pick Up and Delivery to Dismantling Facility	1	01.07.13
WMP 2	Transfer of Waste to Local Facility	1	05.02.14
WMP 3	Transfer of Waste Overseas	2	05.02.14
WMP 4	Dismantling of WEEE	1	01.07.13
FORMS			
WMF001	Aspects and Impacts	0	24.04.13
WMF002	Legal Register	0	24.04.13
WMF003	Complaints Log	0	24.04.13
WMP004	Maintenance Plan	0	24.04.13
WMF005	Objectives and Targets	0	24.04.13
WMF006	Electricity Log	1	05.02.14
Forms common for Electronic Products' QMS and WEEE Recycle's EMS			
EPL F6	Request for corrective action	3	26.06.12
EPL F8	Internal Audit Check list	1	02.08.04
EPL F9	Management review meeting action list	1	20.07.05
EPL F13	Internal Audit Plan	4	04.11.08
EPL F14	Induction Program for New Employees	1	01.10.08
EPL F15	Employee Record Form	1	04.11.08

Appendix II – External Documents

1. Legal Notices and National Requirements (Refer to WMF 002 Legal Register)
2. CP permit application issued by MEPA for carriage of hazardous waste
3. CN Forms issued by MEPA for carriage of hazardous waste
4. DGSA report for the carriage of Old TV Sets: MEPA Reference CP5086, 19.10.11
5. DGSA report for the carriage of Crushed Neon Tubes: MEPA Reference CP4587, 19.10.11

Annex 4: Toner Dismantling Equipment



Reachfill Co.Ltd

No.9,5RD Pingxi ,Nanping Zhuhai,Guangdong,china

Tel : (86)0756-8696077 Fax : (86)0756-8696356

Contact : Miss xi (86)15014928977

Email:sales4@reachfill.com

Toner cleaning machine

Item : WQ-TX1200



幅除尘机(双工位)
ie Breadth Toner

Technical Information :

Voltage:	AC220V(110V) 50~60HZ
Power:	2.2kw
Pumping force :	-20kpa
Filter accuracy :	99.97%
Capacity:	25kg
Weight:	130kg
Dimension(mm):	1400(L)*1000(W)*2000(H)

Description :

- 1.Double workstation
2. Low noise
3. Anti-static polyester filter
4. Machine with filters and collector
5. Filter clean automatically

Note :

Unit price :	****us dollars
Trad term :	FOB Zhuhai/ CFR Destination port
Payment :	T/T (wire transfer)
Shippment :	Within 7 days
MOQ :	1Pcs
Package:	Wooden case (1450*1220*2050mm)
G.W:	300KG
Guarantee :	one year
Valid :	30days

Time : 2014/4/14
Contact : Miss xi shining
Department : sales

Annex 5: Best Available Technique Assessment



IPPC BAT Conclusions

COMMISSION IMPLEMENTING DECISION (EU) 2018/11747 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council

BEST AVAILABLE TECHNIQUES (BAT) CONCLUSIONS FOR WASTE SCOPE

These BAT conclusions concern the following activities specified in Annex I to Directive 2010/75/EU, namely:

- 5.1. Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving one or more of the following activities:
- (a) biological treatment;
 - (b) physico-chemical treatment;
 - (c) blending or mixing prior to submission to any of the other activities listed in points 5.1 and 5.2 of Annex I to Directive 2010/75/EU;
 - (d) repackaging prior to submission to any of the other activities listed in points 5.1 and 5.2 of Annex I to Directive 2010/75/EU;
 - (e) solvent reclamation/regeneration;
 - (f) recycling/reclamation of inorganic materials other than metals or metal compounds;
 - (g) regeneration of acids or bases;
 - (h) recovery of components used for pollution abatement;
 - (i) recovery of components from catalysts;
 - (j) oil re-refining or other reuses of oil;
- 5.3.(a) Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day involving one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC ⁽¹⁾:
- (i) biological treatment;
 - (ii) physico-chemical treatment;
 - (iii) pre-treatment of waste for incineration or co-incineration;
 - (iv) treatment of ashes;
 - (v) treatment in shredders of metal waste, including waste electrical and electronic equipment and end-of-life vehicles and their components.
- (b) Recovery, or a mix of recovery and disposal, of non-hazardous waste with a capacity exceeding 75 tonnes per day involving one or more of the following activities, and excluding activities covered by Directive 91/271/EEC:
- (i) biological treatment;
 - (ii) pre-treatment of waste for incineration or co-incineration;
 - (iii) treatment of ashes;
 - (iv) treatment in shredders of metal waste, including waste electrical and electronic equipment and end-of-life vehicles and their components.
- When the only waste treatment activity carried out is anaerobic digestion, the capacity threshold for this activity shall be 100 tonnes per day.

5.5. Temporary storage of hazardous waste not covered under point 5.4 of Annex I to Directive 2010/75/EU pending any of the activities listed in points 5.1, 5.2, 5.4 and 5.6 of Annex I to Directive 2010/75/EU with a total capacity exceeding 50 tonnes, excluding temporary storage, pending collection, on the site where the waste is generated.

6.11. Independently operated treatment of waste water not covered by Directive 91/271/EEC and discharged by an installation undertaking activities covered under points 5.1, 5.3 or 5.5 as listed above.

Referring to independently operated treatment of waste water not covered by Directive 91/271/EEC above, these BAT conclusions also cover the combined treatment of waste water from different origins if the main pollutant load originates from the activities covered under points 5.1, 5.3 or 5.5 as listed above.

These BAT conclusions do not address the following:

- Surface impoundment.
- Disposal or recycling of animal carcasses or of animal waste covered by the activity description in point 6.5 of Annex I to Directive 2010/75/EU when this is covered by the BAT conclusions on the slaughterhouses and animal by-products industries (SA).
- On-farm processing of manure when this is covered by the BAT conclusions for the intensive rearing of poultry or pigs (IRPP).
- Direct recovery (i.e. without pretreatment) of waste as a substitute for raw materials in installations carrying out activities covered by other BAT conclusions, e.g.:
 - o Direct recovery of lead (e.g. from batteries), zinc or aluminium salts or recovery of the metals from catalysts. This may be covered by the BAT conclusions for the non-ferrous metals industries (NFM).
 - o Processing of paper for recycling. This may be covered by the BAT conclusions for the production of pulp, paper and board (PP).
 - o Use of waste as fuel/raw material in cement kilns. This may be covered by the BAT conclusions for the production of cement, lime and magnesium oxide (CLM).
- Waste (co-)incineration, pyrolysis and gasification. This may be covered by the BAT conclusions for waste incineration (WI) or the BAT conclusions for large combustion plants (LCP).
- Landfill of waste. This is covered by Council Directive 1999/31/EC ⁽²⁾. In particular, underground permanent and long-term storage (≥ 1 year before disposal, ≥ 3 years before recovery) are covered by Directive 1999/31/EC.
- *In situ* remediation of contaminated soil (i.e. unexcavated soil).
- Treatment of slags and bottom ashes. This may be covered by the BAT conclusions for waste incineration (WI) and/or the BAT conclusions for large combustion plants (LCP).
- Smelting of scrap metals and metal-bearing materials. This may be covered by the BAT conclusions for non-ferrous metals industries (NFM), the BAT conclusions for iron and steel production (IS), and/or the BAT conclusions for the

¹ Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment ([OJ L 135, 30.5.1991, p. 40](#)).

² Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste ([OJ L 182, 16.7.1999, p. 1](#)).

smitheries and foundries industry (SF).

- Regeneration of spent acids and alkalis when this is covered by the BAT conclusions for ferrous metals processing.
- Combustion of fuels when it does not generate hot gases which come into direct contact with the waste. This may be covered by the BAT conclusions for large combustion plants (LCP) or by Directive (EU) 2015/2193 of the European Parliament and of the Council [\(3\)](#).

Other BAT conclusions and reference documents which could be relevant for the activities covered by these BAT conclusions are the following:

- Economics and cross-media effects (ECM);
- Emissions from storage (EFS);
- Energy efficiency (ENE);
- Monitoring of emissions to air and water from IED installations (ROM);
- Production of cement, lime and magnesium oxide (CLM);
- Common waste water and waste gas treatment/management systems in the chemical sector (CWW);
- Intensive rearing of poultry or pigs (IRPP).

These BAT conclusions apply without prejudice to the relevant provisions of EU legislation, e.g. the waste hierarchy.

³ Directive (EU) 2015/2193 of the European Parliament and of the Council of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants ([OJ L 313, 28.11.2015, p. 1](#)).

DEFINITIONS

For the purposes of these BAT conclusions, the following **definitions** apply:

Term used	Definition
General terms	
Channelled emissions	Emissions of pollutants into the environment through any kind of duct, pipe, stack, etc. This also includes emissions from open-top biofilters.
Continuous measurement	Measurement using an ‘automated measuring system’ permanently installed on site.
Declaration of cleanliness	Written document provided by the waste producer/holder certifying that the empty waste packaging concerned (e.g. drums, containers) is clean with respect to the acceptance criteria.
Diffuse emissions	Non-channelled emissions (e.g. of dust, organic compounds, odour) which can result from ‘area’ sources (e.g. tanks) or ‘point’ sources (e.g. pipe flanges). This also includes emissions from open-air windrow composting.
Direct discharge	Discharge to a receiving water body without further downstream waste water treatment.
Emissions factors	Numbers that can be multiplied by known data such as plant/process data or throughput data to estimate emissions.
Existing plant	A plant that is not a new plant.
Flaring	High-temperature oxidation to burn combustible compounds of waste gases from industrial operations with an open flame. Flaring is primarily used for burning off flammable gas for safety reasons or during non-routine operating conditions.
Fly ashes	Particles from the combustion chamber or formed within the flue-gas stream, that are transported in the flue-gas.
Fugitive emissions	Diffuse emissions from ‘point’ sources.
Hazardous waste	Hazardous waste as defined in point 2 of Article 3 of Directive 2008/98/EC.
Indirect discharge	Discharge which is not a direct discharge.
Liquid biodegradable waste	Waste of biological origin with a relatively high water content (e.g. fat separator contents, organic sludges, catering waste).
Major plant upgrade	A major change in the design or technology of a plant with major adjustments or replacements of the process and/or abatement technique(s) and associated equipment.
Mechanical biological treatment (MBT)	Treatment of mixed solid waste combining mechanical treatment with biological treatment such as aerobic or anaerobic treatment.
New plant	A plant first permitted at the site of the installation following the publication of these BAT conclusions or a complete replacement of a plant following the publication of these BAT conclusions.
Output	The treated waste exiting the waste treatment plant.
Pasty waste	Sludge which is not free-flowing.
Periodic measurement	Measurement at specified time intervals using manual or automated methods.
Recovery	Recovery as defined in Article 3(15) of Directive 2008/98/EC.
Re-refining	Treatments carried out on waste oil to transform it to base oil.

Regeneration	Treatments and processes mainly designed to make the treated materials (e.g. spent activated carbon or spent solvent) suitable again for a similar use.
Sensitive receptor	Area which needs special protection, such as: — residential areas; — areas where human activities are carried out (e.g. neighbouring workplaces, schools, daycare centres, recreational areas, hospitals or nursing homes).
Surface impoundment	Placement of liquid or sludgy discards into pits, ponds, lagoons, etc.
Treatment of waste with calorific value	Treatment of waste wood, waste oil, waste plastics, waste solvents, etc. to obtain a fuel or to allow a better recovery of its calorific value.
VFCs	Volatile (hydro)fluorocarbons: VOCs consisting of fluorinated (hydro)carbons, in particular chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs).
VHCs	Volatile hydrocarbons: VOCs consisting entirely of hydrogen and carbon (e.g. ethane, propane, iso-butane, cyclopentane).
VOC	Volatile organic compound as defined in Article 3(45) of Directive 2010/75/EU.
Waste holder	Waste holder as defined in Article 3(6) of Directive 2008/98/EC of the European Parliament and of the Council (4) .
Waste input	The incoming waste to be treated in the waste treatment plant.
Water-based liquid waste	Waste consisting of aqueous liquids, acids/alkalis or pumpable sludges (e.g. emulsions, waste acids, aqueous marine waste) which is not liquid biodegradable waste.
Pollutants/parameters	
AOX	Adsorbable organically bound halogens, expressed as Cl, include adsorbable organically bound chlorine, bromine and iodine.
Arsenic	Arsenic, expressed as As, includes all inorganic and organic arsenic compounds, dissolved or bound to particles.
BOD	Biochemical oxygen demand. Amount of oxygen needed for the biochemical oxidation of organic and/or inorganic matter in five (BOD ₅) or in seven (BOD ₇) days.
Cadmium	Cadmium, expressed as Cd, includes all inorganic and organic cadmium compounds, dissolved or bound to particles.
CFCs	Chlorofluorocarbons: VOCs consisting of carbon, chlorine and fluorine.
Chromium	Chromium, expressed as Cr, includes all inorganic and organic chromium compounds, dissolved or bound to particles.
Hexavalent chromium	Hexavalent chromium, expressed as Cr(VI), includes all chromium compounds where the chromium is in the oxidation state +6.
COD	Chemical oxygen demand. Amount of oxygen needed for the total chemical oxidation of the organic matter to carbon dioxide. COD is an indicator for the mass concentration of organic compounds.
Copper	Copper, expressed as Cu, includes all inorganic and organic copper compounds, dissolved or bound to particles.
Cyanide	Free cyanide, expressed as CN ⁻ .
Dust	Total particulate matter (in air).
HOI	Hydrocarbon oil index. The sum of compounds extractable with a hydrocarbon solvent (including long-chain or branched aliphatic, alicyclic, aromatic or alkyl-substituted aromatic hydrocarbons).
HCl	All inorganic gaseous chlorine compounds, expressed as HCl.

⁴ Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives ([OJ L 312, 22.11.2008, p. 3](#)).

HF	All inorganic gaseous fluorine compounds, expressed as HF.
H₂S	Hydrogen sulphide. Carbonyl sulphide and mercaptans are not included.
Lead	Lead, expressed as Pb, includes all inorganic and organic lead compounds, dissolved or bound to particles.
Mercury	Mercury, expressed as Hg, includes elementary mercury and all inorganic and organic mercury compounds, gaseous, dissolved or bound to particles.
NH₃	Ammonia.
Nickel	Nickel, expressed as Ni, includes all inorganic and organic nickel compounds, dissolved or bound to particles.
Odour concentration	Number of European Odour Units (ou _E) in one cubic metre at standard conditions measured by dynamic olfactometry according to EN 13725.
PCB	Polychlorinated biphenyl.
Dioxin-like PCBs	Polychlorinated biphenyls as listed in Commission Regulation (EC) No 199/2006 (5) .
PCDD/F	Polychlorinated dibenzo- <i>p</i> -dioxin/furan(s).
PFOA	Perfluorooctanoic acid.
PFOS	Perfluorooctanesulphonic acid.
Phenol index	The sum of phenolic compounds, expressed as phenol concentration and measured according to EN ISO 14402.
TOC	Total organic carbon, expressed as C (in water), includes all organic compounds.
Total N	Total nitrogen, expressed as N, includes free ammonia and ammonium nitrogen (NH ₄ -N), nitrite nitrogen (NO ₂ -N), nitrate nitrogen (NO ₃ -N) and organically bound nitrogen.
Total P	Total phosphorus, expressed as P, includes all inorganic and organic phosphorus compounds, dissolved or bound to particles
TSS	Total suspended solids. Mass concentration of all suspended solids (in water), measured via filtration through glass fibre filters and gravimetry.
TVOC	Total volatile organic carbon, expressed as C (in air).
Zinc	Zinc, expressed as Zn, includes all inorganic and organic zinc compounds, dissolved or bound to particles.

For the purposes of these BAT conclusions, the following acronyms apply:

Acronym	Definition
EMS	Environmental management system
EoLVs	End-of-life vehicles (as defined in Article 2(2) of Directive 2000/53/EC of the European Parliament and of the Council (6))
HEPA	High-efficiency particle air (filter)
IBC	Intermediate bulk container

⁵ Commission Regulation (EC) No 199/2006 of 3 February 2006 amending Regulation (EC) No 466/2001 setting maximum levels for certain contaminants in foodstuffs as regards dioxins and dioxin-like PCBs ([OJ L 32, 4.2.2006, p. 34](#)).

⁶ Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles ([OJ L 269, 21.10.2000, p. 34](#)).

LDAR	Leak detection and repair
LEV	Local exhaust ventilation system
POP	Persistent organic pollutant (as listed in Regulation (EC) No 850/2004 of the European Parliament and of the Council (7))
WEEE	Waste electrical and electronic equipment (as defined in Article 3(1) of Directive 2012/19/EU of the European Parliament and of the Council (8))

General Considerations:

Best Available Techniques

The techniques listed and described in these BAT conclusions are neither prescriptive nor exhaustive. Other techniques may be used that ensure at least an equivalent level of environmental protection. Unless otherwise stated, the BAT conclusions are generally applicable.

Emission levels associated with BAT

Unless stated otherwise, emission levels associated with the best available techniques (BAT-AELs) for emissions to air given in these BAT conclusions refer to concentrations (mass of emitted substances per volume of waste gas) under the following standard conditions: dry gas at a temperature of 273,15 K and a pressure of 101,3 kPa, without correction for oxygen content, and expressed in µg/Nm³ or mg/Nm³.

For averaging periods of BAT-AELs for emissions to air, the following definitions apply.

Type of measurement	Averaging period	Definition
Continuous	Daily average	Average over a period of one day based on valid hourly or half-hourly averages.
Periodic	Average over the sampling period	Average value of three consecutive measurements of at least 30 minutes each ⁹ .

Where continuous measurement is used, the BAT-AELs may be expressed as daily averages.

Emission levels associated with the best available techniques (BAT-AELs) for emissions to water

Unless stated otherwise, emission levels associated with the best available techniques (BAT-AELs) for emissions to water given in these BAT conclusions refer to concentrations (mass of emitted substances per volume of water), expressed in µg/l or mg/l.

Unless stated otherwise, averaging periods associated with the BAT-AELs refer to either of the following two cases:

- in the case of continuous discharge, daily average values, i.e. 24-hour flow-proportional composite samples;
- in the case of batch discharge, average values over the release duration taken as flow-proportional composite samples, or, provided that the effluent is appropriately mixed and homogeneous, a spot sample taken before discharge.

Time-proportional composite samples can be used provided that sufficient flow stability is demonstrated.

All BAT-AELs for emissions to water apply at the point where the emission leaves the installation.

⁷ Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC ([OJ L 158, 30.4.2004, p. 7](#)).

⁸ Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) ([OJ L 197, 24.7.2012, p. 38](#)).

⁹ For any parameter where, due to sampling or analytical limitations, a 30-minute measurement is inappropriate, a more suitable measurement period may be employed (e.g. for the odour concentration). For PCDD/F or dioxin-like PCBs, one sampling period of 6 to 8 hours is used.

Abatement efficiencies

The calculation of the average abatement efficiency referred to in these BAT conclusions (see Table 6.1) does not include, for COD and TOC, initial treatment steps aiming at separating the bulk organic content from the water-based liquid waste, such as evapo-condensation, emulsion breaking or phase separation.

General BAT conclusions

Kindly cross-reference to the relevant part of the application document for the various aspects below (as may be required) and include further justifications for the responses provided.

BAT conclusion	Status at Installation														
1. Environmental management systems															
BAT 1 In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features: <ul style="list-style-type: none"> i. commitment of the management, including senior management; ii. definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation; iii. planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment; iv. implementation of procedures paying particular attention to: <ul style="list-style-type: none"> a) structure and responsibility; b) recruitment, training, awareness and competence; c) communication; d) employee involvement; e) documentation; f) effective process control; g) maintenance programmes; h) emergency preparedness and response; i) safeguarding compliance with environmental legislation; v. checking performance and taking corrective action, paying particular attention to: <ul style="list-style-type: none"> a) monitoring and measurement (see also the JRC Reference Report on Monitoring of emissions to Air and Water from IED installations — ROM); b) corrective and preventive action; 	<p>Is an Environmental Management System (EMS) being implemented as part of the installation process? Yes – see section B2.1 of the IPPC application.</p> <p>If yes, does it incorporate the aforementioned features? (Ex: commitment of the management, planning and establishing the necessary procedures in conjunction with investment and financial planning etc.) If certain features are not incorporated in the current EMS kindly indicate a timeframe by when the EMS shall be updated to include all missing features (<i>as may be applicable to your operations</i>).</p> <table> <tr> <th>Features</th><th>Yes/No</th></tr> <tr> <td>i. Commitment of the management, including senior management</td><td>Yes</td></tr> <tr> <td>ii. An environmental policy that includes the continuous improvement of the installation by the management</td><td>Yes</td></tr> <tr> <td>iii. Planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment</td><td>Yes</td></tr> <tr> <td>iv. Implementation of procedures paying particular attention to : <ul style="list-style-type: none"> a) Structure and responsibility b) Recruitment, training, awareness and competence c) Communication d) Employee involvement e) Documentation f) Effective process control g) Maintenance programmes h) Emergency preparedness and response i) Safeguarding compliance with environmental legislation </td><td>Yes</td></tr> <tr> <td>v. checking performance and taking corrective action, paying particular attention to: <ul style="list-style-type: none"> a) monitoring and measurement (see also the Reference Report on Monitoring of emissions to Air and Water from IED installations — ROM); b) Corrective and preventive action c) Maintenance of records d) independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained; </td><td>Yes</td></tr> <tr> <td>vi. review of the EMS and its continuing suitability, adequacy and effectiveness by senior management</td><td>Yes</td></tr> </table>	Features	Yes/No	i. Commitment of the management, including senior management	Yes	ii. An environmental policy that includes the continuous improvement of the installation by the management	Yes	iii. Planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment	Yes	iv. Implementation of procedures paying particular attention to : <ul style="list-style-type: none"> a) Structure and responsibility b) Recruitment, training, awareness and competence c) Communication d) Employee involvement e) Documentation f) Effective process control g) Maintenance programmes h) Emergency preparedness and response i) Safeguarding compliance with environmental legislation 	Yes	v. checking performance and taking corrective action, paying particular attention to: <ul style="list-style-type: none"> a) monitoring and measurement (see also the Reference Report on Monitoring of emissions to Air and Water from IED installations — ROM); b) Corrective and preventive action c) Maintenance of records d) independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained; 	Yes	vi. review of the EMS and its continuing suitability, adequacy and effectiveness by senior management	Yes
Features	Yes/No														
i. Commitment of the management, including senior management	Yes														
ii. An environmental policy that includes the continuous improvement of the installation by the management	Yes														
iii. Planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment	Yes														
iv. Implementation of procedures paying particular attention to : <ul style="list-style-type: none"> a) Structure and responsibility b) Recruitment, training, awareness and competence c) Communication d) Employee involvement e) Documentation f) Effective process control g) Maintenance programmes h) Emergency preparedness and response i) Safeguarding compliance with environmental legislation 	Yes														
v. checking performance and taking corrective action, paying particular attention to: <ul style="list-style-type: none"> a) monitoring and measurement (see also the Reference Report on Monitoring of emissions to Air and Water from IED installations — ROM); b) Corrective and preventive action c) Maintenance of records d) independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained; 	Yes														
vi. review of the EMS and its continuing suitability, adequacy and effectiveness by senior management	Yes														

<p>c) maintenance of records;</p> <p>d) independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained;</p> <p>vi. review of the EMS and its continuing suitability, adequacy and effectiveness by senior management;</p> <p>vii. following the development of cleaner technologies;</p> <p>viii. consideration for the environmental impacts from the eventual decommissioning of the plant at the design stage of a new plant, and throughout its operating life;</p> <p>ix. application of sectoral benchmarking on a regular basis;</p> <p>x. waste stream management (see BAT 2).</p> <p>xi. establishment of inventories of waste water and waste gas streams (see BAT 3).</p> <p>xii. residues management plan (see description in Section 6.5);</p> <p>xiii. accident management plan (see description in Section 6.5);</p> <p>xiv. odour management plan (see BAT 12);</p> <p>xv. noise and vibration management plan (see BAT 17).</p>	vii. following the development of cleaner technologies	Yes
	iii. consideration for the environmental impacts from the eventual decommissioning of the plant at the design stage of a new plant, and throughout its operating life	Yes
	ix. application of sectoral benchmarking on a regular basis	Will be carried out if required by ERA and if sectoral data is available; otherwise the Scheme will compare its performance with previous years' data
	x. waste management plan (see BAT 2)	Yes. Details of how incoming waste will be managed are provided in section B3.1 of the IPPC application.
	xi. BAT is to incorporate the following features in the EMS:	
	<p>a. if applicable, on multi-operator installations/sites, establishment of a convention that sets out the roles, responsibilities and coordination of operating procedures of each plant operator in order to enhance the cooperation between the various operators</p> <p>b. establishment of inventories of waste water and waste gas streams (see BAT 3).</p>	<p>a. Not applicable – not a multi-operator site</p> <p>b. See response to BAT 3 below.</p>
	<p>In some cases, the following features are part of the EMS :</p> <p>xii. residues management plan (see description in Section 6.5)</p> <p>xiii. accident management plan (see description in Section 6.5)</p> <p>xiv. odour management plan (see BAT 12)</p> <p>xv. noise management plan (see BAT 17)</p>	<p>xii. Yes. Details of how incoming waste will be managed, and how reuse / recycling / recovery of residues generated (or proper disposal) will be ensured are included in section B3.1 of the IPPC application.</p> <p>xiii. Yes. An environmental risk assessment is included in section B2.8 of the IPPC application, and a land and groundwater risk assessment is included in Volume 3. The measures to address the risks identified are described in these sections.</p> <p>xiv. Not applicable. Odour nuisance is not expected at sensitive receptors (see BAT 12).</p> <p>xv. Noise impacts are not envisaged, see section B3.9 of the IPPC application; nevertheless should any noise issues be identified following the start of operations, mitigation will be implemented (see BAT 17).</p>
Further details may be provided in a separate document.		
<p>Applicability</p> <p>The scope (e.g. level of detail) and nature of the EMS (e.g. standardised or non-standardised) will be generally related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have (determined also by the type and amount of wastes processed).</p>		

BAT 2

In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques provided :

Technique	Description
a. Set up and implement waste characterisation and pre- acceptance procedures	These procedures aim to ensure the technical (and legal) suitability of waste treatment operations for a particular waste prior to the arrival of the waste at the plant. They include procedures to collect information about the waste input and may include waste sampling and characterisation to achieve sufficient knowledge of the waste composition. Waste pre-acceptance procedures are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s).

Which of the following techniques are used to assess environmental performance (kindly provide supporting documentation as evidence that such measures are being implemented):

Should any of the techniques below not be currently implemented on site, kindly provide a timeframe and proposal for their implementation.

		Yes/No
a.	Set up and implement waste characterisation and pre- acceptance procedures	Yes. Information about the nature and origin of waste will be collected from the originating facility prior to acceptance.
b.	Set up and implement waste acceptance procedures	Yes. Waste is inspected upon receipt to ensure it is as described. Waste may be refused if unacceptable. Considering the nature of the waste accepted (limited to WEEE, batteries, WEEE-related packaging and wood), a visual check of the waste upon receipt will be sufficient to determine whether the waste received matches the waste types that the facility will be authorised to receive. Sampling and laboratory analysis are not warranted.
c.	Set up and implement a waste tracking system and inventory	Yes. A computer database will be in place (linked to the weighbridge data), which will allow for tracking of incoming and outgoing waste, and can also act as a stock control system. The database will be backed up regularly.
d.	Set up and implement an output quality management system	<p>An output QMS allows verification that the characteristics of the waste output are in line with the expectations, which may be product specifications, contaminant removal efficiency rate, etc.</p> <p>Given the nature of the waste accepted (limited to WEEE, batteries, WEEE-related packaging and wood), for the most part a visual check of the incoming waste upon receipt, and a visual check of the segregated components prior to their removal from site will be sufficient to determine whether expected output quality is achieved. Additionally, as part of his current operations the Applicant also maintains close relationships with the recipients of the outgoing materials, and has to date never had any material rejected.</p> <p>With regard to the eventual production of briquettes or animal bedding from wood, this process will follow the procedures described in section B2.2.1 of the IPPC application, and an end-of-waste application will be submitted to ERA before any sale of processed wood. Testing will also be carried out as required by ERA. However, it is noted that only non-hazardous wood will be prepared for this use, thus ensuring that it is suitable for its intended use. The material is inputted manually into the shredder by the Scheme’s trained operators, thus reducing the risk of contaminants.</p>
e.	Ensure waste segregation	Yes. Different waste types are stored and processed in designated areas, as described in section B3.1 of the IPPC application. However, no compatibility issues are foreseen.
f.	Ensure waste compatibility	Yes. The Scheme will only accept a limited range of wastes and no

b.	Set up and implement waste acceptance procedures	Acceptance procedures aim to confirm the characteristics of the waste, as identified in the pre-acceptance stage. These procedures define the elements to be verified upon the arrival of the waste at the plant as well as the waste acceptance and rejection criteria. They may include waste sampling, inspection and analysis. Waste acceptance procedures are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s).		prior to mixing or blending of waste	compatibility issues are foreseen. No mixing / blending of liquid wastes is envisaged. Wastes of the same type will be processed / stored together.
			g.	Sort incoming solid waste	Yes. Different waste types are stored and processed in designated areas, as described in section B3.1 of the IPPC application. The cable crusher and the fluorescent tube crusher are able to separate different components (see section B2.2.1 of the IPPC application).
c.	Set up and implement a waste tracking system and inventory	A waste tracking system and inventory aim to track the location and quantity of waste in the plant. It holds all the information generated during waste pre-acceptance procedures (e.g. date of arrival at the plant and unique reference number of the waste, information on the previous waste holder(s), pre-acceptance and acceptance analysis results, intended treatment route, nature and quantity of the waste held on site including all identified hazards), acceptance, storage, treatment and/or transfer off site. The waste tracking system is risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s).			
d.	Set up and implement an output quality management system	This technique involves setting up and implementing an output quality management system, so as to ensure that the output of the waste treatment is in line with the expectations, using for example existing EN standards. This management system also allows the performance of the waste treatment to be monitored and optimised, and for this purpose may include a material flow analysis of relevant components throughout the waste treatment. The use of a material flow analysis is risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s).			

e.	Ensure waste segregation	Waste is kept separated depending on its properties in order to enable easier and environmentally safer storage and treatment. Waste segregation relies on the physical separation of waste and on procedures that identify when and where wastes are stored.													
f.	Ensure waste compatibility prior to mixing or blending of waste	Compatibility is ensured by a set of verification measures and tests in order to detect any unwanted and/or potentially dangerous chemical reactions between wastes (e.g. polymerisation, gas evolution, exothermal reaction, decomposition, crystallisation, precipitation) when mixing, blending or carrying out other treatment operations. The compatibility tests are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety and environmental impact, as well as the information provided by the previous waste holder(s).													
g.	Sort incoming solid waste	Sorting of incoming solid waste ⁽¹⁰⁾ aims to prevent unwanted material from entering subsequent waste treatment process(es). It may include: <ul style="list-style-type: none">• manual separation by means of visual examinations;• ferrous metals, non-ferrous metals or all-metals separation;• optical separation, e.g. by near-infrared spectroscopy or X-ray systems;• density separation, e.g. by air classification, sink-float tanks, vibration tables;• size separation by screening/sieving.													
<p>BAT 3</p> <p>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:</p> <p>(i) information about the characteristics of the waste to be treated and the waste treatment processes, including:</p> <p>(a) simplified process flow sheets that show the origin of the emissions;</p> <p>(b) descriptions of process-integrated techniques and waste water/waste gas treatment at source including their performances;</p> <p>(ii) information about the characteristics of the waste water streams, such as:</p> <p>(a) average values and variability of flow, pH, temperature, and conductivity;</p> <p>(b) average concentration and load values of relevant substances and their variability (e.g. COD/TOC, nitrogen species, phosphorus, metals, priority substances / micropollutants);</p> <p>(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);</p> <p>(iii) information about the characteristics of the waste gas streams, such as:</p> <p>(a) average values and variability of flow and temperature;</p> <p>(b) average concentration and load values of relevant substances and their variability (e.g. organic compounds, POPs such as PCBs);</p> <p>(c) flammability, lower and higher explosive limits, reactivity;</p> <p>(d) presence of other substances that may affect the waste gas treatment system or plant safety (e.g. oxygen, nitrogen, water vapour, dust).</p> <p>Applicability</p>			<p>Which of the following elements are included as part of the inventory relating wastewater? (kindly provide supporting documentation as evidence of the information requested below).</p> <p>(i) information about the characteristics of the waste to be treated and the waste treatment processes, including:</p> <table><tr><th>Features</th><th>Yes/No</th></tr><tr><td>a) simplified process flow sheets that show the origin of the emissions;</td><td>Yes – section B2.2.3 of the IPPC application</td></tr><tr><td>b) descriptions of process-integrated techniques and waste water/waste gas treatment at source including their performances;</td><td>Yes – sections B3.3 and B3.6 of the IPPC application, Appendix 1 of this document.</td></tr></table> <p>(ii) information about the characteristics of the waste water streams, such as:</p> <table><tr><th>Features</th><th>Yes/No</th></tr><tr><td>a) average values and variability of flow, pH, temperature, and conductivity;</td><td rowspan="3">Process effluent will typically be reused on site, and not discharged (see section B3.3). However, should discharge to sewer be required, monitoring will follow the requirements of the Scheme’s Sewer Discharge Permit (see section B3.10 of the IPPC application); the monitoring will be tailored to the Scheme’s discharges. It is noted that any effluent discharged to sewer is then treated further at one of the WSC’s treatment plants.</td></tr><tr><td>b) average concentration and load values of relevant substances and their variability (e.g. COD/TOC, nitrogen species, phosphorus, metals, priority substances / micropollutants);</td></tr><tr><td>c) data on bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of</td></tr></table>	Features	Yes/No	a) simplified process flow sheets that show the origin of the emissions;	Yes – section B2.2.3 of the IPPC application	b) descriptions of process-integrated techniques and waste water/waste gas treatment at source including their performances;	Yes – sections B3.3 and B3.6 of the IPPC application, Appendix 1 of this document.	Features	Yes/No	a) average values and variability of flow, pH, temperature, and conductivity;	Process effluent will typically be reused on site, and not discharged (see section B3.3). However, should discharge to sewer be required, monitoring will follow the requirements of the Scheme’s Sewer Discharge Permit (see section B3.10 of the IPPC application); the monitoring will be tailored to the Scheme’s discharges. It is noted that any effluent discharged to sewer is then treated further at one of the WSC’s treatment plants.	b) average concentration and load values of relevant substances and their variability (e.g. COD/TOC, nitrogen species, phosphorus, metals, priority substances / micropollutants);	c) data on bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of
Features	Yes/No														
a) simplified process flow sheets that show the origin of the emissions;	Yes – section B2.2.3 of the IPPC application														
b) descriptions of process-integrated techniques and waste water/waste gas treatment at source including their performances;	Yes – sections B3.3 and B3.6 of the IPPC application, Appendix 1 of this document.														
Features	Yes/No														
a) average values and variability of flow, pH, temperature, and conductivity;	Process effluent will typically be reused on site, and not discharged (see section B3.3). However, should discharge to sewer be required, monitoring will follow the requirements of the Scheme’s Sewer Discharge Permit (see section B3.10 of the IPPC application); the monitoring will be tailored to the Scheme’s discharges. It is noted that any effluent discharged to sewer is then treated further at one of the WSC’s treatment plants.														
b) average concentration and load values of relevant substances and their variability (e.g. COD/TOC, nitrogen species, phosphorus, metals, priority substances / micropollutants);															
c) data on bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of															

¹⁰ Sorting techniques are described in Section 6.4

The scope (e.g. level of detail) and nature of the inventory will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have (determined also by the type and amount of wastes processed).

activated sludge)) (see BAT 52);	
Which of the following elements are included as part oif the inventory relating waste gas streams?	
(iii) information about the characteristics of the waste gas streams, such as:	
Features	Yes/No
a) average values and variability of flow and temperature;	Emissions to air described in section B3.6 of the IPPC application and Appendix 1 , and a monitoring proposal is included in section B3.10 and Appendix 2 . This proposal is tailored to the nature of the emissions.
b) average concentration and load values of relevant substances and their variability (e.g. organic compounds, POPs such as PCBs);	
c) flammability, lower and higher explosive limits, reactivity;	
d) presence of other substances that may affect the waste gas treatment system or plant safety (e.g. oxygen, nitrogen, water vapour, dust).	

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.

Technique		Description	Applicability
a.	Optimised storage location	<div>This includes techniques such as:<ul style="list-style-type: none">the storage is located as far as technically and economically possible from sensitive receptors, watercourses, etc.;the storage is located in such a way so as to eliminate or minimise the unnecessary handling of wastes within the plant (e.g. the same wastes are handled twice or more or the transport distances on site are unnecessarily long).</div>	Generally applicable to new plants.
b.	Adequate storage capacity	<div>Measures are taken to avoid accumulation of waste, such as:<ul style="list-style-type: none">the maximum waste storage capacity is clearly established and not exceeded taking</div>	Generally applicable.

Kindly provide details on how each of the following techniques is being implemented on site.

	Technique	Yes/No
a.	Optimized storage location	Yes.
	Waste will be stored in designated storage areas according to type, with containment systems being provided for waste that may leak hazardous substances to the environment, as described in section B3.1 of the IPPC application. Process flows are described in section B2.2.1 and do not include any unnecessary handling of wastes.	
b.	Adequate storage capacity	Yes.
	<div>The storage capacity has been defined in section B3.1 of the IPPC application. The maximum quantities of each wastes stored will not exceed the site’s capacity, and wastes will be removed as frequently as necessary to ensure the quantities on site remain within the site’s capacity. A computer database will be in place (linked to the weighbridge data), which will allow for tracking of incoming and outgoing waste, and can also act as a stock control system.</div> <div>It is anticipated that the maximum residence time of incoming waste will not be more than four months, whereas the segregated output of the dismantled waste will typically not be retained on site for more than one year.</div>	

		<p>into account the characteristics of the wastes (e.g. regarding the risk of fire) and the treatment capacity;</p> <ul style="list-style-type: none">the quantity of waste stored is regularly monitored against the maximum allowed storage capacity;the maximum residence time of waste is clearly established.		c.	Safe storage operation	Yes.	
					<p>Simple equipment (forklift trucks) will be used for loading / unloading, and does not need to be labelled. Storage areas will be designated and labelled.</p> <p>All wastes will, as a minimum, be stored under cover, as described in section B3.1. No waste sensitive to heat, light, air or water is envisaged.</p> <p>Containers and drums will be fit for purpose and stored securely.</p>		
c.	Safe storage operation	<p>This includes measures such as:</p> <ul style="list-style-type: none">equipment used for loading, unloading and storing waste is clearly documented and labelled;wastes known to be sensitive to heat, light, air, water, etc. are protected from such ambient conditions;containers and drums are fit for purpose and stored securely.		d.	Separate area for storage and handling of packaged hazardous waste	Not applicable.	
d.	Separate area for storage and handling of packaged hazardous waste	When relevant, a dedicated area is used for storage and handling of packaged hazardous waste.		<p>No packaged hazardous waste (e.g. solvents / laboratory smalls) is envisaged.</p>			

<p>BAT 5</p> <p>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.</p> <p>Description</p> <p>Handling and transfer procedures aim to ensure that wastes are safely handled and transferred to the respective storage or treatment. They include the following elements:</p> <ul style="list-style-type: none">handling and transfer of waste are carried out by competent staff;handling and transfer of waste are duly documented, validated prior to execution and verified after execution;measures are taken to prevent, detect and mitigate spills;operation and design precautions are taken when mixing or blending wastes (e.g. vacuuming dusty/powdery wastes). <p>Handling and transfer procedures are risk-based considering the likelihood of accidents and incidents and their environmental impact.</p>	<p>How will handling and transfer procedures be carried out?</p> <p>Incoming waste (i.e. WEEE, batteries, WEEE-related packaging and wood) will be unloaded from trucks using forklift trucks, and moved internally using a manual palletiser. Care will be taken to avoid breakage in case of fragile WEEE (such as fluorescent tubes) or small packages. Employees will be trained, as described in section B2.9 of the IPPC application. Inputs and outputs of waste from the Scheme are documented. Spill prevention and response measures are described in section B2.8 of the IPPC application. No mixing / blending of wastes of different types is envisaged; however, air emissions will be abated when these are generated (see section B3.6 of the IPPC application and Appendix 1 of the current document).</p>
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1.2 Monitoring

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 pretreatment, at the inlet to the final treatment, at the point where the emission leaves the installation).

Which process parameters will be monitored, and at which points?

There are no direct discharges of wastewater to a water body. As described in section B3.3 of the IPPC application, there may be occasional discharge of industrial effluent to the sewer; in this case monitoring will be in accordance with WSC requirements, which will be tailored to the nature of the emissions from the Scheme. It is noted that effluent discharged to sewer is further treated in the WSC’s effluent treatment plant.

Parameters	Yes/No (If yes, at which points?)
Waste water flow	
pH	
Temperature	
Conductivity	
BOD	

BAT 7
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.

Kindly include the list of parameters together with the proposed monitoring standard as part of the monitoring proposal submitted in line with Section B3.10 of the application.

Should the operator, request any deviations from the requirements listed in BAT 7, adequate justification with cross-reference to the applicable application document is to be provided for ERA’s consideration.

There are no direct discharges of wastewater to a water body. As described in section B3.3 of the IPPC application, there may be occasional discharge of industrial effluent to the sewer (for further off-site treatment); in this case monitoring will be in accordance with WSC requirements, which will be tailored to the nature of the emissions from the Scheme. As this would be an occasional discharge, the monitoring frequency is expected to be prior to every discharge.

Substance/parameter	Standard(s)	Waste treatment process	Minimum monitoring frequency ⁽¹¹⁾ ⁽¹²⁾	Monitoring associated with
Adsorbable organically bound halogens (AOX) ⁽¹³⁾ ⁽¹⁴⁾	EN ISO 9562	Treatment of water-based liquid waste	Once every day	BAT 20
Benzene, toluene, ethylbenzene, xylene (BTEX) ⁽¹³⁾ ⁽¹⁴⁾	EN ISO 15680	Treatment of water-based liquid waste	Once every month	
Chemical oxygen demand (COD) ⁽¹⁵⁾ ⁽¹⁶⁾	No EN standard available	All waste treatments except treatment of water based	Once every month	

¹¹ Monitoring frequencies may be reduced if the emission levels are proven to be sufficiently stable.
¹² In the case of batch discharge less frequent than the minimum monitoring frequency, monitoring is carried out once per batch.
¹³ The monitoring only applies when the substance concerned is identified as relevant in the wastewater inventory mentioned in BAT 3.
¹⁴ In the case of an indirect discharge to a receiving water body, the monitoring frequency may be reduced if the downstream wastewater treatment plant abates the pollutants concerned.
¹⁵ Either TOC or COD is monitored. TOC is the preferred option, because its monitoring does not rely on the use of very toxic compounds.
¹⁶ The monitoring applies only in the case of a direct discharge to a receiving water body.

		liquid waste			
		Treatment of water-based liquid waste	Once every day		
Free cyanide (CN ⁻) ^[13] ^[14]	Various EN standards available (i.e. EN ISO 14403-1 and -2)	Treatment of water-based liquid waste	Once every day		
Hydrocarbon oil index (HOI) ^[14]	EN ISO 9377-2	Mechanical treatment in shredders of metal waste	Once every month		
		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	Once every day		
Arsenic (As), Cadmium (Cd)	Various EN	Mechanical	Once every month		

Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn) ^[13] ^[14]	standards available (e.g. EN ISO 11885, EN ISO 17294-2, EN ISO 15586)	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			
		Treatment of water-based liquid waste	Once every day		

Manganese (Mn) ⁽¹³⁾ ⁽¹⁴⁾		Treatment of water-based liquid waste	Once every day		
Hexavalent chromium (Cr(VI)) ⁽¹³⁾ ⁽¹⁴⁾	Various EN standards available (i.e. EN ISO 10304-3, EN ISO 23913)	Treatment of water-based liquid waste	Once every day		
Mercury (Hg) ⁽¹³⁾ ⁽¹⁴⁾	Various EN standards available (i.e. EN ISO 17852, EN ISO 12846)	Mechanical treatment in shredders of metal waste	Once every month		
		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		
		Treatment of water-based liquid waste	Once every day	
PFOA ⁽¹³⁾	No EN standard available	All waste treatments	Once every six months	
PFOS ⁽¹³⁾				
Phenol index ⁽¹⁶⁾	EN ISO 14402	Re-refining of waste oil	Once every month	
		Physico-chemical treatment of waste with calorific value		
		Treatment of water-based liquid waste	Once every day	
Total nitrogen (Total N) ⁽¹⁶⁾	EN 12260, EN ISO 11905-1	Biological treatment of waste	Once every month	
		Re-refining of waste oil		
		Treatment of water-based liquid waste	Once every day	
Total organic carbon	EN 1484	All waste treatments	Once every month	

		shredders of metal waste			
CFCs	No EN standard available	Treatment of WEEE containing VFCs and/or VHCs	Once every six months	BAT 29	
Dioxin-like PCBs	EN 1948-1, -2, and -4 ⁽¹⁹⁾	Mechanical treatment in shredders of metal waste ⁽¹⁸⁾	Once every year	BAT 25	
		Decontamination of equipment containing PCBs	Once every three months	BAT 51	
Dust	EN 13284-1	Mechanical treatment of waste	Once every six months	BAT 25	
		Mechanical biological treatment of waste		BAT 34	
		Physico-chemical treatment of solid and/or pasty waste		BAT 41	
		Thermal treatment of spent activated carbon, waste catalysts and excavated contaminated soil		BAT 49	
		Water washing of excavated contaminated soil		BAT 50	
HCl	EN 1911	Thermal treatment of spent activated	Once every six	BAT 49	

¹⁹ Instead of EN 1948-1, sampling may also be carried out according to CEN/TS 1948-5.

		carbon, waste catalysts and excavated contaminated soil ⁽¹⁸⁾	months		
		Treatment of water-based liquid waste ⁽¹⁸⁾		BAT 53	
HF	No EN standard available	Thermal treatment of spent activated carbon, waste catalysts and excavated contaminated soil ⁽¹⁸⁾	Once every six months	BAT 49	
Hg	EN 13211	Treatment of WEEE containing mercury	Once every three months	BAT 32	
H ₂ S	No EN standard available	Biological treatment of waste ⁽²⁰⁾	Once every six months	BAT 34	
Metals and metalloids except mercury (e.g. As, Cd, Co, Cr, Cu, Mn, Ni, Pb, Sb, Se, Tl, V) ⁽¹⁸⁾	EN 14385	Mechanical treatment in shredders of metal waste	Once every year	BAT 25	
NH ₃	No EN standard available	Biological treatment of waste ⁽²⁰⁾	Once every six months	BAT 34	
		Physico-chemical treatment of solid and/or pasty waste ⁽¹⁸⁾	Once every six months	BAT 41	
		Treatment of water-based liquid waste ⁽¹⁸⁾		BAT 53	

²⁰ The odour concentration may be monitored instead.

Odour concentration	EN 13725	Biological treatment of waste ⁽²¹⁾	Once every six months	BAT 34	
PCDD/F ⁽¹⁸⁾	EN 1948-1, -2 and -3 ⁽¹⁹⁾	Mechanical treatment in shredders of metal waste	Once every year	BAT 25	
TVOC	EN 12619	Mechanical treatment in shredders of metal waste	Once every six months	BAT 25	
		Treatment of WEEE containing VFCs and/or VHCs	Once every six months	BAT 29	
		Mechanical treatment of waste with calorific value ⁽¹⁸⁾	Once every six months	BAT 31	
		Mechanical biological treatment of waste	Once every six months	BAT 34	
		Physico-chemical treatment of solid and/or pasty waste ⁽¹⁸⁾	Once every six months	BAT 41	
		Re-refining of waste oil		BAT 44	
		Physico-chemical treatment of waste with calorific value		BAT 45	

²¹ The monitoring of NH₃ and H₂S can be used as an alternative to the monitoring of the odour concentration.

		Regeneration of spent solvents		BAT 47	
		Thermal treatment of spent activated carbon, waste catalysts and excavated contaminated soil		BAT 49	
		Water washing of excavated contaminated soil		BAT 50	
		Treatment of water-based liquid waste ⁽¹⁸⁾		BAT 53	
		Decontamination of equipment containing PCBs ⁽²²⁾	Once every three months	BAT 51	

²² The monitoring only applies when solvent is used for cleaning the contaminated equipment.

<div>BAT 9</div> <div>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 below.</div> <table><thead><tr><th colspan="2">Technique</th><th>Description</th></tr></thead><tbody><tr><td>a</td><td>Measurement</td><td>Sniffing methods, optical gas imaging, solar occultation flux or differential absorption. See descriptions in Section 6.2.</td></tr><tr><td>b</td><td>Emissions factors</td><td>Calculation of emissions based on emissions factors, periodically validated (e.g. once every two years) by measurements.</td></tr><tr><td>c</td><td>Mass balance</td><td>Calculation of diffuse emissions using a mass balance considering the solvent input, channelled emissions to air, emissions to water, the solvent in the process output, and process (e.g. distillation) residues.</td></tr></tbody></table>	Technique		Description	a	Measurement	Sniffing methods, optical gas imaging, solar occultation flux or differential absorption. See descriptions in Section 6.2.	b	Emissions factors	Calculation of emissions based on emissions factors, periodically validated (e.g. once every two years) by measurements.	c	Mass balance	Calculation of diffuse emissions using a mass balance considering the solvent input, channelled emissions to air, emissions to water, the solvent in the process output, and process (e.g. distillation) residues.	<div>Which techniques will be applied to monitor diffuse emissions of organic compounds from solvent regeneration?</div> <div>Kindly also specify how diffuse emissions shall be monitored using the chosen technique. Kindly include the proposed moniroing technque as part of the monitoring proposal submitted in line with Section B3.10 of the application.</div> <table><thead><tr><th>Technqiue</th><th>Yes/No</th></tr></thead><tbody><tr><td>Measurement</td><td></td></tr><tr><td>Emissions factors</td><td></td></tr><tr><td>Mass balance</td><td></td></tr></tbody></table> <div>Not applicable. None of the activities that BAT 9 applies to are proposed at the Scheme.</div>	Technqiue	Yes/No	Measurement		Emissions factors		Mass balance	
Technique		Description																			
a	Measurement	Sniffing methods, optical gas imaging, solar occultation flux or differential absorption. See descriptions in Section 6.2.																			
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Technqiue	Yes/No																				
Measurement																					
Emissions factors																					
Mass balance																					
<div>BAT 10</div> <div>BAT is to periodically monitor odour emissions.</div> <div>Description</div> <div>Odour emissions can be monitored using:</div> <div><div><div>–</div><div>EN standards (e.g. dynamic olfactometry according to EN 13725 in order to determine the odour concentration or EN 16841-1 or -2 in order to determine the odour exposure);</div></div><div><div>–</div><div>when applying alternative methods for which no EN standards are available (e.g. estimation of odour impact), ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.</div></div></div> <div>The monitoring frequency is determined in the odour management plan (see BAT 12).</div> <div>Applicability</div> <div>The applicability is restricted to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.</div>	<div>Which methods or features will be applied for frequent monitoring of odour emissions?</div> <div>Kindly also specify how odour emissions shall be monitored using the chosen technique. Kindly include the he proposed moniroing technque as part of the monitoring proposal submitted in line with Section B3.10 of the application.</div> <table><thead><tr><th>Features/Methods</th><th>Yes/No</th></tr></thead><tbody><tr><td>1) EN standards (e.g. dynamic olfactometry according to EN 13725 to determine the odour concentration or EN 16841-1 or -2 in order to determine odour exposure)</td><td></td></tr><tr><td>2) Alternative methods for which no EN standards are available</td><td></td></tr><tr><td>3) ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality</td><td></td></tr></tbody></table> <div>Not applicable. Odour nuisance at sensitive receptors is not expected.</div>	Features/Methods	Yes/No	1) EN standards (e.g. dynamic olfactometry according to EN 13725 to determine the odour concentration or EN 16841-1 or -2 in order to determine odour exposure)		2) Alternative methods for which no EN standards are available		3) ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality													
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2) Alternative methods for which no EN standards are available																					
3) ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality																					
<div>BAT 11</div> <div>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.</div> <div>Description</div> <div>Monitoring includes direct measurements, calculation or recording, e.g. using suitable meters or invoices. The monitoring is broken down at the most appropriate level (e.g. at process or plant/installation level) and considers any significant changes in the plant/installation.</div>	<div>How will the monitoring of the annual consumption of water, energy and raw materials, as well as the annual generation of residues and wastewater, be carried out?</div> <div>Water and electricity consumption will be metered. There will be minimal consumption of raw materials, as described in section B2.3 of the IPPC application; nevertheless consumption will be monitored through purchase records. The quantity of each type of waste removed from site (including waste water, if applicable) will be measured using the site’s weighbridge and recorded.</div>																				

1.3 Emissions to air																								
<p>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:</p> <ul style="list-style-type: none"> • 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. <p>Applicability The applicability is restricted to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.</p>				<p>Kindly specify which of the following elements are included or proposed to be included as part of the odour management plan. Should any of these elements not be currently included in such plan, kindly provide a timeframe by when these elements will be included.</p> <table border="1"> <thead> <tr> <th>Elements</th> <th>Yes/No</th> </tr> </thead> <tbody> <tr> <td>1) A protocol containing actions and timelines</td> <td></td> </tr> <tr> <td>2) A protocol conducting odour monitoring as set out in BAT 10</td> <td></td> </tr> <tr> <td>3) A protocol for response to identified odour incidents, e.g. complaints</td> <td></td> </tr> <tr> <td>4) An odour prevention and reduction programme designed to identify the source(s); to characterize the contributions of the sources; and to implement prevention and/or reduction measures</td> <td></td> </tr> </tbody> </table> <p>Not applicable. Odour nuisance is not expected at sensitive receptors.</p>	Elements	Yes/No	1) A protocol containing actions and timelines		2) A protocol conducting odour monitoring as set out in BAT 10		3) A protocol for response to identified odour incidents, e.g. complaints		4) An odour prevention and reduction programme designed to identify the source(s); to characterize the contributions of the sources; and to implement prevention and/or reduction measures											
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<p>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.</p> <table border="1"> <thead> <tr> <th>Technique</th> <th>Description</th> <th>Applicability</th> </tr> </thead> <tbody> <tr> <td>a. Minimising residence times</td> <td>Minimising the residence time of (potentially) odorous waste in storage or in handling systems (e.g. pipes, tanks, containers), in particular under anaerobic conditions. When relevant, adequate provisions are made for the acceptance of seasonal peak volumes of waste.</td> <td>Only applicable to open systems.</td> </tr> <tr> <td>b. Using chemical treatment</td> <td>Using chemicals to destroy or to reduce the formation of odorous compounds (e.g. to oxidise or to precipitate hydrogen sulphide).</td> <td>Not applicable if it may hamper the desired output quality.</td> </tr> <tr> <td>c. Optimising aerobic treatment</td> <td> <p>In the case of aerobic treatment of water-based liquid waste, it may include:</p> <ul style="list-style-type: none"> — use of pure oxygen; — removal of scum in tanks; — frequent maintenance of the aeration system. <p>In the case of aerobic treatment of waste other than water-based liquid waste, see BAT 36.</p> </td> <td>Generally applicable.</td> </tr> </tbody> </table>				Technique	Description	Applicability	a. Minimising residence times	Minimising the residence time of (potentially) odorous waste in storage or in handling systems (e.g. pipes, tanks, containers), in particular under anaerobic conditions. When relevant, adequate provisions are made for the acceptance of seasonal peak volumes of waste.	Only applicable to open systems.	b. Using chemical treatment	Using chemicals to destroy or to reduce the formation of odorous compounds (e.g. to oxidise or to precipitate hydrogen sulphide).	Not applicable if it may hamper the desired output quality.	c. Optimising aerobic treatment	<p>In the case of aerobic treatment of water-based liquid waste, it may include:</p> <ul style="list-style-type: none"> — use of pure oxygen; — removal of scum in tanks; — frequent maintenance of the aeration system. <p>In the case of aerobic treatment of waste other than water-based liquid waste, see BAT 36.</p>	Generally applicable.	<p>Kindly specify which odour minisatation technique shall be implemented on site and provide details of the chosen technique:</p> <table border="1"> <thead> <tr> <th>Technique</th> <th>Yes/No</th> </tr> </thead> <tbody> <tr> <td>1) Minimizing residence times</td> <td></td> </tr> <tr> <td>2) Using chemical treatment</td> <td></td> </tr> <tr> <td>3) Optimizing aerobic treatment</td> <td></td> </tr> </tbody> </table> <p>Not applicable. Odour nuisance is not expected at sensitive receptors.</p>	Technique	Yes/No	1) Minimizing residence times		2) Using chemical treatment		3) Optimizing aerobic treatment	
Technique	Description	Applicability																						
a. Minimising residence times	Minimising the residence time of (potentially) odorous waste in storage or in handling systems (e.g. pipes, tanks, containers), in particular under anaerobic conditions. When relevant, adequate provisions are made for the acceptance of seasonal peak volumes of waste.	Only applicable to open systems.																						
b. Using chemical treatment	Using chemicals to destroy or to reduce the formation of odorous compounds (e.g. to oxidise or to precipitate hydrogen sulphide).	Not applicable if it may hamper the desired output quality.																						
c. Optimising aerobic treatment	<p>In the case of aerobic treatment of water-based liquid waste, it may include:</p> <ul style="list-style-type: none"> — use of pure oxygen; — removal of scum in tanks; — frequent maintenance of the aeration system. <p>In the case of aerobic treatment of waste other than water-based liquid waste, see BAT 36.</p>	Generally applicable.																						
Technique	Yes/No																							
1) Minimizing residence times																								
2) Using chemical treatment																								
3) Optimizing aerobic treatment																								

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. Depending on the risk posed by the waste in terms of diffuse emissions to air, BAT 14d is especially relevant.				Which techniques will be used in order to reduce diffuse emissions to air, in particular dust, organic compounds and odour?	
Technique		Description	Applicability	Technique	Yes/No
a.	Minimising the number of potential diffuse emission sources	This includes techniques such as: <ul style="list-style-type: none"> — appropriate design of piping layout (e.g. minimising pipe run length, reducing the number of flanges and valves, using welded fittings and pipes); — favouring the use of gravity transfer rather than using pumps; — limiting the drop height of material; — limiting traffic speed; — using wind barriers. 	Generally applicable.	a) Minimizing the number of potential diffuse emission sources	Yes. Waste treatment is carried out indoors, and all storage is carried out under cover. The incoming waste is in solid form, and the only liquid waste transfers carried out are of wastewater, where the pipe length is minimal and the wastewater is treated. Waste is not dropped from a height. Toner cartridges are dismantled inside specialised equipment designed to capture the toner powder. Emissions to air are abated; see section B3.6 of the IPPC application and Appendix 1 of the current document.
b.	Selection and use of high-integrity equipment	This includes techniques such as: <ul style="list-style-type: none"> — valves with double packing seals or equally efficient equipment; — high-integrity gaskets (such as spiral wound, ring joints) for critical applications; — pumps/compressors/agitators fitted with mechanical seals instead of packing; — magnetically driven pumps/compressors/agitators; — appropriate service hose access ports, piercing pliers, drill heads, e.g. when degassing WEEE containing VFCs and/or VHCs. 	Applicability may be restricted in the case of existing plants due to operability requirements.	b) Selection and use of high-integrity equipment	Not applicable. The only liquid waste transfers carried out are of wastewater, where the pipe length is minimal and the wastewater is treated. WEEE degassing is on a very small scale and manually controlled.
				c) Corrosion prevention	Yes. Construction materials are appropriate to the type of activities carried out. It is noted that the only liquid waste on site will be of wastewater, and pipework and tanks will be of appropriate materials to prevent corrosion.
				d) Containment, collection and treatment of diffuse emissions	Yes. Waste treatment is carried out indoors, and all storage is carried out under cover. Emissions to air are abated; see section B3.6 of the IPPC application and Appendix 1 of the current document.
				e) Dampening	Not applicable. There are no open handling processes or outdoor waste storage areas. Toner powder will be collected inside specialised equipment, and shredded waste from the crushers will be collected inside jumbo bags or other containers, ensuring minimal escape of dust. It is noted that the output of the main crusher will be around 4 cm diameter (that from the cable crusher will be in the millimetre scale).
				f) Maintenance	Yes. A maintenance programme is included in section B3.5 of the IPPC application.
				g) Cleaning of waste treatment and storage areas	Yes. Site cleaning is included as part of the maintenance programme (section B3.5 of the IPPC application). Equipment will be cleaned as needed.
				h) Leak detection and repair programmes (LDAR)	Not applicable. The Scheme will not generate significant emissions of volatile organic compounds.
c.	Corrosion prevention	This includes techniques such as: <ul style="list-style-type: none"> — appropriate selection of construction materials; — lining or coating of equipment and painting of pipes with corrosion inhibitors. 	Generally applicable.		

d.	Containment, collection and treatment of diffuse emissions	<p>This includes techniques such as:</p> <ul style="list-style-type: none">— storing, treating and handling waste and material that may generate diffuse emissions in enclosed buildings and/or enclosed equipment (e.g. conveyor belts);— maintaining the enclosed equipment or buildings under an adequate pressure;— collecting and directing the emissions to an appropriate abatement system (see Section 6.1) via an air extraction system and/or air suction systems close to the emission sources.	<p>The use of enclosed equipment or buildings may be restricted by safety considerations such as the risk of explosion or oxygen depletion.</p> <p>The use of enclosed equipment or buildings may also be constrained by the volume of waste.</p>						
e.	Dampening	Dampening potential sources of diffuse dust emissions (e.g. waste storage, traffic areas, and open handling processes) with water or fog.	Generally applicable.						
f.	Maintenance	<p>This includes techniques such as:</p> <ul style="list-style-type: none">— ensuring access to potentially leaky equipment;— regularly controlling protective equipment such as lamellar curtains, fast-action doors.	Generally applicable.						
g.	Cleaning of waste treatment and storage areas	This includes techniques such as regularly cleaning the whole waste treatment area (halls, traffic areas, storage areas, etc.), conveyor belts, equipment and containers.	Generally applicable.						
h.	Leak detection and repair (LDAR) programme	See Section 6.2. When emissions of organic compounds are expected, a LDAR programme is set up and implemented using a risk-based approach, considering in particular the design of the plant and the amount and nature of the organic compounds concerned.	Generally applicable.						
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.					<p>Kidnly specify which of the following techniques shall be utilised to ensure safe use of flares, and details of how this will be monitored? Kindly provide details of the montiroing, which will be carried out during such flaring.</p> <table><tr><td>Technique</td><td>Yes/No</td></tr><tr><td>a) Correct plant design</td><td></td></tr></table>	Technique	Yes/No	a) Correct plant design	
Technique	Yes/No								
a) Correct plant design									
Technique	Description	Applicability							

				<table><tr><td>b) Plant management</td><td></td></tr></table>		b) Plant management	
b) Plant management							
				Not applicable. The Scheme does not include any plant requiring flaring.			

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.					
Technique		Description		Applicability	
a.	Correct design of flaring devices	Optimisation of height and pressure, assistance by steam, air or gas, type of flare tips, etc., to enable smokeless and reliable operation and to ensure the efficient combustion of excess gases.		Generally applicable to new flares. In existing plants, applicability may be restricted, e.g. due to maintenance time availability.	
b.	Monitoring and recording as part of flare management	This includes continuous monitoring of the quantity of gas sent to flaring. It may include estimations of other parameters (e.g. composition of gas flow, heat content, ratio of assistance, velocity, purge gas flow rate, pollutant emissions (e.g. NO _x , CO, hydrocarbons), noise). The recording of flaring events usually includes the duration and number of events and allows for the quantification of emissions and the potential prevention of future flaring events.		Generally applicable.	

Techniques		Yes/No
a) Correct design of flaring devices		
b) Monitoring and recording as part of flare management		

Not applicable. The Scheme does not include any plant requiring flaring.					
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1.4. Noise and vibrations																			
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: a) a protocol containing appropriate actions and timelines; b) a protocol for conducting noise and vibration monitoring; c) a protocol for response to identified noise and vibration events, e.g. complaints; d) 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. Applicability The applicability is restricted to cases where a noise or vibration nuisance at sensitive receptors is expected and/or has been substantiated.			<div>How will noise and vibration emissions be mitigated? Will a noise and vibration management plan be implemented? If yes, which features will be included?</div> <table><thead><tr><th>Feature</th><th>Yes/No</th></tr></thead><tbody><tr><td>a) A protocol containing appropriate actions and timelines</td><td></td></tr><tr><td>b) A protocol for conducting noise and vibration monitoring</td><td></td></tr><tr><td>c) A protocol for response to identified noise and vibration events, e.g. complaints</td><td></td></tr><tr><td>d) A noise and vibration reduction programme designed to identify the source(s), to measure/estimate noise and vibration exposure, to characterize the contributions of the sources and to implement prevention and/or reduction measures</td><td></td></tr></tbody></table> <div>Not applicable. A noise study carried out for the Scheme (section B3.9) concluded that there will be no significant impact from the operation of the Scheme at sensitive receptors.</div>		Feature	Yes/No	a) A protocol containing appropriate actions and timelines		b) A protocol for conducting noise and vibration monitoring		c) A protocol for response to identified noise and vibration events, e.g. complaints		d) A noise and vibration reduction programme designed to identify the source(s), to measure/estimate noise and vibration exposure, to characterize the contributions of the sources and to implement prevention and/or reduction measures						
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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.			<div>Kindly specify which of the following techniques shall be implemented to reduce emissions from noise and vibration. Details of the chosen technique are to be submitted.</div> <table><thead><tr><th>Technique</th><th>Yes/No</th></tr></thead><tbody><tr><td>a) Appropriate location of equipment and buildings</td><td>Yes – as described in the noise study (section B3.9 of the IPPC application), the nearest residential property to the Scheme site is a farmhouse located to approximately 175 m to the north. The intervening area includes a building.</td></tr><tr><td>b) Operational measures</td><td>Yes: (i) A maintenance plan is included in section B2.5 of the IPPC application; (ii) Doors and windows of enclosed areas will be kept closed as far as possible, particularly for the fluorescent tube crushing room (where a negative pressure system will be in place); (iii) Equipment will be operated by trained staff; (iv) The Scheme will operate Monday to Friday (7:00 – 5:00) and Saturday (7:00 – 13:00); and (v) A noise study (submitted in section B3.9) concludes that there will be no significant impact from the Scheme in operation at the sensitive receptors. Therefore no further noise control measures are required.</td></tr><tr><td>c) Low-noise equipment</td><td>The noise study (submitted in section B3.9) concludes that there will be no significant impact from the Scheme in operation at the sensitive receptors. Therefore no further noise control measures are required.</td></tr><tr><td>d) Noise and vibration control equipment</td><td>A noise study (submitted in section B3.9) concludes that there will be no significant impact from the Scheme in operation at the sensitive receptors. Therefore no further noise control measures are required.</td></tr></tbody></table>		Technique	Yes/No	a) Appropriate location of equipment and buildings	Yes – as described in the noise study (section B3.9 of the IPPC application), the nearest residential property to the Scheme site is a farmhouse located to approximately 175 m to the north. The intervening area includes a building.	b) Operational measures	Yes: (i) A maintenance plan is included in section B2.5 of the IPPC application; (ii) Doors and windows of enclosed areas will be kept closed as far as possible, particularly for the fluorescent tube crushing room (where a negative pressure system will be in place); (iii) Equipment will be operated by trained staff; (iv) The Scheme will operate Monday to Friday (7:00 – 5:00) and Saturday (7:00 – 13:00); and (v) A noise study (submitted in section B3.9) concludes that there will be no significant impact from the Scheme in operation at the sensitive receptors. Therefore no further noise control measures are required.	c) Low-noise equipment	The noise study (submitted in section B3.9) concludes that there will be no significant impact from the Scheme in operation at the sensitive receptors. Therefore no further noise control measures are required.	d) Noise and vibration control equipment	A noise study (submitted in section B3.9) concludes that there will be no significant impact from the Scheme in operation at the sensitive receptors. Therefore no further noise control measures are required.					
Technique	Yes/No																		
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b) Operational measures	Yes: (i) A maintenance plan is included in section B2.5 of the IPPC application; (ii) Doors and windows of enclosed areas will be kept closed as far as possible, particularly for the fluorescent tube crushing room (where a negative pressure system will be in place); (iii) Equipment will be operated by trained staff; (iv) The Scheme will operate Monday to Friday (7:00 – 5:00) and Saturday (7:00 – 13:00); and (v) A noise study (submitted in section B3.9) concludes that there will be no significant impact from the Scheme in operation at the sensitive receptors. Therefore no further noise control measures are required.																		
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<table><thead><tr><th colspan="2">Technique</th><th>Description</th><th>Applicability</th></tr></thead><tbody><tr><td>a.</td><td>Appropriate location of equipment and buildings</td><td>Noise levels can be reduced by increasing the distance between the emitter and the receiver, by using buildings as noise screens and by relocating building exits or entrances.</td><td>For existing plants, the relocation of equipment and building exits or entrances may be restricted by a lack of space or excessive costs.</td></tr><tr><td>b.</td><td>Operational measures</td><td>This includes techniques such as: (i) inspection and maintenance of equipment; (ii) closing of doors and windows of enclosed areas, if possible; (iii) equipment operation by experienced staff; (iv) avoidance of noisy activities at night, if possible; (v) provisions for noise control during maintenance, traffic, handling and treatment activities.</td><td rowspan="2">Generally applicable.</td></tr><tr><td>c.</td><td>Low-noise equipment</td><td>This may include direct drive motors, compressors, pumps and flares.</td></tr></tbody></table>			Technique		Description	Applicability	a.	Appropriate location of equipment and buildings	Noise levels can be reduced by increasing the distance between the emitter and the receiver, by using buildings as noise screens and by relocating building exits or entrances.	For existing plants, the relocation of equipment and building exits or entrances may be restricted by a lack of space or excessive costs.	b.	Operational measures	This includes techniques such as: (i) inspection and maintenance of equipment; (ii) closing of doors and windows of enclosed areas, if possible; (iii) equipment operation by experienced staff; (iv) avoidance of noisy activities at night, if possible; (v) provisions for noise control during maintenance, traffic, handling and treatment activities.	Generally applicable.	c.	Low-noise equipment	This may include direct drive motors, compressors, pumps and flares.		
Technique		Description	Applicability																
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b.	Operational measures	This includes techniques such as: (i) inspection and maintenance of equipment; (ii) closing of doors and windows of enclosed areas, if possible; (iii) equipment operation by experienced staff; (iv) avoidance of noisy activities at night, if possible; (v) provisions for noise control during maintenance, traffic, handling and treatment activities.	Generally applicable.																
c.	Low-noise equipment	This may include direct drive motors, compressors, pumps and flares.																	

d.	Noise and vibration control equipment	This includes techniques such as: (i) noise reducers; (ii) acoustic and vibrational insulation of equipment; (iii) enclosure of noisy equipment; (iv) soundproofing of buildings.	Applicability may be restricted by a lack of space (for existing plants).		
e.	Noise attenuation	Noise propagation can be reduced by inserting obstacles between emitters and receivers (e.g. protection walls, embankments and buildings).	Applicable only to existing plants, as the design of new plants should make this technique unnecessary. For existing plants, the insertion of obstacles may be restricted by a lack of space. For mechanical treatment in shredders of metal wastes, it is applicable within the constraints associated with the risk of deflagration in shredders.	e) Noise attenuation	<p>However, the noisiest stationary equipment (cable crusher) will be located indoors.</p> <p>A noise study (submitted in section B3.9) concludes that there will be no significant impact from the Scheme in operation at the sensitive receptors. Therefore no further noise control measures are required. Notwithstanding, the crushers will be located indoors.</p>

1.5. Emissions to water

BAT 19

In order to optimise water consumption, to reduce the volume of wastewater 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.

Technique		Description	Applicability
a.	Water management	Water consumption is optimised by using measures which may include: — water-saving plans (e.g. establishment of water efficiency objectives, flow diagrams and water mass balances); — optimising the use of washing water (e.g. dry cleaning instead of hosing down, using trigger control on all washing equipment); — reducing the use of water for vacuum generation (e.g. use of liquid ring pumps with high boiling point liquids).	Generally applicable.
b.	Water recirculation	Water streams are recirculated within the plant, if necessary after treatment. The degree of recirculation is limited by the water balance of the plant, the content of impurities (e.g. odorous compounds) and/or the characteristics of the water streams (e.g. nutrient content).	Generally applicable.

How will wastewater volume be reduced? Moreover, which techniques will be applied to reduce emissions to soil and water? Kindly provide details of the relevant technique.

Technique	Yes/No
a) Water management	Yes – see section B2.7 of the IPPC application.
b) Water recirculation	Yes – see section B2.7.
c) Impermeable surface	Yes – see sections B2.7 and B3.3.
d) Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels	Yes – section B3.3.
e) Roofing of waste storage and treatment areas	Yes – section B3.1.
f) Segregation of water streams	Yes – sections B3.3 and B3.5.
g) Adequate drainage infrastructure	Yes – sections B3.3 and B3.5.
h) Design and maintenance provisions to allow detection and repair of leaks	Yes: <ul style="list-style-type: none"> Containment of fluorescent tube room steel tank (section B3.3); and Impermeability testing (section B2.5).
i) Appropriate buffer storage capacity	Yes (sections B3.3 and B2.8). Process cesspits have buffer capacity: the WEEE Treatment Building cesspit

c.	Impermeable surface	Depending on the risks posed by the waste in terms of soil and/or water contamination, the surface of the whole waste treatment area (e.g. waste reception, handling, storage, treatment and dispatch areas) is made impermeable to the liquids concerned.	Generally applicable.			has been designed to cater for used extinguishant, while the Fluorescent Tube Room will not be equipped with water-based firefighting systems.
d.	Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels	Depending on the risks posed by the liquids contained in tanks and vessels in terms of soil and/or water contamination, this includes techniques such as: <ul style="list-style-type: none"> — overflow detectors; — overflow pipes that are directed to a contained drainage system (i.e. the relevant secondary containment or another vessel); — tanks for liquids that are located in a suitable secondary containment; the volume is normally sized to accommodate the loss of containment of the largest tank within the secondary containment; — isolation of tanks, vessels and secondary containment (e.g. closing of valves). 	Generally applicable.			
e.	Roofing of waste storage and treatment areas	Depending on the risks posed by the waste in terms of soil and/or water contamination, waste is stored and treated in covered areas to prevent contact with rainwater and thus minimise the volume of contaminated run-off water.	Applicability may be constrained when high volumes of waste are stored or treated (e.g. mechanical treatment in shredders of metal waste).			
f.	Segregation of water streams	Each water stream (e.g. surface run-off water, process water) is collected and treated separately, based on the pollutant content and on the combination of treatment techniques. In particular, uncontaminated waste water streams are segregated from waste water streams that require treatment.	Generally applicable to new plants. Generally applicable to existing plants within the constraints associated with the layout of the water collection system.			
g.	Adequate drainage infrastructure	The waste treatment area is connected to drainage infrastructure. Rainwater falling on the treatment and storage areas is collected in the drainage infrastructure along with washing water, occasional spillages, etc. and, depending on the pollutant content, recirculated or sent for further treatment	Generally applicable to new plants. Generally applicable to existing plants within the constraints			

			associated with the layout of the water drainage system.		
h.	Design and maintenance provisions to allow detection and repair of leaks	Regular monitoring for potential leakages is risk-based, and, when necessary, equipment is repaired. The use of underground components is minimised. When underground components are used, and depending on the risks posed by the waste contained in those components in terms of soil and/or water contamination, secondary containment of underground components is put in place.	The use of above-ground components is generally applicable to new plants. It may be limited however by the risk of freezing. The installation of secondary containment may be limited in the case of existing plants.		
i.	Appropriate buffer storage capacity	Appropriate buffer storage capacity is provided for waste water generated during other than normal operating conditions using a risk-based approach (e.g. taking into account the nature of the pollutants, the effects of downstream waste water treatment, and the receiving environment). The discharge of waste water from this buffer storage is only possible after appropriate measures are taken (e.g. monitor, treat, reuse).	Generally applicable to new plants. For existing plants, applicability may be limited by space availability and by the layout of the water collection system.		

BAT 20

In order to reduce emissions to water, BAT is to treat waste water using an appropriate combination of the techniques given below.

Technique ⁽²³⁾		Typical pollutants targeted	Applicability
Preliminary and primary treatment, e.g.			
a.	Equalisation	All pollutants	Generally applicable.
b.	Neutralisation	Acids, alkalis	
c.	Physical separation, e.g. screens, sieves, grit separators, grease separators, oil-water separation or primary settlement tanks	Gross solids, suspended solids, oil/grease	

How will the treatment procedure for wastewater be undertaken? Which techniques will be applied?
Operator is to also provide justification as to the proposed abatement technique of choice. Moreover, the operator is to also indicated the expected emission limits depending on the proposed technique(s).

Technique	Yes/No
Preliminary and primary treatment	
a) Equalization	No
b) Neutralization	No
c) Physical separation, e.g. screens, sieves, grit separators, grease separators, oil-water separation or primary settlement tanks	Yes, as described in section B3.5: <ul style="list-style-type: none">Oil-water separator for the garage and outdoor areas;A separator was selected to treat oils and suspended solids. Hazardous liquid waste (e.g. waste oils generated from maintenance of site vehicles) will be stored in the garage;

²³ The descriptions of the techniques are given in Section 6.3.

Physico-chemical treatment, e.g.			
d.	Adsorption	Adsorbable dissolved non-biodegradable or inhibitory pollutants, e.g. hydrocarbons, mercury, AOX	Generally applicable.
e.	Distillation/rectification	Dissolved non-biodegradable or inhibitory pollutants that can be distilled, e.g. some solvents	
f.	Precipitation	Precipitable dissolved non-biodegradable or inhibitory pollutants, e.g. metals, phosphorus	
g.	Chemical oxidation	Oxidisable dissolved non-biodegradable or inhibitory pollutants, e.g. nitrite, cyanide	
h.	Chemical reduction	Reducible dissolved non-biodegradable or inhibitory pollutants, e.g. hexavalent chromium (Cr(VI))	
i.	Evaporation	Soluble contaminants	
j.	Ion exchange	Ionic dissolved non-biodegradable or inhibitory pollutants, e.g. metals	
k.	Stripping	Purgeable pollutants, e.g. hydrogen sulphide (H ₂ S), ammonia (NH ₃), some adsorbable organically bound halogens (AOX), hydrocarbons	
Biological treatment, e.g.			
l.	Activated sludge process	Biodegradable organic	Generally applicable.

		<ul style="list-style-type: none">The output of the separator is <1 mg/L (see Volume 5 of IPPC application, Appendix 2); treated effluent will be received in reservoir 2 (476 m³ capacity), which overflows to road surface.
Physico-chemical treatment, e.g.		
d) Adsorption	Yes, as described in section B3.3: <ul style="list-style-type: none">Carbon filter as a second-stage treatment step for both the WEEE treatment building and the fluorescent tube room;Used for mercury absorption (included in the WEEE treatment building effluent system as a precaution);The effluent will be reused in both cases (in the case of the WEE treatment building, after a third step);However, if discharge to sewer of the fluorescent tube room effluent is required, sewer discharge limits will be met (otherwise the wastewater will be disposed of as hazardous waste).	
e) Distillation/rectification	No	
f) Precipitation	No	
g) Chemical oxidation	No	
h) Chemical reduction	No	
i) Evaporation	No	
j) Ion exchange	No	
k) Stripping	No	
Biological treatment, e.g.		
l) Activated sludge process	No	
m) Membrane bioreactor	No	
Nitrogen removal		
n) Nitrification/denitrification when the treatment includes a biological treatment	No	
Solids removal, e.g.		
o) Coagulation and flocculation	No	
p) Sedimentation	No	
q) Filtration (e.g. sand filtration, microfiltration, ultrafiltration)	Yes, as described in section B3.3: <ul style="list-style-type: none">Sand filter as a first-stage treatment step for both the WEEE treatment building and the fluorescent tube room wastewater. Used for initial particulate filtration.	

m.	Membrane bioreactor	compounds	
Nitrogen removal			
n.	Nitrification/denitrification when the treatment includes a biological treatment	Total nitrogen, ammonia	Nitrification may not be applicable in the case of high chloride concentrations (e.g. above 10 g/l) and when the reduction of the chloride concentration prior to nitrification would not be justified by the environmental benefits. Nitrification is not applicable when the temperature of the waste water is low (e.g. below 12 °C).
Solids removal, e.g.			
o.	Coagulation and flocculation	Suspended solids and particulate-bound metals	Generally applicable.
p.	Sedimentation		
q.	Filtration (e.g. sand filtration, microfiltration, ultrafiltration)		
r.	Flotation		

Table 6.1 is not applicable as there are no direct discharges to a water body.

The only *indirect* discharges that may arise to a water body are of the treated effluent from the fluorescent tube room; in this case the WSC limits set by the Sewer Discharge Control Regulations (S.L.545.08) or the Sewer Discharge Permit for the Scheme will apply, and if these are not met the effluent will be exported to an authorised facility. Discharges to sewer will then be abated by the Water Services Corporation’s treatment plant. Typical emission levels (as per section B3.3 of the IPPC application) from the Scheme to sewer are expected to be as follows, which are higher than the BAT-AELs in Table 2:

- Inorganic mercury (Hg²⁺): 50 µg/L; and
- Organic mercury complexes: 20 µg/L.

However, the BAT-AELs in Table 6.2 do not apply, as per footnote 35.

Substance/Parameter	BAT-AEL ⁽²⁴⁾	Waste treatment process to which the BAT-AEL applies
Total organic carbon (TOC) ⁽²⁵⁾	10-60 mg/l	— All waste treatments except treatment of water-based liquid waste
	10-100 mg/l ⁽²⁶⁾ ⁽²⁷⁾	— Treatment of water-based liquid waste
Chemical oxygen demand (COD) ⁽²⁵⁾	30-180 mg/l	— All waste treatments except treatment of water-based liquid waste

	<ul style="list-style-type: none"> Reverse osmosis as a third-stage (final) treatment step for wastewater from the fluorescent tube room. Used for removal of residual dissolved metal. Effluent will be reused after this treatment step.
r) Flotation	No

Table 6.1 is not applicable as there are no direct discharges to a water body.

The only *indirect* discharges that may arise to a water body are of the treated effluent from the fluorescent tube room; in this case the WSC limits set by the Sewer Discharge Control Regulations (S.L.545.08) or the Sewer Discharge Permit for the Scheme will apply, and if these are not met the effluent will be exported to an authorised facility. Discharges to sewer will then be abated by the Water Services Corporation’s treatment plant. Typical emission levels (as per section B3.3 of the IPPC application) from the Scheme to sewer are expected to be as follows, which are higher than the BAT-AELs in Table 2:

- Inorganic mercury (Hg²⁺): 50 µg/L; and
- Organic mercury complexes: 20 µg/L.

However, the BAT-AELs in Table 6.2 do not apply, as per footnote 35.

²⁴ The averaging periods are defined in the General considerations.

²⁵ Either the BAT-AEL for COD or the BAT-AEL for TOC applies. TOC monitoring is the preferred option because it does not rely on the use of very toxic compounds.

²⁶ The upper end of the range may not apply:

- when the abatement efficiency is ≥ 95 % as a rolling yearly average and the waste input shows the following characteristics: TOC > 2 g/l (or COD > 6 g/l) as a daily average and a high proportion of refractory organic compounds (i.e. which are difficult to biodegrade); or
- in the case of high chloride concentrations (e.g. above 5 g/l in the waste input).

²⁷ The BAT-AEL may not apply to plants treating drilling muds/cuttings.

		30-300 mg/l ⁽²⁶⁾ ⁽²⁷⁾	— Treatment of water-based liquid waste	
Total suspended solids (TSS)		5-60 mg/l	— All waste treatments	
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	
Total nitrogen (Total N)		1-25 mg/l ⁽²⁸⁾ ⁽²⁹⁾	— Biological treatment of waste — Re-refining of waste oil	
		10-60 mg/l ⁽²⁸⁾ ⁽²⁹⁾ ⁽³⁰⁾	— Treatment of water-based liquid waste	
Total phosphorus (Total P)		0,3-2 mg/l	— Biological treatment of waste	
		1-3 mg/l ⁽²⁷⁾	— Treatment of water-based liquid waste	
Phenol index		0,05-0,2 mg/l	— Re-refining of waste oil — Physico-chemical treatment of waste with calorific value	
		0,05-0,3 mg/l	— Treatment of water-based liquid waste	
Free cyanide (CN ⁻) ⁽³¹⁾		0,02-0,1 mg/l	— Treatment of water-based liquid waste	
Adsorbable organically bound halogens (AOX) ⁽³¹⁾		0,2-1 mg/l	— Treatment of water-based liquid waste	
Metals and metalloids ⁽³¹⁾	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	
	Cadmium (expressed as Cd)	0,01-0,05 mg/l		

²⁸ The BAT-AEL may not apply when the temperature of the waste water is low (e.g. below 12 °C).

²⁹ The BAT-AEL may not apply in the case of high chloride concentrations (e.g. above 10 g/l in the waste input).

³⁰ The BAT-AEL only applies when biological treatment of waste water is used.

³¹ The BAT-AELs only apply when the substance concerned is identified as relevant in the waste water inventory mentioned in BAT 3.

	Cd)		— 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	
	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 ⁽³²⁾		
	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 ⁽³³⁾		
	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		

³² The upper end of the range is 0,3 mg/l for mechanical treatment in shredders of metal waste.

³³ The upper end of the range is 2 mg/l for mechanical treatment in shredders of metal waste.

	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	

The associated monitoring is given in BAT 7.

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

Substance/Parameter	BAT-AEL ⁽³⁴⁾ ⁽³⁵⁾	Waste treatment process to which the BAT-AEL applies	
Hydrocarbon oil index (HOI)	0,5-10 mg/l	<ul style="list-style-type: none"> — 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 ⁻) ⁽³⁶⁾		0,02-0,1 mg/l	— Treatment of water-based liquid waste
Adsorbable organically bound halogens (AOX) ⁽³⁶⁾		0.2-1 mg/l	Treatment of water based liquid

³⁴ The averaging periods are defined in the General considerations.

³⁵ 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.

³⁶ The BAT-AELs only apply when the substance concerned is identified as relevant in the waste water inventory mentioned in BAT 3.

			waste	
Metals and metalloids ⁽³⁶⁾	Arsenic (expressed as As)	0,01-0,05 mg/l	<ul style="list-style-type: none">— 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 ⁽³⁷⁾		
	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 ⁽³⁸⁾		
	Arsenic (expressed as As)	0,01-0,1 mg/l	<ul style="list-style-type: none">— 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		

³⁷ The upper end of the range is 0,3 mg/l for mechanical treatment in shredders of metal waste.

³⁸ The upper end of the range is 2 mg/l for mechanical treatment in shredders of metal waste.

The associated monitoring is given in BAT 7.																								
1.6 Emissions from accidents and incidents																								
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 (see BAT 1).			Kindly specify how each of the following techniques shall be implemtned to prevent or limit the environmental consequences of accidents and incidents.																					
<table><tr><th colspan="2">Technique</th><th>Description</th></tr><tr><td>a.</td><td>Protection measures</td><td>These include measures such as:<ul style="list-style-type: none">— protection of the plant against malevolent acts;— fire and explosion protection system, containing equipment for prevention, detection, and extinction;— accessibility and operability of relevant control equipment in emergency situations.</td></tr><tr><td>b.</td><td>Management of incidental/accidental emissions</td><td>Procedures are established and technical provisions are in place to manage (in terms of possible containment) emissions from accidents and incidents such as emissions from spillages, firefighting water, or safety valves.</td></tr><tr><td>c.</td><td>Incident/accident registration and assessment system</td><td>This includes techniques such as:<ul style="list-style-type: none">— a log/diary to record all accidents, incidents, changes to procedures and the findings of inspections;— procedures to identify, respond to and learn from such incidents and accidents.</td></tr></table>			Technique		Description	a.	Protection measures	These include measures such as: <ul style="list-style-type: none">— protection of the plant against malevolent acts;— fire and explosion protection system, containing equipment for prevention, detection, and extinction;— accessibility and operability of relevant control equipment in emergency situations.	b.	Management of incidental/accidental emissions	Procedures are established and technical provisions are in place to manage (in terms of possible containment) emissions from accidents and incidents such as emissions from spillages, firefighting water, or safety valves.	c.	Incident/accident registration and assessment system	This includes techniques such as: <ul style="list-style-type: none">— a log/diary to record all accidents, incidents, changes to procedures and the findings of inspections;— procedures to identify, respond to and learn from such incidents and accidents.	<table><tr><th>Technique</th></tr><tr><td>a) Protection measures</td></tr><tr><td>The site will be closed after hours, and fitted with security cameras.</td></tr><tr><td>Section B2.8: A fire and explosion prevention and response plan will be commissioned by the Applicant once the Scheme has been constructed. The Applicant has also engaged a competent fire expert to advise on and install a fire detection system and any additional fire-fighting equipment that may be required. Additionally, approval by the Civil Protection Department has beene obtained before construction, and the site layout includes a clear buffer for fire truck access, and provision of a 100 m³ reservoir which will always be kept full for fire-fighting purposes. The fire safety procedures and equipment will be certified by a competent fire expert once they are in place.</td></tr><tr><td>b) Management of incidental/accidental emissions</td></tr><tr><td>Procedures and technical provisions are in place. See section B2.8.</td></tr><tr><td>c) Incident/accident registration and assessment system</td></tr><tr><td>Incidents are recorded in the site diary.</td></tr><tr><td>Procedures for improvements after incidents / accidents / nonconformities will be included as part of the EMS.</td></tr></table>	Technique	a) Protection measures	The site will be closed after hours, and fitted with security cameras.	Section B2.8: A fire and explosion prevention and response plan will be commissioned by the Applicant once the Scheme has been constructed. The Applicant has also engaged a competent fire expert to advise on and install a fire detection system and any additional fire-fighting equipment that may be required. Additionally, approval by the Civil Protection Department has beene obtained before construction, and the site layout includes a clear buffer for fire truck access, and provision of a 100 m³ reservoir which will always be kept full for fire-fighting purposes. The fire safety procedures and equipment will be certified by a competent fire expert once they are in place.	b) Management of incidental/accidental emissions	Procedures and technical provisions are in place. See section B2.8.	c) Incident/accident registration and assessment system	Incidents are recorded in the site diary.	Procedures for improvements after incidents / accidents / nonconformities will be included as part of the EMS.
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1.7. Material efficiency																								
BAT 22 In order to use materials efficiently, BAT is to substitute materials with waste. Description Waste is used instead of other materials for the treatment of wastes (e.g. waste alkalis or waste acids are used for pH adjustment, fly ashes are used as binders). Applicability Some applicability limitations derive from the risk of contamination posed by the presence of impurities (e.g. heavy metals, POPs, salts, pathogens) in the waste that substitutes other materials. Another limitation is the compatibility of the waste substituting other materials with the waste input (see BAT 2).			How will the substitution of materials with waste be carried out? Where will it apply? While none of the waste outputs are usable for the treatment of other wastes on site, pallets that arrive with incoming waste will be reused for transportation purposes (including export). Wastewater from washing of floors inside the WEEE treatment building and the incoming waste shed and from the tube crushing room will be treated and reused, as described in section B3.3. Rainwater will be collected and used as described in section B3.5.																					
1.8 Energy efficiency																								
BAT 23			Kindly specify how each of the following techniques shall be implemented on site.																					

In order to use energy efficiently, BAT is to use both of the techniques given below.														
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Technique		Description												
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1.9 Reuse of packaging														
<p>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 (see BAT 1).</p> <p>Description Packaging (drums, containers, IBCs, pallets, etc.) is reused for containing waste, when it is in good condition and sufficiently clean, depending on a compatibility check between the substances contained (in consecutive uses). If necessary, packaging is sent for appropriate treatment prior to reuse (e.g. reconditioning, cleaning).</p> <p>Applicability Some applicability restrictions derive from the risk of contamination of the waste posed by the reused packaging.</p>		<p>Kindly specify how will the re-use of waste packaging shall be maximised to reduce the amount of waste sent for disposal. Kindly provide a copy of the residues management plan.</p> <p>Pallets that arrive with incoming waste will be reused for transportation purposes (including export). The residues management plan describing the fate of each waste type (including maximisation of recycling / recovery) is included as part of section B3.1 of the IPPC application.</p>												
2. BAT conclusions for the mechanical treatment of waste														
Unless otherwise stated, the BAT conclusions presented in Section 2 apply to the mechanical treatment of waste when it is not combined with biological treatment, and in addition to the general BAT conclusions in Section 1.														
2.1 General BAT conclusions for the mechanical treatment of waste														
2.1.1 Emissions to air														
<p>BAT 25 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.</p>		<p>Kindly specify which of the following technique(s) shall be used in order to reduce emissions to air of the specified parameters. Further details of the relevant techniques are to be provided in the relevant section of the application.</p> <table border="1"> <thead> <tr> <th>Technique</th> <th>Yes/No</th> </tr> </thead> <tbody> </tbody> </table>	Technique	Yes/No										
Technique	Yes/No													

Technique		Description	Applicability
a.	Cyclone	See Section 6.1. Cyclones are mainly used as preliminary separators for coarse dust.	Generally applicable.
b.	Fabric filter	See Section 6.1.	May not be applicable to exhaust air ducts directly connected to the shredder when the effects of deflagration on the fabric filter cannot be mitigated (e.g. by using pressure relief valves).
c.	Wet scrubbing	See Section 6.1.	Generally applicable.
d.	Water injection into the shredder	The waste to be shredded is damped by injecting water into the shredder. The amount of water injected is regulated in relation to the amount of waste being shredded (which may be monitored via the energy consumed by the shredder motor). The waste gas that contains residual dust is directed to cyclone(s) and/or a wet scrubber.	Only applicable within the constraints associated with local conditions (e.g. low temperature, drought).

The above responses apply to the main crusher and the cable crusher. The abatement system for the fluorescent tube crusher is described in the response to BAT 32.

Parameter	Unit	BAT-AEL (Average over the sampling period)
Dust	mg/Nm ³	2–5 ⁽³⁹⁾

The associated monitoring is given in BAT 8.

2.2 BAT conclusions for the mechanical treatment in shredders of metal waste

Unless otherwise stated, the BAT conclusions presented in this section apply to the mechanical treatment in shredders of metal waste, in addition to BAT 25.

2.2.1 Overall environmental performance

BAT 26
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, non-depolluted EoLVs, non-depolluted WEEE, items contaminated with PCBs or mercury, radioactive items);
c. treatment of containers only when accompanied by a declaration of cleanliness.

Kindly specify how each of the following techniques shall be implemented in order to improve the overall environmental performance?

Technique
a) Implementation of a detailed inspection procedure for baled waste before shredding Not applicable. The Scheme will not accept baled waste directly for shredding.

³⁹ When a fabric filter is not applicable, the upper end of the range is 10 mg/Nm³.

				<div>b) Removal of dangerous items from the waste input stream and their safe disposal (e.g. gas cylinders, non-depolluted EoLVs, non-depolluted WEEE, items contaminated with PCBs or mercury, radioactive items) This practice will be implemented, as described in section B3.1 (Volume 2) of the IPPC application.</div> <div>c) Treatment of containers only when accompanied by a declaration of cleanliness Not applicable. The Scheme will not accept containers for shredding; the types of waste to be accepted are as summarised in Table 4.1 of Volume 2 of the IPPC application.</div>																
BAT 27 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.				<div>Which techniques will be used to prevent deflagrations as well as to reduce emissions from deflagrations ?</div> <table><tr><th>Technique</th><th>Yes/No</th></tr><tr><td>a) Deflagration management plan</td><td>Not applicable</td></tr><tr><td>b) Pressure relief dampers</td><td>Not applicable</td></tr><tr><td>c) Pre-shredding</td><td>Not applicable</td></tr></table> <div>Degassed / oil-depolluted equipment is not shredded / crushed at the Scheme (see Table 4.1 of Volume 2 of the IPPC application for a summary of how the different waste types will be treated). Only clean non-hazardous materials will be shredded / crushed. Therefore the risk of deflagration from such an activity is absent at the Scheme.</div>	Technique	Yes/No	a) Deflagration management plan	Not applicable	b) Pressure relief dampers	Not applicable	c) Pre-shredding	Not applicable								
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2.2.3 Energy efficiency																				
BAT 28 In order to use energy efficiently, BAT is to keep the shredder feed stable.				Kindly specify how the shredder operations shall be stabilised to ensure efficient use of																

Description The shredder feed is equalised by avoiding disruption or overload of the waste feed which would lead to unwanted shutdowns and start-ups of the shredder.			energy? The shredders are fed manually; in this way the feed is equalised, avoiding disruptions.																																			
2.3 BAT conclusions for the treatment of WEEE containing VFCs and/or VHCs																																						
Unless otherwise stated, the BAT conclusions presented in this section apply to the treatment of WEEE containing VFCs and/or VHCs, in addition to BAT 25.																																						
2.3.1 Emissions to air																																						
BAT 29 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.			Kindly specify how technique a. and one or both of techniques b. and c. shall be implemented to ensure that emissions of organic compounds to air shall be prevented and reduced?																																			
<table><tr><th colspan="2">Technique</th><th>Description</th></tr><tr><td>a.</td><td>Optimised removal and capture of refrigerants and oils</td><td>All refrigerants and oils are removed from the WEEE containing VFCs and/or VHCs and captured by a vacuum suction system (e.g. achieving refrigerant removal of at least 90 %). Refrigerants are separated from oils and the oils are degassed. The amount of oil remaining in the compressor is reduced to a minimum (so that the compressor does not drip).</td></tr><tr><td>b.</td><td>Cryogenic condensation</td><td>Waste gas containing organic compounds such as VFCs/VHCs is sent to a cryogenic condensation unit where they are liquefied (see description in Section 6.1). The liquefied gas is stored in pressurised vessels for further treatment.</td></tr><tr><td>c.</td><td>Adsorption</td><td>Waste gas containing organic compounds such as VFCs/VHCs is led into adsorption systems (see description in Section 6.1). The spent activated carbon is regenerated by means of heated air pumped into the filter to desorb the organic compounds. Subsequently, the regeneration waste gas is compressed and cooled in order to liquefy the organic compounds (in some cases by cryogenic condensation). The liquefied gas is then stored in pressurised vessels. The remaining waste gas from the compression stage is usually led back into the adsorption system in order to minimise VFC/VHC emissions.</td></tr></table>			Technique		Description	a.	Optimised removal and capture of refrigerants and oils	All refrigerants and oils are removed from the WEEE containing VFCs and/or VHCs and captured by a vacuum suction system (e.g. achieving refrigerant removal of at least 90 %). Refrigerants are separated from oils and the oils are degassed. The amount of oil remaining in the compressor is reduced to a minimum (so that the compressor does not drip).	b.	Cryogenic condensation	Waste gas containing organic compounds such as VFCs/VHCs is sent to a cryogenic condensation unit where they are liquefied (see description in Section 6.1). The liquefied gas is stored in pressurised vessels for further treatment.	c.	Adsorption	Waste gas containing organic compounds such as VFCs/VHCs is led into adsorption systems (see description in Section 6.1). The spent activated carbon is regenerated by means of heated air pumped into the filter to desorb the organic compounds. Subsequently, the regeneration waste gas is compressed and cooled in order to liquefy the organic compounds (in some cases by cryogenic condensation). The liquefied gas is then stored in pressurised vessels. The remaining waste gas from the compression stage is usually led back into the adsorption system in order to minimise VFC/VHC emissions.	<table><tr><th colspan="2">Technique</th><th>Yes/No</th></tr><tr><td colspan="2">a) Optimized removal and capture of refrigerants and oils</td><td>Yes</td></tr><tr><td colspan="3">Refrigerants are removed using specialised equipment (as described in Volume 5, Appendix 4 of the IPPC application). This technique achieves around 97% refrigerant recovery. Oils are also removed from refrigerant-containing equipment, but they are not degassed at the Scheme. Any degassing of oils is carried out at the final receiving facility.</td></tr><tr><td colspan="2">b) Cryogenic condensation</td><td>Not applicable</td></tr><tr><td colspan="3">No waste gas containing refrigerants / volatile hydrocarbons is generated, since degassed / oil-depolluted equipment is not shredded or dismantled at the Scheme (see Table 4.1 of Volume 2 of the IPPC application for a summary of how the different waste types will be treated). Refrigerants collected as described in Volume 5, Appendix 4 of the IPPC application will be retained in cylinders and not released to air.</td></tr><tr><td colspan="2">c) Adsorption</td><td>Not applicable</td></tr><tr><td colspan="3">No waste gas containing refrigerants / volatile hydrocarbons is generated, since degassed / oil-depolluted equipment is not shredded or dismantled at the Scheme (see Table 4.1 of Volume 2 of the IPPC application for a summary of how the different waste types will be treated). Refrigerants collected as described in Volume 5, Appendix 4 of the IPPC application will be retained in cylinders and not released to air.</td></tr></table>			Technique		Yes/No	a) Optimized removal and capture of refrigerants and oils		Yes	Refrigerants are removed using specialised equipment (as described in Volume 5, Appendix 4 of the IPPC application). This technique achieves around 97% refrigerant recovery. Oils are also removed from refrigerant-containing equipment, but they are not degassed at the Scheme. Any degassing of oils is carried out at the final receiving facility.			b) Cryogenic condensation		Not applicable	No waste gas containing refrigerants / volatile hydrocarbons is generated, since degassed / oil-depolluted equipment is not shredded or dismantled at the Scheme (see Table 4.1 of Volume 2 of the IPPC application for a summary of how the different waste types will be treated). Refrigerants collected as described in Volume 5, Appendix 4 of the IPPC application will be retained in cylinders and not released to air.			c) Adsorption		Not applicable	No waste gas containing refrigerants / volatile hydrocarbons is generated, since degassed / oil-depolluted equipment is not shredded or dismantled at the Scheme (see Table 4.1 of Volume 2 of the IPPC application for a summary of how the different waste types will be treated). Refrigerants collected as described in Volume 5, Appendix 4 of the IPPC application will be retained in cylinders and not released to air.		
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c.	Adsorption	Waste gas containing organic compounds such as VFCs/VHCs is led into adsorption systems (see description in Section 6.1). The spent activated carbon is regenerated by means of heated air pumped into the filter to desorb the organic compounds. Subsequently, the regeneration waste gas is compressed and cooled in order to liquefy the organic compounds (in some cases by cryogenic condensation). The liquefied gas is then stored in pressurised vessels. The remaining waste gas from the compression stage is usually led back into the adsorption system in order to minimise VFC/VHC emissions.																																				
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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			Kindly specify the emissions level which the proposed technqiues is expected to achieve and include monitoring details as part of the monitoring programme submitted in section B3.10 of the application.																																			
<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></table>			Parameter	Unit	BAT-AEL (Average over the sampling period)	TVOC	mg/Nm ³	3-15	Not applicable. No waste gas containing refrigerants / volatile hydrocarbons is																													
Parameter	Unit	BAT-AEL (Average over the sampling period)																																				
TVOC	mg/Nm ³	3-15																																				

CFCs	mg/Nm ³	0,5-10	generated, since degassed / oil-depolluted equipment is not shredded at the Scheme (see Table 4.1 of Volume 2 of the IPPC application for a summary of how the different waste types will be treated). Refrigerants collected as described in Volume 5, Appendix 4 of the IPPC application will be retained in cylinders and not released to air.																						
The associated monitoring is given in BAT 8.																									
2.3.2 Explosions																									
BAT 30 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.			How will emissions from explosions be prevented when treating WEEE containing VFCs and/or VHCs? Which techniques will be suitable for use and application?																						
<table><tr><th colspan="2">Technique</th><th>Description</th></tr><tr><td>a.</td><td>Inert atmosphere</td><td>By injecting inert gas (e.g. nitrogen), the oxygen concentration in enclosed equipment (e.g. in enclosed shredders, crushers, dust and foam collectors) is reduced (e.g. to 4 vol-%).</td></tr><tr><td>b.</td><td>Forced ventilation</td><td>By using forced ventilation, the hydrocarbon concentration in enclosed equipment (e.g. in enclosed shredders, crushers, dust and foam collectors) is reduced to < 25 % of the lower explosive limit.</td></tr></table>			Technique		Description	a.	Inert atmosphere	By injecting inert gas (e.g. nitrogen), the oxygen concentration in enclosed equipment (e.g. in enclosed shredders, crushers, dust and foam collectors) is reduced (e.g. to 4 vol-%).	b.	Forced ventilation	By using forced ventilation, the hydrocarbon concentration in enclosed equipment (e.g. in enclosed shredders, crushers, dust and foam collectors) is reduced to < 25 % of the lower explosive limit.	<table><tr><th>Technique</th><th>Yes/No</th></tr><tr><td>a) Inert atmosphere</td><td>Not applicable</td></tr><tr><td>b) Forced ventilation</td><td>Not applicable</td></tr></table> Degassed / oil-depolluted equipment is not shredded / crushed at the Scheme (see Table 4.1 of Volume 2 of the IPPC application for a summary of how the different waste types will be treated). Therefore the risk of explosion from such an activity is absent at the Scheme.	Technique	Yes/No	a) Inert atmosphere	Not applicable	b) Forced ventilation	Not applicable							
Technique		Description																							
a.	Inert atmosphere	By injecting inert gas (e.g. nitrogen), the oxygen concentration in enclosed equipment (e.g. in enclosed shredders, crushers, dust and foam collectors) is reduced (e.g. to 4 vol-%).																							
b.	Forced ventilation	By using forced ventilation, the hydrocarbon concentration in enclosed equipment (e.g. in enclosed shredders, crushers, dust and foam collectors) is reduced to < 25 % of the lower explosive limit.																							
Technique	Yes/No																								
a) Inert atmosphere	Not applicable																								
b) Forced ventilation	Not applicable																								
2.4 BAT conclusions for the mechanical treatment of waste with calorific value																									
In addition to BAT 25, the BAT conclusions presented in this section apply to the mechanical treatment of waste with calorific value covered by points 5.3(a)(iii) and 5.3(b)(ii) of Annex I to Directive 2010/75/EU.																									
2.4.1 Emissions to air																									
BAT 31 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.			Kindly specify which of the following techniques shall be implemented to reduce emissions to air of organic compounds.																						
<table><tr><th colspan="2">Technique</th><th>Description</th></tr><tr><td>a.</td><td>Adsorption</td><td rowspan="4">See Section 6.1.</td></tr><tr><td>b.</td><td>Biofilter</td></tr><tr><td>c.</td><td>Thermal oxidation</td></tr><tr><td>d.</td><td>Wet scrubbing</td></tr></table>			Technique		Description	a.	Adsorption	See Section 6.1.	b.	Biofilter	c.	Thermal oxidation	d.	Wet scrubbing	<table><tr><th>Technique</th><th>Yes/No</th></tr><tr><td>a) Adsorption</td><td></td></tr><tr><td>b) Biofilter</td><td></td></tr><tr><td>c) Thermal oxidation</td><td></td></tr><tr><td>d) Wet scrubbing</td><td></td></tr></table> Kindly specify the emissions levels which the proposed technique(s) is expected to achieve and include monitoring details as part of the monitoring programme submitted in section B3.10 of the application. Not applicable. The only waste with calorific value that will be treated mechanically at the Scheme is wood, which does not release VOC when shredded.	Technique	Yes/No	a) Adsorption		b) Biofilter		c) Thermal oxidation		d) Wet scrubbing	
Technique		Description																							
a.	Adsorption	See Section 6.1.																							
b.	Biofilter																								
c.	Thermal oxidation																								
d.	Wet scrubbing																								
Technique	Yes/No																								
a) Adsorption																									
b) Biofilter																									
c) Thermal oxidation																									
d) Wet scrubbing																									
Table 6.5: BAT-associated emission level (BAT-AEL) for channelled TVOC emissions to air from the mechanical treatment of waste with calorific value																									

<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>10–30 ⁽⁴⁰⁾</td></tr></table>	Parameter	Unit	BAT-AEL (Average over the sampling period)	TVOC	mg/Nm ³	10–30 ⁽⁴⁰⁾		
Parameter	Unit	BAT-AEL (Average over the sampling period)						
TVOC	mg/Nm ³	10–30 ⁽⁴⁰⁾						
The associated monitoring is given in BAT 8.								
2.5. BAT conclusions for the mechanical treatment of WEEE containing mercury								
Unless otherwise stated, the BAT conclusions presented in this section apply to the mechanical treatment of WEEE containing mercury, in addition to BAT 25.								
2.5.1. Emissions to air								
<div>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.</div> <div>Description This includes all of the following measures:<ul style="list-style-type: none">equipment used to treat WEEE containing mercury is enclosed, under negative pressure and connected to a local exhaust ventilation (LEV) system;waste gas from the processes is treated by dedusting techniques such as cyclones, fabric filters, and HEPA filters, followed by adsorption on activated carbon (see Section 6.1);the efficiency of the waste gas treatment is monitored;mercury levels in the treatment and storage areas are measured frequently (e.g. once every week) to detect potential mercury leaks.</div> <div>Table 6.6: BAT-associated emission level (BAT-AEL) for channelled mercury emissions to air from the mechanical treatment of WEEE containing mercury<table><tr><th>Parameter</th><th>Unit</th><th>BAT-AEL (Average over the sampling period)</th></tr><tr><td>Mercury (Hg)</td><td>µg/Nm³</td><td>2–7</td></tr></table></div> <div>The associated monitoring is given in BAT 8.</div>	Parameter	Unit	BAT-AEL (Average over the sampling period)	Mercury (Hg)	µg/Nm ³	2–7	<div>Which measures and schemes will be implemented to reduce mercury emissions to air?</div> <div>The abatement systems and monitoring proposal for the fluorescent tube crushing room are described in sections B3.6 and B3.10 of the IPPC application respectively; the latter has been updated in Appendix 2 of the current document.</div> <div>The type of gas treatment is in accordance with BAT 32. This abatement system is expected to ensure that mercury emissions from fluorescent tube crushing are lower than 0.001 ppb (0.008 µg/m³).</div>	
Parameter	Unit	BAT-AEL (Average over the sampling period)						
Mercury (Hg)	µg/Nm ³	2–7						
3. BAT conclusions for the biological treatment of waste								
Unless otherwise stated, the BAT conclusions presented in Section 3 apply to the biological treatment of waste, and in addition to the general BAT conclusions in Section 1. The BAT conclusions in Section 3 do not apply to the treatment of water-based liquid waste.								
3.1. General BAT conclusions for the biological treatment of waste								
3.1.1. Overall environmental performance								
<div>BAT 33 In order to reduce odour emissions and to improve the overall environmental performance, BAT is to select the waste input.</div> <div>Description</div>	Kindly describe the relevant technique which will be implemented in order to reduce odour emissions and improving the overall environmental performance in relation to waste input?							

⁴⁰ The BAT-AEL only applies when organic compounds are identified as relevant in the waste gas stream, based on the inventory mentioned in BAT 3.

The technique consists of carrying out the pre-acceptance, acceptance and sorting of the waste input (see BAT 2) so as to ensure the suitability of the waste input for the waste treatment, e.g. in terms of nutrient balance, moisture or toxic compounds which may reduce the biological activity.			Not applicable. Biological treatment of waste is not envisaged at the Scheme.																																	
3.1.2. Emissions to air																																				
BAT 34 In order to reduce channelled emissions to air of dust, organic compounds and odorous compounds, including H2S and NH3, BAT is to use one or a combination of the techniques given below.			Kindly specify which technique shall be implemented to reduce channelled emissions to air of dust, organic and odorous compounds be reduced?																																	
<table><tr><th colspan="2">Technique</th><th>Description</th></tr><tr><td>a.</td><td>Adsorption</td><td>See Section 6.1.</td></tr><tr><td>b.</td><td>Biofilter</td><td>See Section 6.1. A pretreatment of the waste gas before the biofilter (e.g. with a water or acid scrubber) may be needed in the case of a high NH3 content (e.g. 5-40 mg/Nm³) in order to control the media pH and to limit the formation of N2O in the biofilter. Some other odorous compounds (e.g. mercaptans, H2S) can cause acidification of the biofilter media and necessitate the use of a water or alkaline scrubber for pretreatment of the waste gas before the biofilter.</td></tr><tr><td>c.</td><td>Fabric filter</td><td>See Section 6.1. The fabric filter is used in the case of mechanical biological treatment of waste.</td></tr><tr><td>d.</td><td>Thermal oxidation</td><td>See Section 6.1.</td></tr><tr><td>e.</td><td>Wet scrubbing</td><td>See Section 6.1. Water, acid or alkaline scrubbers are used in combination with a biofilter, thermal oxidation or adsorption on activated carbon.</td></tr></table>			Technique		Description	a.	Adsorption	See Section 6.1.	b.	Biofilter	See Section 6.1. A pretreatment of the waste gas before the biofilter (e.g. with a water or acid scrubber) may be needed in the case of a high NH3 content (e.g. 5-40 mg/Nm³) in order to control the media pH and to limit the formation of N2O in the biofilter. Some other odorous compounds (e.g. mercaptans, H2S) can cause acidification of the biofilter media and necessitate the use of a water or alkaline scrubber for pretreatment of the waste gas before the biofilter.	c.	Fabric filter	See Section 6.1. The fabric filter is used in the case of mechanical biological treatment of waste.	d.	Thermal oxidation	See Section 6.1.	e.	Wet scrubbing	See Section 6.1. Water, acid or alkaline scrubbers are used in combination with a biofilter, thermal oxidation or adsorption on activated carbon.	<table><tr><th>Technique</th><th>Yes/No</th></tr><tr><td>a) Adsorption</td><td></td></tr><tr><td>b) Biofilter</td><td></td></tr><tr><td>c) Fabric filter</td><td></td></tr><tr><td>d) Thermal oxidation</td><td></td></tr><tr><td>e) Wet scrubbing</td><td></td></tr></table>				Technique	Yes/No	a) Adsorption		b) Biofilter		c) Fabric filter		d) Thermal oxidation		e) Wet scrubbing	
Technique		Description																																		
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c.	Fabric filter	See Section 6.1. The fabric filter is used in the case of mechanical biological treatment of waste.																																		
d.	Thermal oxidation	See Section 6.1.																																		
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d) Thermal oxidation																																				
e) Wet scrubbing																																				
Table 6.7: BAT-associated emission levels (BAT-AELs) for channelled NH3, odour, dust and TVOC emissions to air from the biological treatment of waste			Kindly specify the emissions level which the proposed technique(s) is expected to achieve and include monitoring details as part of the monitoring programme submitted in section B3.10 of the application.																																	
<table><tr><th>Parameter</th><th>Unit</th><th>BAT-AEL (Average over the sampling period)</th><th colspan="2">Waste treatment process</th></tr><tr><td>NH3 ⁽⁴¹⁾ ⁽⁴²⁾</td><td>mg/Nm³</td><td>0.3–20</td><td colspan="2" rowspan="2">All biological treatments of waste</td></tr><tr><td>Odour concentration ⁽⁴¹⁾ ⁽⁴²⁾</td><td>ouE /Nm³</td><td>200–1 000</td></tr><tr><td>Dust</td><td>mg/Nm³</td><td>2–5</td><td colspan="2" rowspan="2">Mechanical biological treatment of waste</td></tr><tr><td>TVOC</td><td>mg/Nm³</td><td>5–40 ⁽⁴³⁾</td></tr></table>			Parameter	Unit	BAT-AEL (Average over the sampling period)	Waste treatment process		NH3 ⁽⁴¹⁾ ⁽⁴²⁾	mg/Nm³	0.3–20	All biological treatments of waste		Odour concentration ⁽⁴¹⁾ ⁽⁴²⁾	ouE /Nm³	200–1 000	Dust	mg/Nm³	2–5	Mechanical biological treatment of waste		TVOC	mg/Nm³	5–40 ⁽⁴³⁾	Not applicable. Biological treatment of waste is not envisaged at the Scheme.												
Parameter	Unit	BAT-AEL (Average over the sampling period)	Waste treatment process																																	
NH3 ⁽⁴¹⁾ ⁽⁴²⁾	mg/Nm³	0.3–20	All biological treatments of waste																																	
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Dust	mg/Nm³	2–5	Mechanical biological treatment of waste																																	
TVOC	mg/Nm³	5–40 ⁽⁴³⁾																																		
The associated monitoring is given in BAT 8.																																				

⁴¹ Either the BAT-AEL for NH₃ or the BAT-AEL for the odour concentration applies.

⁴² This BAT-AEL does not apply to the treatment of waste mainly composed of manure.

⁴³ The lower end of the range can be achieved by using thermal oxidation.

3.1.3. Emissions to water and water usage

BAT 35

In order to reduce the generation of waste water and to reduce water usage, BAT is to use all of the techniques given below.

Technique		Description	Applicability
a.	Segregation of water streams	Leachate seeping from compost piles and windrows is segregated from surface run-off water (see BAT 19f).	Generally applicable to new plants. Generally applicable to existing plants within the constraints associated with the layout of the water circuits.
b.	Water recirculation	Recirculating process water streams (e.g. from dewatering of liquid digestate in anaerobic processes) or using as much as possible other water streams (e.g. water condensate, rinsing water, surface run-off water). The degree of recirculation is limited by the water balance of the plant, the content of impurities (e.g. heavy metals, salts, pathogens, odorous compounds) and/or the characteristics of the water streams (e.g. nutrient content).	Generally applicable.
c.	Minimisation of the generation of leachate	Optimising the moisture content of the waste in order to minimise the generation of leachate.	Generally applicable.

Kindly provide a description of how each of the following techniques shall be implemented to reduce the generation of waste water, as well as water usage?

Technique
a) Segregation of water streams
b) Water recirculation
c) Minimization of the generation of leachate

Not applicable. Biological treatment of waste is not envisaged at the Scheme.

3.2 BAT conclusions for the aerobic treatment of waste

Unless otherwise stated, the BAT conclusions presented in this section apply to the aerobic treatment of waste, and in addition to the general BAT conclusions for the biological treatment of waste in Section 3.1

3.2.1. Overall environmental performance

BAT 36

In order to reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters.

Description	How will emissions to air be reduced? Which strategy will be utilized to improve the overall environmental performance? Which of the following waste and process parameters will be monitored?										
Monitoring and/or control of key waste and process parameters, including: <ul style="list-style-type: none">waste input characteristics (e.g. C to N ratio, particle size);temperature and moisture content at different points in the windrow;aeration of the windrow (e.g. via the windrow turning frequency, O2 and/or CO2 concentration in the windrow, temperature of air streams in the case of forced aeration);windrow porosity, height and width.	<table><tr><th>Parameters</th><th>Yes/No</th></tr><tr><td>a) Waste input characteristics (e.g. C to N ratio, particle size)</td><td></td></tr><tr><td>b) Temperature and moisture content at different points in the windrow</td><td></td></tr><tr><td>c) Aeration of the windrow (e.g. via the windrow turning frequency, O2 and/or CO2 concentration in the windrow, temperature of air streams in the case of forced aeration)</td><td></td></tr><tr><td>d) Windrow porosity, height and width</td><td></td></tr></table>	Parameters	Yes/No	a) Waste input characteristics (e.g. C to N ratio, particle size)		b) Temperature and moisture content at different points in the windrow		c) Aeration of the windrow (e.g. via the windrow turning frequency, O2 and/or CO2 concentration in the windrow, temperature of air streams in the case of forced aeration)		d) Windrow porosity, height and width	
Parameters	Yes/No										
a) Waste input characteristics (e.g. C to N ratio, particle size)											
b) Temperature and moisture content at different points in the windrow											
c) Aeration of the windrow (e.g. via the windrow turning frequency, O2 and/or CO2 concentration in the windrow, temperature of air streams in the case of forced aeration)											
d) Windrow porosity, height and width											
Applicability	Not applicable. Biological treatment of waste is not envisaged at the Scheme.										

3.2.2. Odour and diffuse emissions to air																									
BAT 37 In order to reduce diffuse emissions to air of dust, odour and bioaerosols from open-air treatment steps, BAT is to use one or both of the techniques given below.			<p>How will diffuse emissions to air of dust, odour and bioaerosols be reduced from open-air treatment steps? Will the following techniques be used in order to do so?</p> <table border="1"> <thead> <tr> <th colspan="2">Technique</th> <th>Yes/No</th> </tr> </thead> <tbody> <tr> <td>a)</td> <td>Use of semipermeable membrane covers</td> <td></td> </tr> <tr> <td>b)</td> <td>Adaptation of operations to the meteorological conditions</td> <td></td> </tr> </tbody> </table> <p>If none of the above techniques is currently being implemented, kindly provide a proposal including timeframes of the technique which shall be implemented.</p> <p>Not applicable. Biological treatment of waste is not envisaged at the Scheme.</p>		Technique		Yes/No	a)	Use of semipermeable membrane covers		b)	Adaptation of operations to the meteorological conditions													
Technique		Yes/No																							
a)	Use of semipermeable membrane covers																								
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3.3 BAT conclusions for the anaerobic treatment of waste																									
Unless otherwise stated, the BAT conclusions presented in this section apply to the anaerobic treatment of waste, and in addition to the general BAT conclusions for the biological treatment of waste in Section 3.1.																									
3.3.1. Emissions to air																									
BAT 38 In order to reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters.			<p>How can a reduction in emissions to air be achieved along with improvements in the overall environmental performance? Which of the following key waste and process parameters will be monitored?</p> <table border="1"> <thead> <tr> <th colspan="2">Parameters</th> <th>Yes/No</th> </tr> </thead> <tbody> <tr> <td>a)</td> <td>pH and alkalinity of the digester feed</td> <td></td> </tr> <tr> <td>b)</td> <td>digester operating temperature</td> <td></td> </tr> <tr> <td>c)</td> <td>hydraulic and organic loading rates of the digester feed</td> <td></td> </tr> <tr> <td>d)</td> <td>concentration of volatile fatty acids (VFA) and ammonia within the digester and digestate</td> <td></td> </tr> <tr> <td>e)</td> <td>biogas quantity, composition (e.g. H₂S) and pressure</td> <td></td> </tr> <tr> <td>f)</td> <td>liquid and foam levels in the digester</td> <td></td> </tr> </tbody> </table> <p>Not applicable. Biological treatment of waste is not envisaged at the Scheme.</p>		Parameters		Yes/No	a)	pH and alkalinity of the digester feed		b)	digester operating temperature		c)	hydraulic and organic loading rates of the digester feed		d)	concentration of volatile fatty acids (VFA) and ammonia within the digester and digestate		e)	biogas quantity, composition (e.g. H ₂ S) and pressure		f)	liquid and foam levels in the digester	
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Description Implementation of a manual and/or automatic monitoring system to: <ul style="list-style-type: none"> • ensure a stable digester operation; • minimise operational difficulties, such as foaming, which may lead to odour emissions; • provide sufficient early warning of system failures which may lead to a loss of containment and explosions. <p>This includes monitoring and/or control of key waste and process parameters, e.g.:</p> <ul style="list-style-type: none"> • pH and alkalinity of the digester feed; • digester operating temperature; • hydraulic and organic loading rates of the digester feed; • concentration of volatile fatty acids (VFA) and ammonia within the digester and digestate; • biogas quantity, composition (e.g. H₂S) and pressure; • liquid and foam levels in the digester. 																									
3.4 BAT conclusions for the mechanical biological treatment (MBT) of waste																									

Unless otherwise stated, the BAT conclusions presented in this section apply to MBT, and in addition to the general BAT conclusions for the biological treatment of waste in Section 3.1.

The BAT conclusions for the aerobic treatment (Section 3.2) and anaerobic treatment (Section 3.3) of waste apply, when relevant, to the mechanical biological treatment of waste.

3.4.1. Emissions to air

BAT 39
In order to reduce emissions to air, BAT is to use both of the techniques given below.

Technique		Description	Applicability
a.	Segregation of the waste gas streams	Splitting of the total waste gas stream into waste gas streams with a high pollutant content and waste gas streams with a low pollutant content, as identified in the inventory mentioned in BAT 3.	Generally applicable to new plants. Generally applicable to existing plants within the constraints associated with the layout of the air circuits.
b.	Recirculation of waste gas	Recirculation of waste gas with a low pollutant content in the biological process followed by waste gas treatment adapted to the concentration of pollutants (see BAT 34). The use of waste gas in the biological process may be limited by the waste gas temperature and/or the pollutant content. It may be necessary to condense the water vapour contained in the waste gas before reuse. In this case, cooling is necessary, and the condensed water is recirculated when possible (see BAT 35) or treated before discharge.	

Kindly provide details of how each of the following techniques is or will be applied?

Not applicable. Biological treatment of waste is not envisaged at the Scheme.

Technique
a) Segregation of the waste gas streams
b) Recirculation of waste gas

4. BAT conclusions for the physico-chemical treatment of waste

Unless otherwise stated, the BAT conclusions presented in Section 4 apply to the physico-chemical treatment of waste, and in addition to the general BAT conclusions in Section 1.

4.1. BAT conclusions for the physico-chemical treatment of solid and/or pasty waste

4.1.1. Overall environmental performance

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).

Description
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.

Kindly describe how waste input will be monitored and for which parameters?

Not applicable. Physico-chemical treatment of waste is not envisaged at the Scheme.

4.1.2. Emissions to air

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.

How will emissions of dust, organic compounds and NH₃ be reduced? Which technique(s) shall be implemented to mitigate such emissions?

Technique	Yes/No
a) Adsorption	

50

Technique		Description
a.	Adsorption	See Section 6.1.
b.	Biofilter	
c.	Fabric filter	
d.	Wet scrubbing	

Table 6.8: BAT-associated emission level (BAT-AEL) for channelled emissions of dust to air from the physico-chemical treatment of solid and/or pasty waste

Parameter	Unit	BAT-AEL (Average over the sampling period)
Dust	mg/Nm ³	2–5

The associated monitoring is given in BAT 8.

b)	Biofilter	
c)	Fabric filter	
d)	Wet scrubbing	

Kindly specify the emission limit which shall be achieved by the selected technology.

Not applicable. Physico-chemical treatment of waste is not envisaged at the Scheme.

4.2 BAT conclusions for the re-refining of waste oil

4.2.1. Overall environmental performance

<p>BAT 42 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).</p> <p>Description Monitoring of the waste input in terms of content of chlorinated compounds (e.g. chlorinated solvents or PCBs).</p>	<p>Kindly specify how monitoring of the waste input in terms of chlorinated compounds will be carried out.</p> <p>Not applicable. Physico-chemical treatment of waste is not envisaged at the Scheme.</p>
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<p>BAT 43 In order to reduce the quantity of waste sent for disposal, BAT is to use one or both of the techniques given below.</p> <table border="1"> <thead> <tr> <th>Technique</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>a.</td> <td>Material recovery</td> </tr> <tr> <td>b.</td> <td>Energy recovery</td> </tr> </tbody> </table>	Technique	Description	a.	Material recovery	b.	Energy recovery	<p>How can the quantity of waste be reduced to minimize amounts sent for disposal? Will the following techniques apply?</p> <table border="1"> <thead> <tr> <th>Technique</th> <th>Yes/No</th> </tr> </thead> <tbody> <tr> <td>a) Material recovery</td> <td></td> </tr> <tr> <td>b) Energy recovery</td> <td></td> </tr> </tbody> </table> <p>Not applicable. Physico-chemical treatment of waste is not envisaged at the Scheme.</p>	Technique	Yes/No	a) Material recovery		b) Energy recovery	
Technique	Description												
a.	Material recovery												
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b) Energy recovery													

4.2.2. Emissions to air

<p>BAT 44 In order to reduce emissions of organic compounds to air, BAT is to apply BAT 14d and to use one or a combination of the techniques given below.</p> <table border="1"> <thead> <tr> <th>Technique</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>a.</td> <td>Adsorption</td> </tr> <tr> <td>b.</td> <td>Thermal oxidation</td> </tr> </tbody> </table>	Technique	Description	a.	Adsorption	b.	Thermal oxidation	<p>Kindly specify which of the following techniques shall be applied in order to reduce emissions of organic compounds to air.</p> <table border="1"> <thead> <tr> <th>Technique</th> <th>Yes/No</th> </tr> </thead> <tbody> <tr> <td>a) Adsorption</td> <td></td> </tr> <tr> <td>b) Thermal oxidation</td> <td></td> </tr> <tr> <td>c) Wet scrubbing</td> <td></td> </tr> </tbody> </table> <p>Kindly specify the emission limits (in relation to the BAT AELs set in section 4.5) which can be achieved through the implementation of the proposed technique(s).</p> <p>Not applicable. Physico-chemical treatment of waste is not envisaged at the Scheme.</p>	Technique	Yes/No	a) Adsorption		b) Thermal oxidation		c) Wet scrubbing	
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c.	Wet scrubbing	See Section 6.1.																							
The BAT-AEL set in Section 4.5 applies.																									
The associated monitoring is given in BAT 8.																									
4.3 BAT conclusions for the physico-chemical treatment of waste with calorific value																									
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4.4 BAT conclusions for the regeneration of spent solvents																									
4.4.1. Overall environmental performance																									
BAT 46 In order to improve the overall environmental performance of the regeneration of spent solvents, BAT is to use one or both of the techniques given below.			Kindly specify which of the following techniques shall be applied in order to improve the environmental performance of the regeneration of spent solvent.																						
<table><tr><th>Technique</th><th>Description</th><th>Applicability</th></tr><tr><td>a.</td><td>Material recovery</td><td>Solvents are recovered from the distillation residues by evaporation.</td><td>Applicability may be restricted when the energy demand is excessive with regards to the quantity of solvent recovered.</td></tr><tr><td>b.</td><td>Energy recovery</td><td>The residues from distillation are used to recover energy.</td><td>Generally applicable.</td></tr></table>			Technique	Description	Applicability	a.	Material recovery	Solvents are recovered from the distillation residues by evaporation.	Applicability may be restricted when the energy demand is excessive with regards to the quantity of solvent recovered.	b.	Energy recovery	The residues from distillation are used to recover energy.	Generally applicable.	<table><tr><th>Technique</th><th>Yes/No</th></tr><tr><td>a) Material recovery</td><td></td></tr><tr><td>b) Energy recovery</td><td></td></tr></table>	Technique	Yes/No	a) Material recovery		b) Energy recovery						
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b) Energy recovery																									
4.4.2. Emissions to air																									
BAT 47 In order to reduce emissions of organic compounds to air, BAT is to apply BAT 14d and to use a combination of the techniques given below.			Kindly specify which of the following techniques shall be implemented in order to reduce emission of organic compounds to air.																						
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Technique	Description	Applicability																							
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c) Thermal oxidation																									
d) Condensation or cryogenic condensation																									
e) Wet scrubbing																									

b.		Adsorption	See Section 6.1.	There may be limitations to the applicability of the technique due to safety reasons (e.g. activated carbon beds tend to self-ignite when loaded with ketones).	Kindly specify the emission limits (in relation to the BAT AELs set in section 4.5) which can be achieved through the implementation of the proposed technique(s). Not applicable. Physico-chemical treatment of waste is not envisaged at the Scheme.
c.		Thermal oxidation	See Section 6.1.	May not be applicable to the treatment of halogenated solvent wastes, in order to avoid generating and emitting PCBs and/or PCDD/F.	
d.		Condensation or cryogenic condensation	See Section 6.1.	Generally applicable.	
e.		Wet scrubbing	See Section 6.1.	Generally applicable.	
The BAT-AEL set in Section 4.5 applies. The associated monitoring is given in BAT 8.					
4.5 BAT-AEL for emissions of organic compounds to air from the re-refining of waste oil, the physico-chemical treatment of waste with calorific value and the regeneration of spent solvents					
Table 6.9 BAT-associated emission level (BAT-AEL) for channelled emissions of TVOC to air from the re-refining of waste oil, the physico-chemical treatment of waste with calorific value and the regeneration of spent solvents					
Parameter		Unit	BAT-AEL ⁽⁴⁴⁾ (Average over the sampling period)		
TVOC		Mg/Nm ³	5-30		
		Kindly specify the emission limit for TVOC which can be achieved using the proposed technology.			
4.6 BAT conclusions for the thermal treatment of spent activated carbon, waste catalysts and excavated contaminated soil					
4.6.1. Overall environmental performance					
BAT 48 In order to improve the overall environmental performance of the thermal treatment of spent activated carbon, waste catalysts and excavated contaminated soil, BAT is to use all of the techniques given below.					Kindly specify how each of the following techniques is or shall be implemented in order to improve overall environmental performance. Not applicable. Physico-chemical treatment of waste is not envisaged at the Scheme.
Technique		Description		Applicability	Technique
a.	Heat recovery from the furnace off-gas	Recovered heat may be used, for example, for preheating of combustion air or for the generation of steam, which is also used in the reactivation of the spent activated carbon.		Generally applicable.	a) Heat recovery from the furnace off-gas
b.	Indirectly fired furnace	An indirectly fired furnace is used to avoid contact between the contents of the furnace and the flue-gases from the burner(s).		Indirectly fired furnaces are normally constructed with a metal tube and applicability may be restricted due to corrosion problems. There may be also economic restrictions for	b) Indirectly fired furnace

⁴⁴ The BAT-AEL does not apply when the emission load is below 2 kg/h at the emission point provided that no CMR substances are identified as relevant in the waste gas stream, based on the inventory mentioned in BAT 3.

The associated monitoring is given in BAT 8.			
4.8 BAT conclusions for the decontamination of equipment containing PCBs			
4.8.1. Overall environmental performance			
BAT 51 In order to improve the overall environmental performance and to reduce channelled emissions of PCBs and organic compounds to air, BAT is to use all of the techniques given below.			Kindly specify how the following techniques shall be implemented in order to improve the overall environmental performance and reduce channelled emissions of PCBs and organic compounds to air? Kindly specify associated monitoring details in line with BAT 8. Not applicable. Physico-chemical treatment of waste is not envisaged at the Scheme.
Technique		Description	Technique
a.	Coating of the storage and treatment areas	This includes techniques such as: — resin coating applied to the concrete floor of the whole storage and treatment area.	a) Coating of the storage and treatment areas
b.	Implementation of staff access rules to prevent dispersion of contamination	This includes techniques such as: — access points to storage and treatment areas are locked; — special qualification is required to access the area where the contaminated equipment is stored and handled; — separate ‘clean’ and ‘dirty’ cloakrooms to put on/remove individual protective outfit.	b) Implementation of staff access rules to prevent dispersion of contamination
c.	Optimised equipment cleaning and drainage	This includes techniques such as: — external surfaces of the contaminated equipment are cleaned with anionic detergent; — emptying of the equipment with a pump or under vacuum instead of gravity emptying; — procedures are defined and used for filling, emptying and (dis)connecting the vacuum vessel; — a long period of drainage (at least 12 hours) is ensured to avoid any dripping of contaminated liquid during further treatment operations, after the separation of the core from the casing of an electrical transformer.	c) Optimized equipment cleaning and drainage
d.	Control and monitoring of emissions to air	This includes techniques such as: — the air of the decontamination area is collected and treated with activated carbon filters; — the exhaust of the vacuum pump mentioned in technique c. above is connected to an end-of-pipe abatement system (e.g. a high-temperature incinerator, thermal oxidation or adsorption on activated carbon); — the channelled emissions are monitored (see BAT 8); — the potential atmospheric deposition of PCBs is monitored (e.g. through physico-chemical measurements or biomonitoring).	d) Control and monitoring of emissions to air

e.	Disposal of waste treatment residues	<p>This includes techniques such as:</p> <ul style="list-style-type: none">— porous, contaminated parts of the electrical transformer (wood and paper) are sent to high-temperature incineration;— PCBs in the oils are destroyed (e.g. dechlorination, hydrogenation, solvated electron processes, high-temperature incineration).	The associated monitoring is given in BAT 8.	e) Disposal of waste treatment residues
f.	Recovery of solvent when solvent washing is used	Organic solvent is collected and distilled to be reused in the process.		f) Recovery of solvent when solvent washing is used

5. BAT conclusions for the treatment of water-based liquid waste

Unless otherwise stated, the BAT conclusions presented in Section 5 apply to the treatment of water-based liquid waste, and in addition to the general BAT conclusions in Section 1.

5.1 Overall environmental performance

BAT 52
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).

Description
Monitoring the waste input, e.g. in terms of:

- bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of activated sludge));
- feasibility of emulsion breaking, e.g. by means of laboratory-scale tests.

Kindly specify what type of monitoring will be carried out for the waste input.

Not applicable. Treatment of water-based liquid waste (other than small amounts of wastewater generated on site) is not envisaged at the Scheme.

5.2 Emissions to air

BAT 53
In order to reduce emissions of HCl, NH3 and organic compounds to air, BAT is to apply BAT 14d and to use one or a combination of the techniques given below.

Technique	Description
a. Adsorption	See Section 6.1.
b. Biofilter	
c. Thermal oxidation	
d. Wet scrubbing	

Table 6.10 : BAT-associated emission levels (BAT-AELs) for channelled emissions of HCl and TVOC to air from the treatment of water-based liquid waste

Parameter	Unit	BAT-AEL ⁽⁴⁶⁾ (Average over the sampling period)
Hydrogen chloride (HCl)	mg/Nm ³	1–5
TVOC		3–20 ⁽⁴⁷⁾

The associated monitoring is given in BAT 8.

Kindly specify which of the following technique(s) is or shall be implemented in order to reduce emissions of HCl, NH3 and organic compounds.

Technique	Yes/No
a) Adsorption	
b) Biofilter	
c) Thermal oxidation	
d) Wet scrubbing	

Kindly specify the emission level for HCl and TVOC which can be achieved by the proposed technology.

Not applicable. Treatment of water-based liquid waste (other than small amounts of wastewater generated on site) is not envisaged at the Scheme.

⁴⁶ These BAT-AELs only apply when the substance concerned is identified as relevant in the waste gas stream, based on the inventory mentioned in BAT 3.
⁴⁷ The upper end of the range is 45 mg/Nm³ when the emission load is below 0,5 kg/h at the emission point.

Kindly refer to the following techniques in order to select the most appropriate technique for the proposed operations and associated pollutants.

6. Description of techniques		
6.1. Channelled emissions to air		
<i>Technique</i>	<i>Typical pollutant(s) abated</i>	<i>Description</i>
Adsorption	Mercury, volatile organic compounds, hydrogen sulphide, odorous compounds	Adsorption is a heterogeneous reaction in which gas molecules are retained on a solid or liquid surface that prefers specific compounds to others and thus, removes them from effluent streams. When the surface has adsorbed as much as it can, the adsorbent is replaced or the adsorbed content is desorbed as part of the regeneration of the adsorbent. When desorbed, the contaminants are usually at a higher concentration and can either be recovered or disposed of. The most common adsorbent is granular activated carbon.
Biofilter	Ammonia, hydrogen sulphide, volatile organic compounds, odorous compounds	The waste gas stream is passed through a bed of organic material (such as peat, heather, compost, root, tree bark, softwood and different combinations) or some inert material (such as clay, activated carbon, and polyurethane), where it is biologically oxidised by naturally occurring microorganisms into carbon dioxide, water, inorganic salts and biomass. A biofilter is designed considering the type(s) of waste input. An appropriate bed material, e.g. in terms of water retention capacity, bulk density, porosity, structural integrity, is selected. Also important are an appropriate height and surface area of the filter bed. The biofilter is connected to a suitable ventilation and air circulation system in order to ensure a uniform air distribution through the bed and a sufficient residence time of the waste gas inside the bed.
Condensation and cryogenic condensation	Volatile organic compounds	Condensation is a technique that eliminates solvent vapours from a waste gas stream by reducing its temperature below its dew point. For cryogenic condensation, the operating temperature can be down to -120 °C, but in practice it is often between -40 °C and -80 °C in the condensation device. Cryogenic condensation can cope with all VOCs and volatile inorganic pollutants, irrespective of their individual vapour pressures. The low temperatures applied allow for very high condensation efficiencies which make it well-suited as a final VOC emission control technique.
Cyclone	Dust	Cyclone filters are used to remove heavier particulates, which 'fall out' as the waste gases are forced into a rotating motion before they leave the separator. Cyclones are used to control particulate material, primarily PM10.
Electrostatic precipitator (ESP)	Dust	Electrostatic precipitators operate such that particles are charged and separated under the influence of an electrical field. Electrostatic precipitators are capable of operating under a wide range of conditions. In a dry ESP, the collected material is mechanically removed (e.g. by shaking, vibration, compressed air), while in a wet ESP it is flushed with a suitable liquid, usually water.
Fabric filter	Dust	Fabric filters, often referred to as bag filters, are constructed from porous woven or felted fabric through which gases are passed to remove particles. The use of a fabric filter requires the selection of a fabric suitable for the characteristics of the waste gas and the maximum operating temperature.
HEPA filter	Dust	HEPA filters (high-efficiency particle air filters) are absolute filters. The filter medium consists of paper or matted glass fibre with a high packing density. The waste gas stream is passed through the filter medium, where particulate matter is collected.
Thermal oxidation	Volatile organic compounds	The oxidation of combustible gases and odorants in a waste gas stream by heating the mixture of contaminants with air or oxygen to above its auto-ignition point in a combustion chamber and maintaining it at a high temperature long enough to complete its combustion to carbon dioxide and water.
Wet scrubbing	Dust, volatile organic compounds, gaseous acidic compounds (alkaline scrubber), gaseous alkaline compounds (acid scrubber)	The removal of gaseous or particulate pollutants from a gas stream via mass transfer to a liquid solvent, often water or an aqueous solution. It may involve a chemical reaction (e.g. in an acid or alkaline scrubber). In some cases, the compounds may be recovered from the solvent.

6.2. Diffuse emissions of organic compounds to air		
<i>Technique</i>	<i>Typical pollutant(s) abated</i>	<i>Description</i>
Leak detection and repair (LDAR) programme	Volatile organic compounds	A structured approach to reduce fugitive emissions of organic compounds by detection and subsequent repair or replacement of leaking components. Currently, sniffing (described by EN 15446) and optical gas imaging methods are available for the identification of leaks. Sniffing method: The first step is the detection using hand-held organic compound analysers measuring the concentration adjacent to the equipment (e.g. using flame ionisation or photo- ionisation). The second step consists of enclosing the component in an impermeable bag to carry out a direct measurement at the source of the emission. This second step is sometimes replaced by mathematical correlation curves derived from statistical results obtained from a large number of previous measurements made on similar components. Optical gas imaging methods: Optical imaging uses small lightweight hand-held cameras which enable the visualisation of gas leaks in real time, so that they appear as 'smoke' on a video recorder together with the normal image of the component concerned, to easily and rapidly locate significant organic compound leaks. Active systems produce an image with a back-scattered infrared laser light reflected on the component and its surroundings. Passive systems are based on the natural infrared radiation of the equipment and its surroundings.

Measurement of diffuse VOC emissions	Volatile organic compounds	<p>Solar occultation flux (SOF): The technique is based on the recording and spectrometric Fourier Transform analysis of a broadband infrared or ultraviolet/visible sunlight spectrum along a given geographical itinerary, crossing the wind direction and cutting through VOC plumes.</p> <p>Differential absorption LIDAR (DIAL): This is a laser-based technique using differential absorption LIDAR (light detection and ranging), which is the optical analogue of radio wave-based RADAR. The technique relies on the backscattering of laser beam pulses by atmospheric aerosols, and the analysis of the spectral properties of the returned light collected with a telescope.</p>
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6.3 Emissions to water		
<i>Technique</i>	<i>Typical pollutant(s) targeted</i>	<i>Description</i>
Activated sludge process	Biodegradable organic compounds	The biological oxidation of dissolved organic pollutants with oxygen using the metabolism of microorganisms. In the presence of dissolved oxygen (injected as air or pure oxygen), the organic components are transformed into carbon dioxide, water or other metabolites and biomass (i.e. the activated sludge). The microorganisms are maintained in suspension in the waste water and the whole mixture is mechanically aerated. The activated sludge mixture is sent to a separation facility from where the sludge is recycled to the aeration tank.
Adsorption	Adsorbable dissolved non-biodegradable or inhibitory pollutants, e.g. hydrocarbons, mercury, AOX	Separation method in which compounds (i.e. pollutants) in a fluid (i.e. waste water) are retained on a solid surface (typically activated carbon).
Chemical oxidation	Oxidisable dissolved non-biodegradable or inhibitory pollutants, e.g. nitrite, cyanide	Organic compounds are oxidised to less harmful and more easily biodegradable compounds. Techniques include wet oxidation or oxidation with ozone or hydrogen peroxide, optionally supported by catalysts or UV radiation. Chemical oxidation is also used to degrade organic compounds causing odour, taste and colour and for disinfection purposes.
Chemical reduction	Reducible dissolved non-biodegradable or inhibitory pollutants, e.g. hexavalent chromium (Cr(VI))	Chemical reduction is the conversion of pollutants by chemical reducing agents into similar but less harmful or hazardous compounds.
Coagulation and flocculation	Suspended solids and particulate-bound metals	Coagulation and flocculation are used to separate suspended solids from waste water and are often carried out in successive steps. Coagulation is carried out by adding coagulants with charges opposite to those of the suspended solids. Flocculation is carried out by adding polymers, so that collisions of microfloc particles cause them to bond to produce larger flocs. The flocs formed are subsequently separated by sedimentation, air flotation or filtration.
Distillation/rectification	Dissolved non-biodegradable or inhibitory pollutants that can be distilled, e.g. some solvents	Distillation is a technique to separate compounds with different boiling points by partial evaporation and recondensation. Waste water distillation is the removal of low-boiling contaminants from waste water by transferring them into the vapour phase. Distillation is carried out in columns, equipped with plates or packing material, and a downstream condenser.
Equalisation	All pollutants	Balancing of flows and pollutant loads by using tanks or other management techniques.
Evaporation	Soluble pollutants	The use of distillation (see above) to concentrate aqueous solutions of high-boiling substances for further use, processing or disposal (e.g. waste water incineration) by transferring water to the vapour phase. It is typically carried out in multistage units with increasing vacuum, to reduce the energy demand. The water vapours are condensed, to be reused or discharged as waste water.
Filtration	Suspended solids and particulate-bound metals	The separation of solids from waste water by passing them through a porous medium, e.g. sand filtration, microfiltration and ultrafiltration.
Flotation		The separation of solid or liquid particles from waste water by attaching them to fine gas bubbles, usually air. The buoyant particles accumulate at the water surface and are collected with skimmers.
Ion exchange	Ionic dissolved non-biodegradable or inhibitory pollutants, e.g. metals	The retention of undesired or hazardous ionic constituents of waste water and their replacement by more acceptable ions using an ion exchange resin. The pollutants are temporarily retained and afterwards released into a regeneration or backwashing liquid.
Membrane bioreactor	Biodegradable organic compounds	A combination of activated sludge treatment and membrane filtration. Two variants are used: a) an external recirculation loop between the activated sludge tank and the membrane module; and b) immersion of the membrane module in the aerated activated sludge tank, where the effluent is filtered through a hollow fibre membrane, the biomass remaining in the tank.
Membrane filtration	Suspended solids and particulate-bound metals	Microfiltration (MF) and ultrafiltration (UF) are membrane filtration processes that retain and concentrate, on one side of the

		membrane, pollutants such as suspended particles and colloidal particles contained in waste waters.
Neutralization	Acids, alkalis	The adjustment of the pH of waste water to a neutral level (approximately 7) by the addition of chemicals. Sodium hydroxide (NaOH) or calcium hydroxide (Ca(OH) ₂) may be used to increase the pH, whereas sulphuric acid (H ₂ SO ₄), hydrochloric acid (HCl) or carbon dioxide (CO ₂) may be used to decrease the pH. The precipitation of some pollutants may occur during neutralisation.
Nitrification/denitrification	Total nitrogen, ammonia	A two-step process that is typically incorporated into biological waste water treatment plants. The first step is aerobic nitrification where microorganisms oxidise ammonium (NH ₄ ⁺) to the intermediate nitrite (NO ₂ ⁻), which is then further oxidised to nitrate (NO ₃ ⁻). In the subsequent anoxic denitrification step, microorganisms chemically reduce nitrate to nitrogen gas.
Oil-water separation	Oil/grease	The separation of oil and water and subsequent oil removal by gravity separation of free oil, using separation equipment or emulsion breaking (using emulsion breaking chemicals such as metal salts, mineral acids, adsorbents and organic polymers).
Sedimentation	Suspended solids and particulate-bound metals	The separation of suspended particles by gravitational settling.
Precipitation	Precipitable dissolved non-biodegradable or inhibitory pollutants, e.g. metals, phosphorus	The conversion of dissolved pollutants into insoluble compounds by adding precipitants. The solid precipitates formed are subsequently separated by sedimentation, air flotation or filtration.
Stripping	Purgeable pollutants, e.g. hydrogen sulphide (H ₂ S), ammonia (NH ₃), some adsorbable organically bound halogens (AOX), hydrocarbons	The removal of purgeable pollutants from the aqueous phase by a gaseous phase (e.g. steam, nitrogen or air) that is passed through the liquid. They are subsequently recovered (e.g. by condensation) for further use or disposal. The removal efficiency may be enhanced by increasing the temperature or reducing the pressure.

6.4 Sorting Techniques	
Air classification	Air classification (or air separation, or aeraulic separation) is a process of approximate sizing of dry mixtures of different particle sizes into groups or grades at cut points ranging from 10 mesh to sub-mesh sizes. Air classifiers (also called windsifters) complement screens in applications requiring cut points below commercial screen sizes, and supplement sieves and screens for coarser cuts where the special advantages of air classification warrant it.
All-metal separator	Metals (ferrous and non-ferrous) are sorted by means of a detection coil, in which the magnetic field is influenced by metal particles, linked to a processor that controls the air jet for ejecting the materials that have been detected.
Electromagnetic separation of non-ferrous metals	Non-ferrous metals are sorted by means of eddy current separators. An eddy current is induced by a series of rare earth magnetic or ceramic rotors at the head of a conveyor that spins at high speed independently of the conveyor. This process induces temporary magnetic forces in non-magnetic metals of the same polarity as the rotor, causing the metals to be repelled away and then separated from the other feedstock.
Manual separation	Material is manually separated by means of visual examination by staff on a picking line or on the floor, either to selectively remove a target material from a general waste stream or to remove contamination from an output stream to increase purity. This technique generally targets recyclables (glass, plastic, etc.) and any contaminants, hazardous materials and oversized materials such as WEEE.
Magnetic separation	Ferrous metals are sorted by means of a magnet which attracts ferrous metal materials. This can be carried out, for example, by an overband magnetic separator or a magnetic drum.
Near-infrared spectroscopy (NIRS)	Materials are sorted by means of a near-infrared sensor which scans the whole width of the belt conveyor and transmits the characteristic spectra of the different materials to a data processor which controls an air jet for ejecting the materials that have been detected. Generally NIRS is not suitable for sorting black materials.
Sink-float tanks	Solid materials are separated into two flows by exploiting the different material densities.
Size separation	Materials are sorted according to their particle size. This can be carried out by drum screens, linear and circular oscillating screens, flip-flop screens, flat screens, tumbler screens and moving grates.
Vibration table	Materials are separated according to their density and size, moving (in slurry in the case of wet tables or wet density separators) across an inclined table, which oscillates backwards and forwards.
X-ray systems	Material composites are sorted according to various material densities, halogen components, or organic components, with the aid of X-rays. The characteristics of the different materials are transmitted to a data processor which controls an air jet for ejecting the materials that have been detected.

6.5 Management techniques	
Accident management plan	The accident management plan is part of the EMS (see BAT 1) and identifies hazards posed by the plant and the associated risks and defines measures to address these risks. It considers the inventory of pollutants present or likely to be present which could have environmental consequences if they escape.
Residues management plan	A residues management plan is part of the EMS (see BAT 1) and is a set of measures aiming to 1) minimise the generation of residues arising from the treatment of waste, 2) optimise the reuse, regeneration, recycling and/or recovery of energy of the residues, and 3) ensure the proper disposal of residues.

Appendix 1: Abatement of emissions from the shredders

1. Commission Implementing Decision (EU) 2018/11747 establishing best available techniques (BAT) conclusions for waste treatment is applicable to the Scheme.
2. BAT 14d requires containment, collection and treatment of diffuse emissions, whereas BAT 25 defines the techniques that may be applied for such treatment.
3. Hoods will be installed on top of the main crusher and the cable crusher, each hood then leading to an air treatment system servicing both crushers. The system will be composed of two elements:
 - A cyclone to pre-treat the dust emissions; this separates up to 99% of bulk debris and fine dusts from the airstream, and collects it in a bin;
 - A HEPA filter media rated as 99.97% efficient at 0.3 μm .
4. Details about the system are included overleaf. Treated exhaust air will be released from an emission point on the roof, the approximate location of which is labelled as PS3 in **Figure 1**. It is envisaged that this system will be sufficient to meet the upper end of the BAT-AEL range for dust (5 mg/Nm³).
5. The cyclone bin will be emptied periodically, and the HEPA filter will be cleaned as required (typically once per year, depending on use and whether a drop in suction performance is noted), and replaced when damaged. The dust collected will be classified under EWC 19 12 12 (other wastes, including mixtures of materials, from mechanical treatment of waste, not containing hazardous substances). This classification is deemed appropriate because only non-hazardous substances will be shredded.

Built for the Jobs Other Vacuums Can't Handle

Oneida Air Systems' Dust Cobra® is the system of choice for both hobbyist and professional craftsman looking for a powerful, compact, and versatile dust control system. Its patented cyclonic design provides **3x higher airflow performance** when compared to traditional vacuums and works to minimize downtime by virtually eliminating filter clogging and suction loss.

By combining the best features of a dust collector and a vacuum, the portable Dust Cobra is a hybrid system that can be used in nearly *any* application for general shop clean-up. Its high pressure intake makes it ideal for dust extraction from tools with dust ports **4" dia. and smaller** (where standard dust collectors fall short) including sanders, buffers, edgers, grinders, band saws, scroll saws, chop/miter saws, routers, mini-lathes, and more!

Innovative Benefits & Features

- Industrial 110V High Efficiency Fan Blower Motor
- Streamlined High-Efficiency Cyclone Separator with 2.5" Inlet
- Full-Unit HEPA Certification Meets & Exceeds EPA RRP Guidelines
- Internal Rapid Pulse Filter Cleaner™ System
- Compact, Portable Footprint w/ Optional Mobility Kit
- Reinforced 17 Gallon Steel Dust Bin
- Plastic Liner Bag Gripping System (5 Free Bags Included)
- Automatic Dust Bin Level Sensor
- Mobility Kit with Large, Non-Marking Casters (2x Locking)
- 25 Foot Vacuum Hose and Hose Accessory Kit

See how [Clayscapes](#), a pottery supply, and pottery school uses the Industrial Dust Cobra for cleanup of toxic materials around the studio.

High Pressure Suction Performance

Your dust collector should perform at peak efficiency at all times to ensure the health, safety, and quality of your work. That's why Oneida Air uses only the highest quality motors with our dust collection systems.

- High-efficiency 110V fan blower motor (220V available by request)
- Delivers up to 245 Actual CFM @ 23" WC - ideal for handheld and benchtop tools
- Motor specially selected for low pitch noise to provide ideal operator comfort
- Suitable for continuous duty with [replaceable motor brushes](#)



be used with hot or smoldering materials.

Molded cyclone cannot

Streamlined Integrated Cyclone Pre-Separator

Within standard vacuum systems, fine dusts can quickly clog the filter - reducing suction power and creating the need for expensive downtime for cleaning and/or replacement parts. That's why every [good dust collection](#) system needs a cyclone to remove waste from the incoming airstream.

- Separates up to 99% of bulk debris and fine dusts from the airstream, containing it safely in the dust bin
- Patented "V-Shape" cyclone design maximizes particle separation performance
- Virtually eliminates filter clogging and significantly extends the lifespan of the filter
- Rotationally molded from a lightweight, [static dissipative](#), industrial-grade resin
- Neutral-vane inlet and integrated air ramp minimizes inbound air turbulence



RP-CC0034.3

IES RP-CC002.3 and IES-

Full-Unit Certified HEPA Dust Extractor

In the home renovation and professional contracting industry, **there's no substitute for Full-Unit HEPA Certification.** That's why each Dust Cobra purchase includes a [printed certificate](#) to document that the unit has been independently tested and certified to strict [EPA guidelines](#), protecting you from expensive fines! With this certification you can work comfortably with the knowledge that your vacuum system is fully sealed to eliminate leakage, protecting the work environment and those within it.

- HEPA filter media rated as 99.97% efficient at 0.3 microns
- Meets and exceeds all EPA RRP Requirements for contractors - including lead!
- Requires zero pre-loading; works at peak efficiency right out of the box
- Wide-spaced pleating and non-stick coating facilitates quick and easy maintenance



Technology

Adjustable Infrared

Automatic Dust Bin Level Sensor

Oneida Air Systems' patented Dust Sentry™ **takes the guesswork out of using your vacuum!** This adjustable optical sensor detects when the drum has been filled to a pre-set level and flashes a high visibility strobe light to alert you when it's time to empty.

Capable of detecting nearly any type of wet/dry material, the Dust Sentry will significantly streamline your workflow and put you back in control of how long you can keep working.



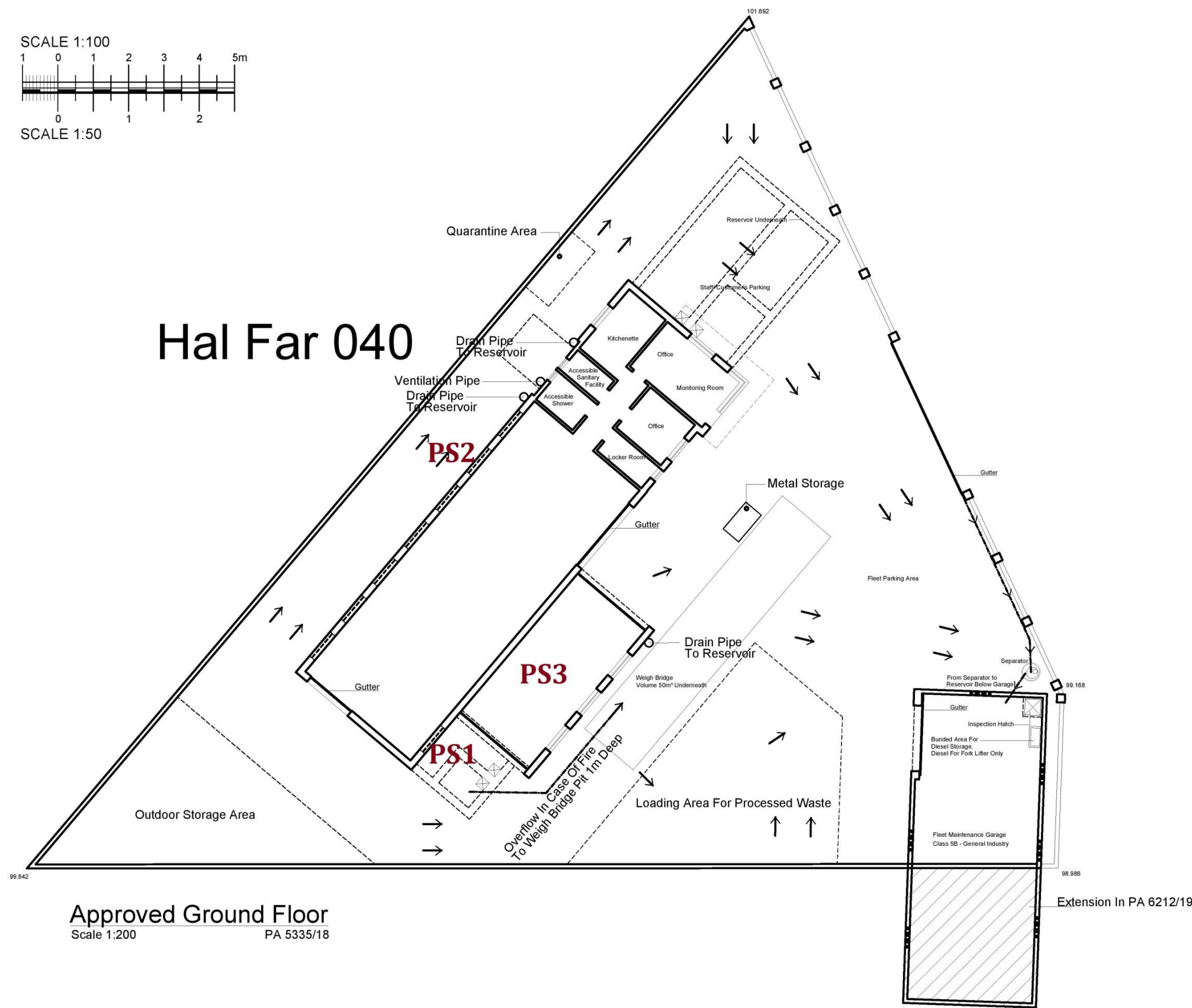
17 Gallon Steel Drum w/ Bag Hold Down

The Dust Cobra features one of the largest waste containers available for a wet/dry vacuum at a whopping 17 gallon capacity! Intended for contractors and other professionals who need the freedom to work without worrying about constantly emptying their vacuum.

Waste disposal is made fast and simple thanks to the Dust Cobra's integrated Bag Hold Down System that uses vacuum pressure to keep plastic bags open inside the drum. When you know the drum is full (thanks to the built-in bin level sensor), simply remove the lid, tie off the bag, and lift it out!

Please visit oneida-air.com/prop65 for information

Figure 1: Emission points to air



Appendix 2: Addendum to monitoring proposal

1. A monitoring proposal for the Scheme is already included in section B3.10 of the IPPC application. Nevertheless, due to the addition of a new point source (PS3), a monitoring proposal for emissions from this source is presented in **Table 1**.

Table 1: Monitoring proposal for PS3

Parameter	Standard(s)	Monitoring frequency
Brominated flame retardants	In-house method (no EN standard available)	Once every year
Dioxin-like PCBs	EN 1948-1, -2, and -4 or CEN/TS 1948-5	Once every year
Dust	EN 13284-1	Once every six months (three consecutive measurements each time)
Metals and metalloids (e.g. As, Cd, Co, Cr, Cu, Mn, Ni, Pb, Sb, Se, Tl, V)	EN 14385	Once every year (three consecutive measurements each time)
PCDD/F	EN 1948-1, -2, and -4 or CEN/TS 1948-5	Once every year

2. This monitoring proposal is in accordance with the requirements of BAT 8. However, in accordance with BAT 8 the monitoring frequency may be reduced if emission levels of certain substances are proven to be consistently low, provided no new sources of these substances are introduced; this would be done with prior agreement with ERA.
3. It is noted that some of the parameters mentioned in BAT 8 are not included in **Table 1**. Justification for their exclusion is presented in **Table 2**.

Table 2: Justification for excluding certain parameters

Parameter	Justification for exclusion from Table 1
CFCs	Not applicable. See response to BAT 29.
HCl	Not applicable. See response to BAT 49 and BAT 53.
HF	Not applicable. See response to BAT 49.
Hg	Not relevant to PS3 as there will be no treatment of WEEE containing mercury at these crushers.
H ₂ S	Not applicable. See response to BAT 34.
NH ₃	Not applicable. See response to BAT 34, 41 and 53.
Odour concentration	Not applicable. See response to BAT 34.
TVOC	Not applicable. Although mechanical treatment of metal waste in shredders is proposed, VOC emissions would only be relevant if fuel-containing end-of-life vehicles are shredded (as per BAT Reference document, section 3.1.2.1.3). See also the response to BAT 29, 31, 34, 41, 44, 45, 47, 49, 50, 51 and 53.

4. Monitoring of mercury from PS1 is already included as part of the monitoring programme in the IPPC application (section B3.10), and is in conformity with BAT 8. Dust monitoring to EN 13284-1 will also start being carried out from PS1 (the fluorescent tube crusher room) once every six months (three consecutive measurements each time). The other parameters listed in BAT 8 are not relevant to this emission point.

5. Additionally, in accordance with BAT 32, mercury levels inside the fluorescent tube room will be measured once a week to detect potential mercury leaks. Real-time equipment will be used for this purpose. The specifications of this equipment are included overleaf. The equipment will be sent for calibration periodically, as recommended by the manufacturer.
6. The above monitoring is over and above that already presented in section B3.10 of the IPPC application.
7. There is no mechanical treatment in shredders in the CRT breaking room, and therefore BAT 8 does not apply to emission point PS2.
8. The additional recurrent cost of such monitoring is estimated at €5,550 + VAT per annum, as well as an estimated €6,000 + VAT for purchase of the real-time mercury monitoring equipment. This amount is to be added to that listed in expenditure plan in section B2.9 (Volume 1 of the IPPC application).

MVI



Instrument User Manual V2.0



Register
your instrument
online to receive
your extended
warranty.

Unrivalled Detection.

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Register your instrument online for extended warranty

Thank you for purchasing your Ion Science instrument.

The standard warranty of your instrument can be extended to up to five years on PhoCheck Tiger and two years on other Ion Science instruments.

To receive your extended warranty, you must register your instrument online within one month of purchase (terms and conditions apply.)

Visit www.ionscience.com/instrument-registration

Declaration of conformity

Manufacturer: Shawcity Limited, Pioneer Road, Faringdon, Oxon., SN7 7BU

Product: MVI Mercury Vapour Indicator

Product Description: Hand held detector comprising dual beam UV absorption module for the detection of Mercury vapour

EMC Directives: 83/336/EEC
91/263/EEC
92/31/EEC

Standards Applicable: EN 55022: 1987 Class B
EN 50082-1: 1992 Table 1

Date of Issue: 8th January 1996

On behalf of Shawcity Limited, I hereby certify that the listed apparatus conforms to the protection requirements of the EMC Standards listed above.



David Hughes
Technical Manager
Shawcity Ltd

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Statements

Responsibility for Use

Inadequate performance of the gas detection equipment described in this manual may not necessarily be self-evident and consequently equipment must be regularly inspected and maintained. Ion Science recommends that personnel responsible for equipment use institute a regime of regular checks to ensure it performs within calibration limits, and that a record be maintained which logs calibration check data. The equipment should be used in accordance with this manual, and in compliance with local safety standards.

Warnings

Mercury amalgamates with gold, silver, stainless steel, aluminium and copper alloys. Accidental trapping of Mercury can cause serious damage to vital parts of electronic equipment and delicate instruments. Mercury is also toxic if inhaled, ingested or absorbed through the skin or eyes. Care must always be exercised when handling Mercury.

The MVI employs an internal Ultra-Violet light source operating in the 254 nm region. Ultra-Violet radiation is dangerous and if for any reason the lamp is operated whilst exposed, UV protective glasses must be worn.

High voltages are used in this instrument and the cover should only be removed by qualified technicians.

Ion Science Limited can accept no responsibility for the incorrect use of the instrument that cause harm or damage to persons or property. It is the user's responsibility to appropriately respond to the readings given.

Quality Assurance

Ion Science Limited is an ISO 9001:2008 accredited company.

Disposal

Please dispose of the MVI, its components and any used batteries in accordance with all local and national safety and environmental requirements. This includes the European WEEE (Waste Electrical and Electronic Equipment) Directive. Ion Science Limited offers a take back service. Please contact us for more information.

Calibration and Repair Facility

Ion Science Limited offer a repair and calibration service. Please contact us for more information:

Training

Ion Science would be happy to provide training in the operation and maintenance of the MVI. Please contact us should this be of interest.

Legal Notice

Whilst every attempt is made to ensure the accuracy of the information contained in this manual, Ion Science accepts no liability for errors or omissions, or any consequences deriving from the use of information contained herein. It is provided "as is" and without any representation, term, condition or warranty of any kind, either express or implied. To the extent permitted by law, Ion Science shall not be liable to any person or entity for any loss or damage which may arise from the use of this manual. We reserve the right at any time and without any notice to remove, amend or vary any of the content which appears herein.

Statements

Warranty

Standard Warranty can be extended to up to 2 years on the MVI when registering your instrument via our website: www.ionscience.com/instrument-registration

To receive your Extended Warranty, you need to register within one month of purchase (Terms and Conditions apply). You will then receive a confirmation email that your Extended Warranty Period has been activated and processed.

Full details, along with a copy of our Warranty Statement can be found by visiting: www.ionscience.com/instrument-registration

Contact Ion Science Limited

UK Head Office

Ion Science Ltd
The Way, Fowlmere
Cambridge
SG8 7UJ
UK

Tel: +44 (0)1763 207206

Fax: +44 (0) 1763 208814

Email: info@ionscience.com

Web: www.ionscience.com

USA Office

Ion Science LLC
33 Commercial Drive
Waterbury
VT 05676
USA

Tel: +1 802 244 5153

Fax: +1 802 244 8942

Email: info@ionscienceusa.com

Web: www.ionscience.com

German Office

Ion Science Messtechnik GMBH
Laubach 30
Metmann-Neandertal
40822
GERMANY

Tel: +49 2104 14480

Fax: +49 2104 144825

Email: info@ism-d.de

Web: www.ism-d.de

Introduction

The Mercury Vapour Indicator (MVI) is primarily used to monitor environments where Mercury or any of the Mercury compounds are produced, processed or stored and applications where Mercury vapours may pose a health hazard to personnel.

Units of measurement used for detecting Mercury vapour are micrograms/cubic metre expressed as $\mu\text{g}/\text{m}^3$.

The MVI has two manually switched ranges of measurement:

0-200 $\mu\text{g}/\text{m}^3$ with a resolution of 0.1 $\mu\text{g}/\text{m}^3$

0-2000 $\mu\text{g}/\text{m}^3$ with a resolution of 1 $\mu\text{g}/\text{m}^3$

Principle of Operation

A sample of the immediate atmosphere under investigation is drawn by the pump into a glass sampling cell where a Ultra-Violet light source is absorbed by the sample. Photodiode detectors are used to measure the intensity of radiation passing through the sample chamber. The optical system is designed specifically to detect Mercury in the Ultra-Violet region of 254 nm.

The presence of Mercury vapour will reduce the radiation energy reaching the photodiode detector in proportion to the vapour concentration. This change is then converted into an electrical signal and conditioned to provide a linear reading on the front LCD as $\mu\text{g}/\text{m}^3$.

An audible alarm is fitted which gives warnings when preset conditions are achieved.



Specification

Function	Surveying atmospheres for Mercury (Hg) concentrations below and above the accepted exposure limit
Detector	Dual beam Ultra-Violet absorption module
Measuring Ranges	0.1-199.9 and 1.0-1999 $\mu\text{g}/\text{m}^3$ (user controlled)
Sensitivity	0.1 $\mu\text{g}/\text{m}^3$ and 1.0 $\mu\text{g}/\text{m}^3$
Accuracy	± 5 micrograms or $\pm 10\%$ of reading
Repeatability	$\pm 5\%$ FSD
Response Time	Approximately 3 seconds
Temperature Range	+10°C to +50°C
Battery Type	15 Volt NiMH rechargeable
Battery Life	Greater than 6 hours after full charge
Dimensions	145 x 295 x 80 mm (120 mm with handle)
Weight	5 lb 3 oz (2.35 kg)
Linearity	Higher than 5% from 0 to 500 $\mu\text{g}/\text{m}^3$
Zero Drift	Less than 5 $\mu\text{g}/\text{hour}$
Alarms	Audible alarm factory preset to 20 $\mu\text{g}/\text{m}^3$
Datalogger	0-2 volt for use with a datalogger (not supplied)
Operation	After a short warm up the MVI gives real time indication of Mercury vapour levels through the PTFE probe

Packing list

The MVI is sent to you packaged in a lightweight, waterproof structural resin instrument case with foam insert.

Contents should be carefully removed and checked against the packing list. Any discrepancies between the contents and packing list must be reported to Ion Science Limited within 10 days of receipt of shipment. Ion Science cannot be held responsible for shortages not reported within that period.

<u>Item</u>	<u>Description</u>	<u>Quantity</u>
1	MVI instrument	1
2	MVI battery charger	1
3	Charcoal in line filter	1
4	PTFE probe and filter assembly (including 10 water trap filters)	1
5	MVI operation manual	1
6	Explorer case with foam inserts	1



Description

The Mercury Vapour Indicator (MVI) is a compact, self contained and completely portable instrument which indicates the amounts of Mercury in micrograms/cubic metre.

The indicating digital display and carrying handle are mounted on the top cover. A female luer connector is provided at the end of the instrument to accommodate a dust and water trap filter with PTFE extension probe. In addition, a length of flexible tubing may be connected to the filter for greater convenience when checking floor areas or gratings.

The internal Nickel Metal Hydride battery is rechargeable using a plug-in battery charger. The operating time when fully charged is greater than 6 hours. Warm up time is approximately 10 minutes and direct readings are indicated on an easy to read LCD display.

The audible alarm provides warning of three pre-defined conditions:

<u>Condition</u>	<u>Audible Signal</u>
1. High Mercury vapour concentration greater than 20 $\mu\text{g}/\text{m}^3$	Slow pulse (1/sec)
2. Negative reading from -20 to -25 $\mu\text{g}/\text{m}^3$ and lower	Continuous tone
3. Low battery	Fast pulse (3/sec)

The audible alarm is inhibited during the first 5 minutes of operation.

Operating controls

The MVI indicating display and all operating controls are mounted on the front panel where they are readily accessible when the unit is held in the operating position.

1. The **ON/OFF** switch is located immediately below the display and to the left. In the **ON** position the MVI will operate and display. In the **OFF** position, battery power to the MVI is disconnected. The instrument **MUST** also be switched **OFF** to enable charging.
2. The **Zero Adjust** control is located at centre of the panel between the handle and display. A ten turn potentiometer is used to manually set the display to zero, provided that the instrument is in a Mercury free atmosphere. The MVI is designed to show both positive and negative readings and can be adjusted between $\pm 240 \mu\text{g}/\text{m}^3$ by use of the zero control. Zero drift shown on the display is normal and is caused by changes in temperature or humidity. The zero control is used to cancel out any negative or positive change on the display prior to taking a reading.
3. **Range Switch**
 - a) **2000** in this range the instrument will measure over a range of 0-2000 $\mu\text{g}/\text{m}^3$ in steps of 1 $\mu\text{g}/\text{m}^3$.
 - b) **200** in this range the instrument will measure over a range of 0-200 $\mu\text{g}/\text{m}^3$ in steps of 0.1 $\mu\text{g}/\text{m}^3$.

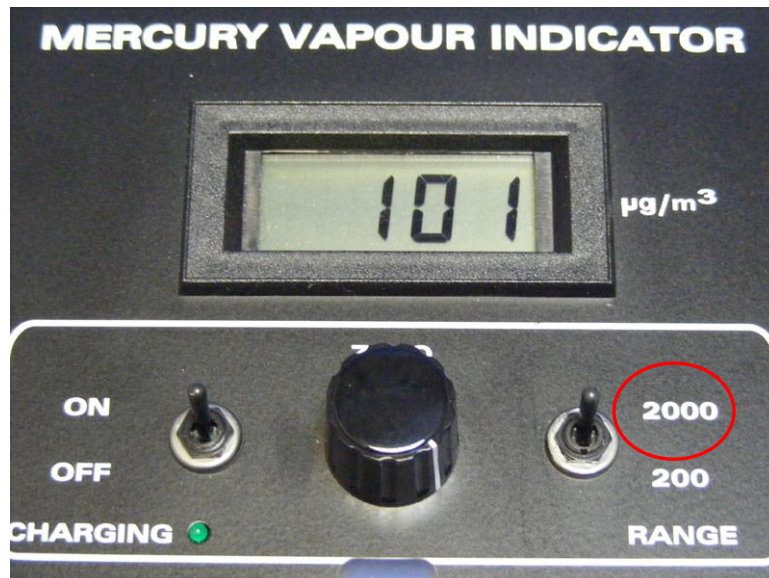


Operating controls

4. Indicating Display

This shows the Mercury concentration in the monitored environment.

Range: 0-2000 $\mu\text{g}/\text{m}^3$



Range: 0-200 $\mu\text{g}/\text{m}^3$



Operating controls

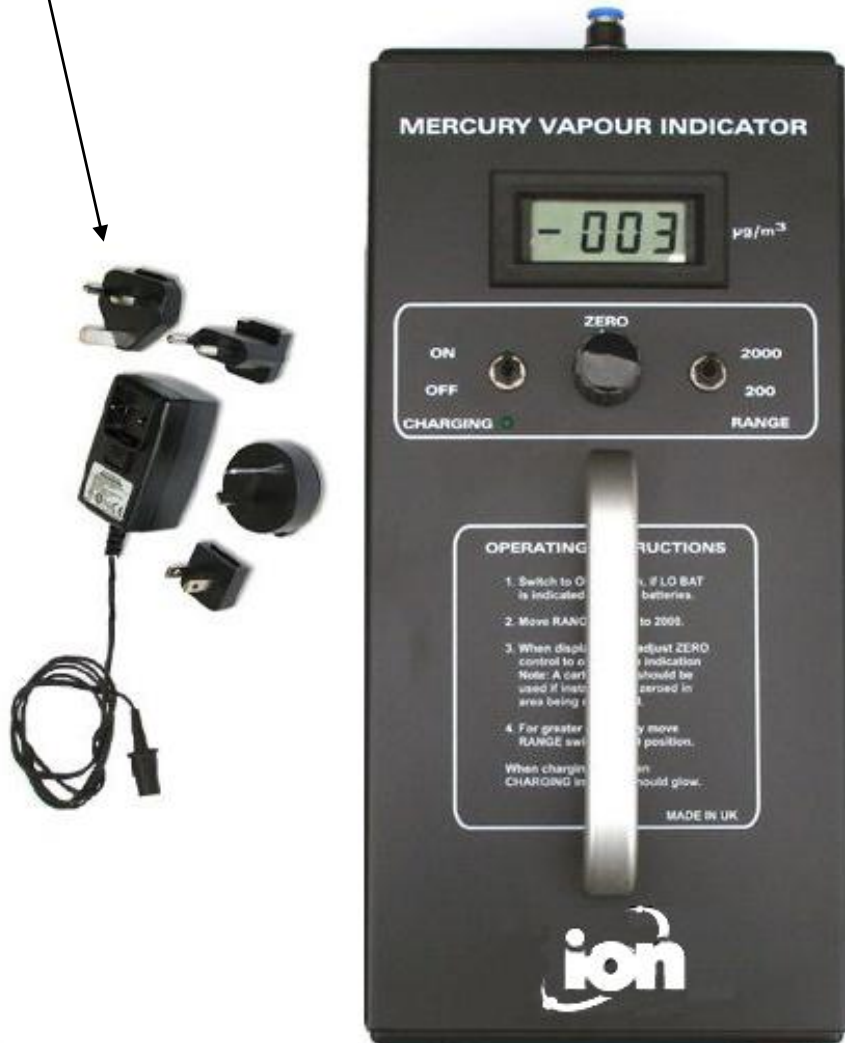
Important Note

The display will indicate **LO BAT** when batteries require charging. ***Please note the instrument does not operate reliably when LO BAT is indicated.***



Battery charging

Universal
Battery
Charger
(A-26220)



Battery charging

The MVI incorporates a NiMH battery with a continuous duty cycle of greater than 6 hours' operation. The full charge cycle for the battery is 16 hours.

Please note: If the units are charged from a flat battery the unit should not be charged for more than 16 hours continuously.

If the unit requires a top up charging then 2 – 8 hours charging should be sufficient.

Recharging

Switch the instrument off. Connect the MVI battery charger to the instrument. Use only the MVI charger supplied with the instrument. Use of an alternative charger may damage the instrument and will void the warranty. The green charging LED lamp located immediately below the ON/OFF switch will light indicating the batteries are accepting charge.



Only store the unit in a fully charged state.

IMPORTANT NOTE

Only use the Ion Science universal battery charger (Part Number: A-26220) provided with your instrument.

When received as new or after Service by Ion Science or an approved Ion Science Service Centre, your Instrument will arrive fully charged. Do NOT recharge until the "LO BAT" symbol appears. Do not leave connected to the AC power supply unless charging and certainly no more than 16 hours from a low battery message.

Excessive charging will dramatically reduce your battery life and will mean the batteries require replacing frequently.

Preparing the MVI for use

It is recommended that you zero your instrument in a known 'clean environment' using fresh air.

1. Turn the instrument **ON** and ensure the **LO BAT** indication does not appear.
 - If **LO BAT** does appear then charge the unit for 16 hours before proceeding to next step (refer to Battery Charging Section of this manual for further information).
2. Allow the instrument to run until you see a stable reading
 - This should happen after 3 – 4 minutes when operating in the 0 – 2000 range
 - Allow 10 minutes before operating in the 0 – 200 range
3. As soon as the reading is stable you can zero the instrument
 - rotate the 'zero adjust control knob' until '000' shows on the LCD screen



4. Fit the PTFE probe and filter



If you suspect you are in an area contaminated with mercury, you **MUST** connect the charcoal filter to the inlet of the MVI before adjusting the zero control knob.



Due to the nature of the carbon filter case and the materials used, it can give odours which will show as a small negative reading on the MVI when removed.

Preparing the MVI for use

The MVI is now ready for use.



When using the instrument it is important to remember that Mercury is heavier than air and therefore measurement should be taken at approx 1 foot (30 cm) from ground.

After use, switch the instrument **OFF** and recharge the batteries if necessary. ***Please remember the MVI may not operate correctly when LO BAT is indicated on the display.***

Interferences

The MVI detector operates on the principle of UV light absorption. There are substances other than Mercury which also cause light absorption and these substances are known as interference vapours.

Some of the interference vapours encountered are various hydrocarbons, water vapour, Sulphur compounds and particles such as smoke. There is no measurable interference from Carbon Monoxide, Carbon Dioxide or Ammonia. High concentrations of water vapour will give readings of between 5 to 10 $\mu\text{g}/\text{m}^3$, however if the MVI is zeroed at a similar humidity, this will not be seen.

Table of some interferences at 100 ppm concentration:

<u>Compound</u>	<u>Reading in $\mu\text{g}/\text{m}^3$</u>
Benzene	20
Toluene	3.5
Acetone	3.0
Ethyl Alcohol	6.0
Ethyl Acetate	3.0

User maintenance

Filter Replacement

Charcoal (Zero) Filter

It is advised that you replace the carbon filter after exposure to contaminants as it will become saturated with use.

To check the condition of the filter, use the following procedure:

- a) Turn the instrument **ON** and ensure that the **LO BAT** indicator does not appear.
- b) Allow the instrument to warm up for 10 minutes. Zero the instrument in fresh air.
- c) Connect the charcoal filter to the MVI. The reading should not increase by more than 4 µg. If the reading increases by more than 4 µg then the filter must be replaced.

Always replace end caps to maximise life of filter.



PTFE Probe and Filter Assembly

The MVI is supplied with a PTFE probe and luer filter. This can become contaminated or loaded with dust in regular use.

Typical symptoms of contamination are a sluggish response to Mercury and an unstable zero. If either of these symptoms occurs then the filter must be replaced.

Replacing the filter:

- a) Unlock the luer filter and discard
- b) Replace with a new filter



User maintenance

Alarm Level

The Mercury alarm level is factory set at $20 \mu\text{g}/\text{m}^3$. These values are limited by unit accuracy. The alarm level cannot be set beyond $35 \mu\text{g}$ per metre cube.

MVI Health Check

Over time the internal filter and tubing can become contaminated. We, therefore, recommend carrying out an occasional health check to ensure that the instrument is clean and not giving slow or false readings. There are 4 simple tests as detailed below which can be carried out by the user.

Prior to testing switch on the MVI and select the 2000 range. Leave the instrument to stabilise for 10 minutes before proceeding.

Test 1: Can the MVI be zeroed?

Zero the MVI in clean air (do not use the charcoal filter). Can the MVI be zeroed? If not, then a service is required. If yes, then continue.

Test 2: Check for internal contamination

Using a clean piece of flat card or plastic, block the air flow to the luer connector. This will force air to be drawn from the internal parts and any contamination will show on the display. If the reading increases by a value greater than $5 \mu\text{g}/\text{m}^3$ then the MVI internal parts are contaminated and service is required.

Test 3: Check for case contamination

Use a clean, dry cotton bud and scrub the lid top where dirty. Offer the bud to the luer inlet and note any reading changes. A change of greater than $5 \mu\text{g}/\text{m}^3$ indicates the case requires some cleaning.

Test 4: Does the MVI detect Mercury?

Obtain a sample of mercury and offer this to the inlet. Check that the MVI responds accordingly. If the instrument does not detect any Mercury then the MVI will require servicing.

Consumable items

<u>Description</u>	<u>Part Number</u>
Zero Filter	A-31057
PTFE Probe and pack of 10 filters	A-26007
Manual	26002
Universal Battery Charger	A-26220

Calibration and repair

The MVI requires annual calibration to maintain the best accuracy. Ion Science Ltd will calibrate the instrument against a near Primary Standard and issue a certificate of calibration. If any calibration or repair work is required please return the instrument to the Service Department at Ion Science Ltd. A written estimate will be provided for all work.

For further information please contact our Service Department on + 44 (0) 1763 208503 or via email on service@ionscience.com and they will be pleased to assist you.




Calibration Room

Manual log

Manual Version	Amendment	Issue Date
MVI Manual V1.8	The audible alarm level information has been updated – page 18	28/06/2011
MVI Manual V1.9	The audible alarm (factory set) info has been updated – page 6 & page 18	22/6/2012
MVI Manual V2.0	Manual format and layout updated Over charging information added (page 13)	07/01/2013

BAT: ERA Comments (18 th September 2019)	Applicant's Response (28 th October 2019)
<p><u>Bat 4.d:</u> In view of the incoming WEEE to be processed, kindly note that untreated packaged WEEE shall be considered as packaged hazardous waste and requires 'a dedicated area is used for storage and handling of packaged hazardous waste.' Such an area shall be distinguishable from other storage areas for non-hazardous waste and packaging.</p>	<p>The requirement in BAT 4d emanates from page 230 of the BREF, which addresses liquid hazardous waste (i.e. not the type of waste that will be accepted at the Scheme). Nevertheless, specific storage areas have been designated for different types of WEEE; these are shown in Attachment 1.</p>
<p><u>BAT No. 5:</u> Further to the mentioned incoming /outgoing waste documentation, the applicant is to clarify how on-site transfers of waste will be documented. All such documentation needs to be validated prior to any such handling and transfer of waste and verified afterwards.</p>	<p>The handling and transfer requirements in BAT 5 are risk-based, and originate from section 2.3.13.3 of the BREF, which refers to more complicated types of on-site transfers (e.g. piped transfers) than will occur at the Scheme.</p> <p>As mentioned, at the Scheme, incoming waste (i.e. WEEE, batteries, WEEE-related packaging and wood) will be unloaded from trucks using forklift trucks, and moved internally using a manual palletiser. To minimise the risk of collision, clear routes will be defined, and a beacon will operate during operation of the forklift trucks.</p> <p>Care will be taken to avoid breakage in case of fragile WEEE (such as fluorescent tubes) or small packages.</p> <p>Employees will also be trained, as described in section B2.9 of the IPPC application.</p>
<p><u>BAT No. 8</u> – Monitoring program is to include CFC monitoring given the proposed degassing of refrigerated equipment.</p>	<p>The monitoring in BAT 8 is associated with BAT 29, which only requires monitoring of <i>channelled</i> CFC emissions to air. As there is no shredding of degassed equipment at the Scheme, there is no channelled emission point, and so no monitoring can be carried out.</p> <p>In relation to diffuse emissions from degassing, whenever a valve is not available on the equipment being degassed a piercing plier (similar to the below) will be used to access the gas in the equipment. The plier simultaneously pierces the equipment and creates a tight seal; there are no</p>

BAT: ERA Comments (18 th September 2019)	Applicant's Response (28 th October 2019)
	<p>parts that need to be replaced, since the seal is created by a hard plastic (if this is broken then the pliers will need to be changed entirely).</p> 
<p><u>BAT 51</u> – to be completed.</p>	<p>Section 4.8 of the BAT conclusions (which includes BAT 51) is only applicable to BAT conclusions for the decontamination of equipment containing polychlorinated biphenyls (PCBs).</p> <p>No EWC codes with PCBs (such as 16 01 09*, 16 02 09*, and 16 02 10*) are included in the IPPC application. Therefore BAT 51 is not applicable.</p> <p>It is noted that PCBs were found in specialised equipment (such as transformers), and were phased out from the 1980s. Such equipment will not be accepted at the Scheme, and given the nature of such equipment, the</p>

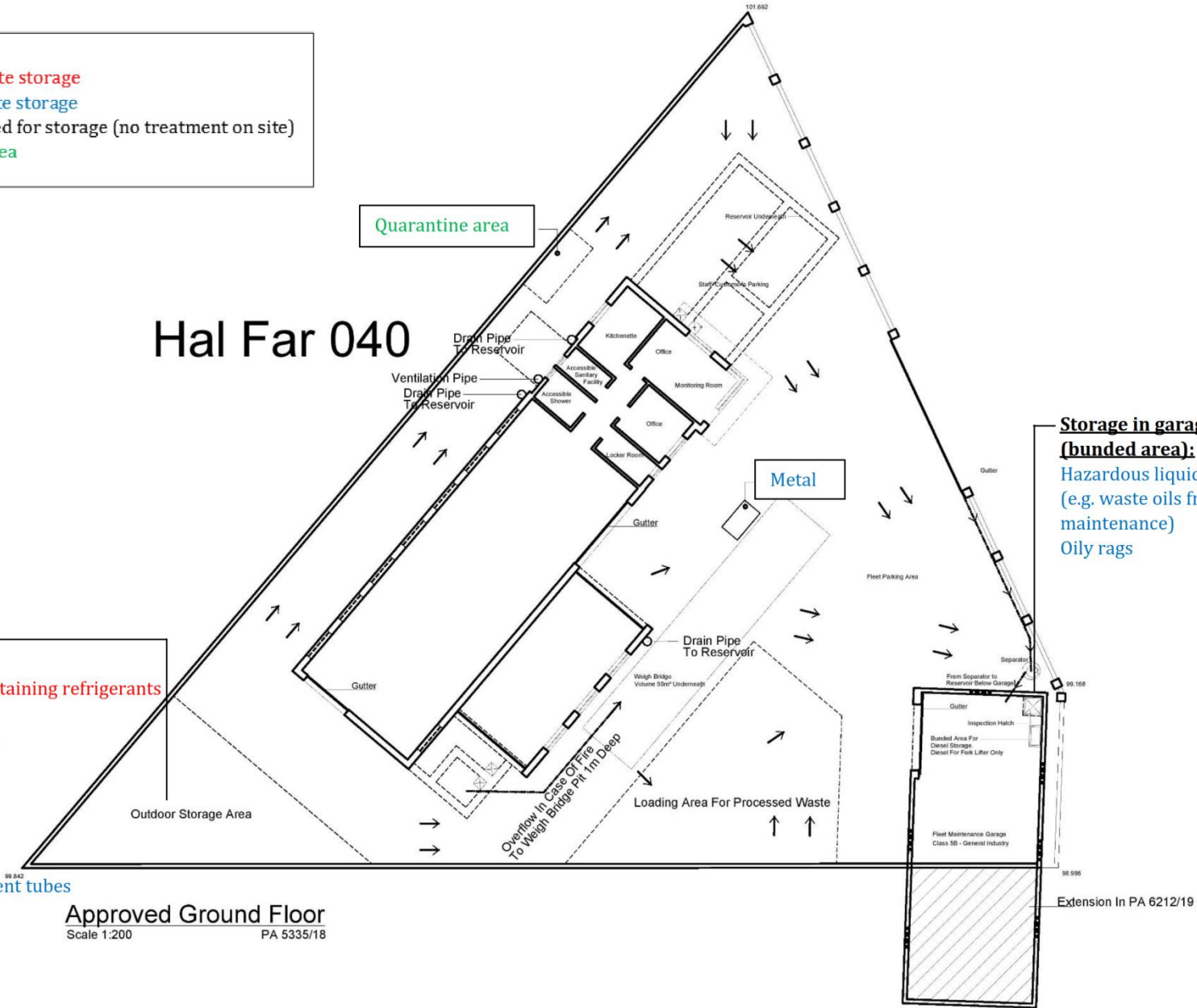
BAT: ERA Comments (18 th September 2019)	Applicant's Response (28 th October 2019)
	absence of PCBs is easily verifiable in the pre-acceptance / acceptance procedures.

Attachment 1: Storage areas

Legend:

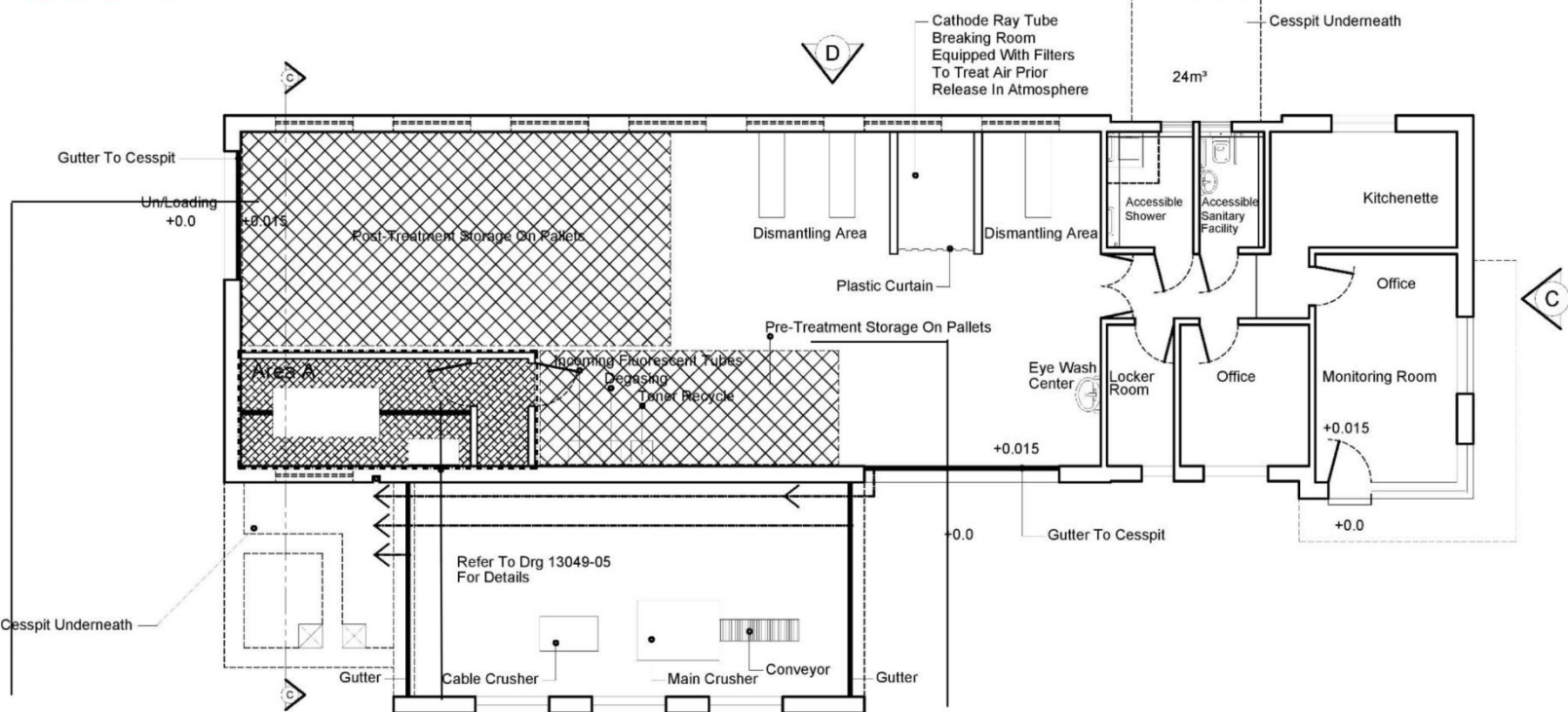
- Incoming waste storage
- Outgoing waste storage
- Waste accepted for storage (no treatment on site)
- Quarantine area

Hal Far 040



- Storage outdoors:**
- Fridges / freezers
 - Discarded equipment containing refrigerants
 - Wood items
 - WEEE-related packaging
 - Refrigerants
 - Plastic
 - Rubber
 - Metal
 - Packaging
 - Clean glass from fluorescent tubes
 - Shredded wood
 - Glass
 - Concrete blocks
 - TFT screens (covered)
 - Waste oil IBCs (bunded)

- Storage in garage (bunded area):**
- Hazardous liquid waste (e.g. waste oils from maintenance)
 - Oily rags



- Post-treatment storage:**
- Aluminium
 - Copper
 - Wires
 - Printed circuit boards
 - Toner powder
 - Hard drives
 - Glass from CRT TVs / monitors
 - Used overalls
 - Clean glass from fluorescent tubes
 - Used HEPA / carbon filters
 - Batteries

- Fluorescent tube room:**
- Broken fluorescent tubes & bulbs

- Pre-treatment storage:**
- WEEE & WEEE components / parts
 - CRT TVs / monitors

Annex 6: Safety Data Sheets

DIESEL FUEL

MATERIAL SAFETY DATA SHEET

NATIONAL COOPERATIVE REFINERY ASSOCIATION (NCRA)

BOX 1404 MCPHERSON, KS 67460
316-241-2344 OR 2345, PRODUCT INFORMATION, S. G. CATER

EMERGENCY CONTACT: CHEMTREC 1-800-424-9300 - USE ONLY IN THE CASE
OF EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT
INVOLVING CHEMICALS.

SUBSTANCE IDENTIFICATION

SUBSTANCE: DIESEL FUEL

CHEMICAL FAMILY: PETROLEUM HYDROCARBON

CAS NUMBER: 68334-30-5

TRADE NAMES/SYNONYMS: DIESEL OIL; DIESEL FUEL; DIESEL OIL, LIGHT;
DIESEL OIL PETROLEUM PRODUCT; DIESEL FUEL, NO.
1-D; NO. 1-D FUEL OIL; PETROLEUM DIESEL OIL
PRODUCT; SUMMER DIESEL; DIESEL FUEL #1.

CERCLA RATINGS (SCALE 0-3): HEALTH = 1 FIRE = 2 REACTIVITY = 0
PERSISTENCE = 1

NFPA RATINGS (SCALE 0-4): HEALTH = 0 FIRE = 2 REACTIVITY = 0

COMPONENTS AND CONTAMINANTS

HAZARDOUS INGREDIENTS	CAS NUMBER	PERCENT
DIESEL FUEL	68334-30-5	>99

MAY INCLUDE TRACES OF SULFUR

HYDROGEN SULFIDE	7783-06-4
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EXPOSURE LIMIT:

MINERAL OIL MIST: 5 MG/M³ OSHA TWA
5 MG/M³ ACGIH TWA
10 MG/M³ ACGIH STEL
5 MG/M³ NIOSH RECOMMENDED TWA
10 MG/M³ NIOSH RECOMMENDED STEL

MEASUREMENT METHOD: PARTICULATE FILTER; 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE; INFRARED SPECTROMETRY; (NIOSH VOL. III #5026).

HYDROGEN SULFIDE: 10 PPM (14 MG/M³) OSHA TWA
15 PPM (21 MG/M³) OSHA STEL
10 PPM (14 MG/M³) ACGIH TWA
15 PPM (21 MG/M³) ACGIH STEL
10 PPM NIOSH RECOMMENDED 10-MINUTE CEILING
10 PPM (14 MG/M³) DFG MAK TWA
20 PPM (28 MG/M³) DFG MAK 10-MINUTE PEAK MOMENTARY
VALUE: 4 TIMES/SHIFT

MEASUREMENT METHOD: DRYING TUBE/MOLECULAR SIEVE TUBE; THERMAL DESORPTION APPARATUS; GAS CHROMATOGRAPHY WITH FLAME IONIZATION DETECTION; (NIOSH VOL. II(6) #296).

PHYSICAL DATA

DESCRIPTION: YELLOW-BROWN, OILY LIQUID WITH A MILD PETROLEUM ODOR.

SOLUBILITY IN WATER: INSOLUBLE

SPECIFIC GRAVITY: 0.80

VAPOR PRESSURE: 2 MM HG @ 20 C

VAPOR DENSITY: >1 AIR = 1.0

BOILING POINT: 325 - 675 F (163 - 357 C)

MELTING POINT: -30 F (-34 C)

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD: MODERATE FIRE HAZARD WHEN EXPOSED TO HEAT AND FLAME.
VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

FLASH POINT: 100 F (38 C) (CC)
UPPER EXPLOSIVE LIMIT: 6.0 %
LOWER EXPLOSIVE LIMIT: 1.3 %
AUTOIGNITION TEMP.: 350 F (177 C)
OSHA FLAMMABILITY CLASS: II
FIREFIGHTING MEDIA: DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR
REGULAR FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK,
DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR
FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P
5800.5).

FIREFIGHTING: MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT
WITHOUT RISK. APPLY COOLING WATER TO SIDES OF
CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL
AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS.
FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE
HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE,
WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW
IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING
SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO
FIRE. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF
TANK, RAIL CAR, OR TANK TRUCK IS INVOLVED IN FIRE
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5,
GUIDE PAGE 27).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED. USE
FLOODING AMOUNTS OF WATER AS FOG, SOLID STREAMS MAY
BE INEFFECTIVE. COOL CONTAINERS WITH FLOODING
AMOUNTS OF WATER. APPLY WATER FROM AS FAR A
DISTANCE AS POSSIBLE. AVOID BREATHING VAPORS, KEEP
UPWIND.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD
CLASSIFICATION 49 CFR 172.101:

COMBUSTIBLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING
REQUIREMENTS 49 CFR 172.101 AND SUBPART E: NONE

DEPARTMENT OF TRANSPORTATION PACKAGING
REQUIREMENTS:
EXCEPTIONS:

NONE
49 CFR 173.118(A)

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180), DOCKET NUMBERS HM-181, HM-181A, HM-181C, HM-181D, AND HM-204. EFFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90).

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO OCTOBER 1, 1993. (56 FR 47158, 10/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING
NAME-ID NUMBER, 49 CFR 172.101: DIESEL FUEL-NA 1993

U.S. DEPARTMENT OF TRANSPORTATION HAZARD
CLASS OR DIVISION, 49 CFR 172.101: 3 - FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKING
GROUP, 49 CFR 172.101: PG III

U.S. DEPARTMENT OF TRANSPORTATION LABELING
REQUIREMENTS, 49 CFR 172.101 AND SUBPART E: NONE

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING
REQUIREMENTS:
EXCEPTIONS: 49 CFR 173.150
NON-BULK PACKAGING: 49 CFR 173.203
BULK PACKAGING: 49 CFR 173.241

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY
LIMITATIONS, 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 60 L
CARGO AIRCRAFT ONLY: 220 L

TOXICITY

DIESEL FUEL

IRRITATION DATA: 500 MG SKIN-RABBIT MODERATE.

TOXICITY DATA: 9 GM/KG ORAL-RAT LD50; 7.5 GM/KG (MARKET PLACE
SAMPLE) ORAL-RAT LD50 (AETODY); >5 ML/KG (MARKET
PLACE SAMPLE) SKIN-RABBIT LD50 (AETODY).

CARCINOGEN STATUS: HUMAN INADEQUATE EVIDENCE, ANIMAL LIMITED EVIDENCE
(IARC-GROUP 3). (SEE ADDITIONAL DATA).

LOCAL EFFECTS: IRRITANT - INHALATION, SKIN.

ACUTE TOXICITY LEVEL: SLIGHTLY TOXIC BY DERMAL ABSORPTION; RELATIVELY
NON-TOXIC BY INGESTION.

TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY ALSO AFFECT THE LIVER AND KIDNEYS.

ADDITIONAL DATA: ANIMAL STUDIES HAVE CONFIRMED AN ASSOCIATION BETWEEN THE INDUCTION OF CANCER, PRIMARILY OF THE LUNG, AND INHALATION EXPOSURE TO WHOLE DIESEL EXHAUST. LIMITED EPIDEMIOLOGIC EVIDENCE ALSO SUGGESTS AN ASSOCIATION BETWEEN OCCUPATIONAL EXPOSURE TO DIESEL ENGINE EMISSIONS AND LUNG CANCER (NIOSH, 1988).

HEALTH EFFECTS AND FIRST AID

INHALATION:

DIESEL FUEL: IRRITANT/NARCOTIC.

ACUTE EXPOSURE: VAPORS OR MIST MAY CAUSE RESPIRATORY TRACT IRRITATION. A HUMAN EXPOSURE HAS RESULTED IN IMMEDIATE COUGH, DYSPNEA, CYANOSIS AND UNCONSCIOUSNESS FOR ONE HOUR. A PRODUCTIVE COUGH WITH SPUTUM SMELLING OF DIESEL FUEL PERSISTED FOR 37 DAYS. CHEST X-RAYS SHOWED DIFFUSE SHADOWING, MOST PROMINENT AT THE LUNG BASES, WHICH RESOLVED SLOWLY WITH TREATMENT BUT WAS STILL PRESENT AT DAY 37. HIGH LEVELS MAY ALSO CAUSE CENTRAL NERVOUS SYSTEM EXCITATION FOLLOWED BY DEPRESSION WITH SYMPTOMS POSSIBLY INCLUDING RESTLESSNESS, CONFUSION, ATAXIA, HEADACHE, DIZZINESS, ANOREXIA, NAUSEA, VOMITING, WEAKNESS, INCOORDINATION, STUPOR, DELIRIUM, AND COMA.

CHRONIC EXPOSURE: PROLONGED OR REPEATED EXPOSURE MAY CAUSE IRRITATION. ONE INDIVIDUAL EXPOSED TO DIESEL VAPORS IN A TRUCK CAB DEVELOPED NEPHROTOXIC EFFECTS.

FIRST AID: REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

DIESEL FUEL: IRRITANT.

ACUTE EXPOSURE: MAY CAUSE SMARTING, REDNESS AND IRRITATION. A SAMPLE OF DIESEL FUEL APPLIED TO RABBITS UNDER A PATCH FOR 24 HOURS CAUSED EXTREME IRRITATION WITH SEVERE ERYTHEMA AND EDEMA WITH BLISTERING AND OPEN SORES.

CHRONIC EXPOSURE:

REPEATED OR PROLONGED EXPOSURE MAY CAUSE DEFATTING AND DRYING OF THE SKIN RESULTING IN SEVERE IRRITATION AND DERMATITIS. CUTANEOUS HYPERKERATOSIS HAS BEEN DESCRIBED IN ENGINE DRIVERS WITH OCCUPATIONAL EXPOSURE TO DIESEL FUEL. TWO INDIVIDUALS WITH TOPICAL EXPOSURE FROM WASHING HAIR OR HANDS WITH DIESEL FUEL DEVELOPED ACUTE RENAL FAILURE; ONE ALSO HAD GASTROINTESTINAL SYMPTOMS. REPEATED APPLICATIONS TO RABBIT SKIN PRODUCED 67 % MORTALITY AT 8 ML/KG. THE PRIMARY CAUSE OF DEATH WERE DEPRESSION AND ANOREXIA WHICH WERE INDUCED BY DERMAL IRRITATION WITH INFECTION, RATHER THAN SYSTEMIC INTOXICATION. AUTOPSY REVEALED EFFECTS ON THE LIVER AND KIDNEYS.

FIRST AID:

REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15 - 20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

DIESEL FUEL:

ACUTE EXPOSURE:

LIQUID OR VAPOR MAY CAUSE SLIGHT IRRITATION, ALTHOUGH TESTS WITH ONE SAMPLE OF DIESEL FUEL IN RABBIT EYES WAS NON-IRRITATING.

CHRONIC EXPOSURE:

REPEATED OR PROLONGED EXPOSURE MAY CAUSE IRRITATION.

FIRST AID:

WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

DIESEL FUEL:

NARCOTIC.

ACUTE EXPOSURE:

MAY CAUSE NAUSEA, VOMITING, CRAMPING, DIARRHEA, AND POSSIBLY SYMPTOMS OF CENTRAL NERVOUS SYSTEM DEPRESSION. ASPIRATION OF EVEN SMALL AMOUNTS DURING INGESTION OR VOMITING MAY RESULT IN SEVERE PULMONARY IRRITATION WITH COUGHING, GAGGING, DYSPNEA, SUBSTERNAL DISTRESS, AND PNEUMONITIS, PULMONARY EDEMA AND HEMORRHAGE, AND DEATH.

CHRONIC EXPOSURE:

NO DATA AVAILABLE.

FIRST AID:

ONLY HYDROCARBONS THAT ARE SOLVENTS FOR A TOXIC AGENT OR ARE THEMSELVES TOXIC NEED TO BE EVACUATED. EXTREME CARE MUST BE TAKEN TO AVOID ASPIRATION. GASTRIC LAVAGE WITH A CUFFED ENDOTRACHEAL TUBE IN PLACE TO PREVENT FURTHER ASPIRATION SHOULD BE DONE WITHIN 15 MINUTES. IN THE ABSENCE OF DEPRESSION OR CONVULSIONS OR IMPAIRED GAG REFLEX, EMESIS CAN ALSO BE INDUCED USING SYRUP OF IPECAC WITHOUT INCREASING THE HAZARD OF ASPIRATION. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GASTRIC LAVAGE SHOULD BE PREFORMED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES IN A CLOSED CONTAINER.

INCOMPATIBILITIES:

DIESEL FUEL AND:

STRONG OXIDIZERS: MAY REACT.

DECOMPOSITION:

THERMAL DECOMPOSITION MAY INCLUDE TOXIC OXIDES OF SULFUR AND CARBON.

POLYMERIZATION:

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

CONDITIONS TO AVOID:

AVOID CONTACT WITH HEAT, SPARKS, FLAMES, OR OTHER SOURCES OF IGNITION. VAPORS MAY BE EXPLOSIVE. AVOID OVERHEATING OF CONTAINERS; CONTAINERS MAY VIOLENTLY RUPTURE IN HEAT OF FIRE. AVOID CONTAMINATION OF WATER SOURCES.

TRACE AMOUNTS OF HYDROGEN SULFIDE MAY BE PRESENT. THERE IS A POTENTIAL FOR THE ACCUMULATION OF HYDROGEN SULFIDE IN THE HEAD SPACE OF CONTAINERS OR IN ENCLOSED AREAS WHERE THIS PRODUCT IS STORED, HANDLED OR USED.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE:

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

BONDING AND GROUNDING:

SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH MAY BE IGNITED BY ELECTROSTATIC SPARKS, SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NFPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

**THRESHOLD PLANNING
QUANTITY (TPQ):**

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 302 REQUIRES THAT EACH FACILITY WHERE ANY EXTREMELY HAZARDOUS SUBSTANCE IS PRESENT IN A QUANTITY EQUAL TO OR GREATER THAN THE TPQ ESTABLISHED FOR THAT SUBSTANCE NOTIFY THE STATE EMERGENCY RESPONSE COMMISSION (SERC) FOR THAT STATE IN WHICH IT IS LOCATED. SECTION 303 OF SARA REQUIRES THESE FACILITIES TO PARTICIPATE IN LOCAL EMERGENCY RESPONSE.

HYDROGEN SULFIDE:

SARA SECTION 302 TPQ: 500 POUNDS.

DISPOSAL:

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. ALSO COMPLY WITH APPROPRIATE STATE STANDARDS.

**EPA HAZARDOUS
WASTE NUMBER:**

D001

**CERCLA SECTION 103
REPORTABLE QUANTITY:**

100 POUNDS

REPORTABLE QUANTITY(RQ): THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

D001 HAZARDOUS WASTE:

**CERCLA SECTION 103
REPORTABLE QUANTITY:**

100 POUNDS

HYDROGEN SULFIDE:

CERCLA SECTION 103 100 POUNDS
REPORTABLE QUANTITY (RQ):

SARA SECTION 304 100 POUNDS
REPORTABLE QUANTITY (RQ):

SPILLS AND LEAKS

OCCUPATIONAL SPILL:

SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND RESTRICT ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:

THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST BE BASED ON THE SPECIFIC OPERATION, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND MUST BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

ANY CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE(S) AND A FULL FACEPIECE.

ANY GAS MASK WITH ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER), WITH A FULL FACEPIECE.

ANY TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET, HOOD OPERATED IN CONTINUOUS-FLOW MODE.

ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

WEAR OIL IMPERVIOUS CLOTHING. AVOID PROLONGED OR REPEATED CONTACT WITH SUBSTANCE. AVOID WEARING OIL SOAKED CLOTHING.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH:

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

CREATION DATE: 01/04/90

MOST RECENT REVISION: 06/03/92

THE ABOVE DATA IS BASED ON EXPERIENCE AND OTHER INFORMATION WHICH NCRA BELIEVES TO BE RELIABLE AND IS SUPPLIED FOR INFORMATIONAL PURPOSES ONLY. SINCE CONDITIONS OF USE ARE OUTSIDE OUR CONTROL, NCRA DISCLAIMS ANY LIABILITY FOR DAMAGE OR INJURY WHICH RESULTS FROM USE OF THE ABOVE DATA. NOTHING CONTAINED HEREIN SHALL CONSTITUTE A GUARANTEE, WARRANTY (INCLUDING WARRANTY OF MERCHANTABILITY) OR REPRESENTATION BY NCRA WITH RESPECT TO THE DATA, THE MATERIAL DESCRIBED, OR ITS USE FOR ANY SPECIFIC PURPOSE, EVEN IF THAT USE IS KNOWN TO NCRA.

CRC 5040 Jump Start (NZ)

CRC Industries (CRC Industries New Zealand)

Chemwatch: 4546-42

Version No: 7.1.1.1

Safety Data Sheet according to HSNO Regulations

Chemwatch Hazard Alert Code: 4

Issue Date: 12/02/2014

Print Date: 04/05/2015

Initial Date: Not Available

S.GHS.NZL.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	CRC 5040 Jump Start (NZ)
Synonyms	CRC 5040 Engine Start, CRC 5040 Jump Start, Manufacturer's Code 5040
Proper shipping name	AEROSOLS
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Application is by spray atomisation from a hand held aerosol pack Engine starting fluid.
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Details of the manufacturer/importer

Registered company name	CRC Industries (CRC Industries New Zealand)
Address	10 Highbrook Drive East Tamaki Auckland New Zealand
Telephone	+64 9 272 2700
Fax	+64 9 274 9696
Website	www.crc.co.nz
Email	customerservices@crc.co.nz

Emergency telephone number






Association / Organisation	Not Available
Emergency telephone numbers	+64 9 278-7913
Other emergency telephone numbers	Not Available

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

**Considered a Hazardous Substance according to the criteria of the New Zealand Hazardous Substances New Organisms legislation.
Classified as Dangerous Goods for transport purposes.**




CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability	4	
Toxicity	2	
Body Contact	2	
Reactivity	1	
Chronic	3	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

GHS Classification [1]	Flammable Aerosol Category 1, Skin Corrosion/Irritation Category 2, Germ Cell Mutagen Category 1B, Carcinogen Category 1B, STOT - SE (Narcosis) Category 3, STOT - RE Category 2
Legend:	1. Classified by Chemwatch; 2. Classification drawn from CCID EPA NZ ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI
Determined by Chemwatch using GHS/HSNO criteria	2.1.2A, 6.3A, 6.6A, 6.7A, 6.9 (narcotic), 6.9B

Label elements

GHS label elements	  
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SIGNAL WORD	DANGER
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Hazard statement(s)

H222	Extremely flammable aerosol
H315	Causes skin irritation
H340	May cause genetic defects
H350	May cause cancer
H336	May cause drowsiness or dizziness
H373	May cause damage to organs through prolonged or repeated exposure

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P211	Do not spray on an open flame or other ignition source.
P251	Do not pierce or burn, even after use.

Precautionary statement(s) Response

P308+P313	IF exposed or concerned: Get medical advice/attention.
P312	Call a POISON CENTER/doctor/physician/first aider/if you feel unwell.
P302+P352	IF ON SKIN: Wash with plenty of water and soap
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Precautionary statement(s) Storage

P405	Store locked up.
P410+P412	Protect from sunlight. Do not expose to temperatures exceeding 50 °C/122 °F.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised chemical landfill or if organic to high temperature incineration
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SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
8006-61-9	30-60	<u>gasoline</u>
Not Available	5-20	<u>Diethyl ether GPR RECTAPUR</u>
64-17-5	1-9	<u>ethanol</u>
Not avail	1-9	<u>mineral oil</u>
124-38-9	1-9	<u>carbon dioxide</u>
Not Available	NotSpec.	NOTE: Manufacturer has supplied full igredient
Not Available	NotSpec.	information to allow CHEMWATCH assessment.

NOTE: Manufacturer has supplied full igredient information to allow CHEMWATCH assessment.

SECTION 4 FIRST AID MEASURES

NZ Poisons Centre 0800 POISON (0800 764 766) | NZ Emergency Services: 111

Description of first aid measures

Eye Contact	<p>If aerosols come in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold the eyelids apart and flush the eye continuously for at least 15 minutes with fresh running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally
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	<ul style="list-style-type: none"> ▶ lifting the upper and lower lids. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If solids or aerosol mists are deposited upon the skin:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Remove any adhering solids with industrial skin cleansing cream. ▶ DO NOT use solvents. ▶ Seek medical attention in the event of irritation.
Inhalation	<p>If aerosols, fumes or combustion products are inhaled:</p> <ul style="list-style-type: none"> ▶ Remove to fresh air. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ If breathing is shallow or has stopped, ensure clear airway and apply resuscitation, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor.
Ingestion	<ul style="list-style-type: none"> ▶ Avoid giving milk or oils. ▶ Avoid giving alcohol. <p>Not considered a normal route of entry.</p>

Indication of any immediate medical attention and special treatment needed

For acute or short term repeated exposures to petroleum distillates or related hydrocarbons:

- ▶ Primary threat to life, from pure petroleum distillate ingestion and/or inhalation, is respiratory failure.
- ▶ Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnoea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO₂ 50 mm Hg) should be intubated.
- ▶ Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
- ▶ A chest x-ray should be taken immediately after stabilisation of breathing and circulation to document aspiration and detect the presence of pneumothorax.
- ▶ Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitisation to catecholamines. Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
- ▶ Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients. [Ellenhorn and Barceloux: Medical Toxicology]

Treat symptomatically.

for lower alkyl ethers:

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ A low-stimulus environment must be maintained.
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate and treat, where necessary, for seizures.
- ▶ **DO NOT use emetics.** Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Hypotension without signs of hypovolaemia may require vasopressors.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

EMERGENCY DEPARTMENT

- ▶ Laboratory analysis of complete blood count, serum electrolytes, BUN, creatinine, glucose, urinalysis, baseline for serum aminotransferases (ALT and AST), calcium, phosphorus and magnesium, may assist in establishing a treatment regime. Other useful analyses include anion and osmolar gaps, arterial blood gases (ABGs), chest radiographs and electrocardiograph.
- ▶ Ethers may produce anion gap acidosis. Hyperventilation and bicarbonate therapy might be indicated.
- ▶ Haemodialysis might be considered in patients with impaired renal function.
- ▶ Consult a toxicologist as necessary.

BRONSTEIN, A.C. and CURRANCE, P.L.

EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

SMALL FIRE:

	<ul style="list-style-type: none"> Water spray, dry chemical or CO2 LARGE FIRE: <ul style="list-style-type: none"> Water spray or fog.
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Special hazards arising from the substrate or mixture

Fire Incompatibility	<ul style="list-style-type: none"> Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result
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Advice for firefighters

Fire Fighting	<ul style="list-style-type: none"> Alert Fire Brigade and tell them location and nature of hazard. May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or water course.
Fire/Explosion Hazard	<ul style="list-style-type: none"> Liquid and vapour are highly flammable. Severe fire hazard when exposed to heat or flame. Vapour forms an explosive mixture with air. Severe explosion hazard, in the form of vapour, when exposed to flame or spark.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	<ul style="list-style-type: none"> Clean up all spills immediately. Avoid breathing vapours and contact with skin and eyes. Wear protective clothing, impervious gloves and safety glasses. Shut off all possible sources of ignition and increase ventilation.
Major Spills	<ul style="list-style-type: none"> Remove leaking cylinders to a safe place if possible. Release pressure under safe, controlled conditions by opening the valve. DO NOT exert excessive pressure on valve; DO NOT attempt to operate damaged valve. Clear area of personnel and move upwind.

	Personal Protective Equipment advice is contained in Section 8 of the MSDS.
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SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> Avoid all personal contact, including inhalation. Wear protective clothing when risk of exposure occurs. Use in a well-ventilated area. Prevent concentration in hollows and sumps.
Other information	<ul style="list-style-type: none"> Keep dry to avoid corrosion of cans. Corrosion may result in container perforation and internal pressure may eject contents of can Store in original containers in approved flammable liquid storage area. DO NOT store in pits, depressions, basements or areas where vapours may be trapped. No smoking, naked lights, heat or ignition sources.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> Aerosol dispenser. Check that containers are clearly labelled.
Storage incompatibility	<ul style="list-style-type: none"> Avoid reaction with oxidising agents

PACKAGE MATERIAL INCOMPATIBILITIES

Not Available

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
New Zealand Workplace Exposure Standards (WES)	gasoline	Petrol (Gasoline)	890 mg/m3 / 300 ppm	1480 mg/m3 / 500 ppm	Not Available	Not Available
New Zealand Workplace Exposure Standards (WES)	Diethyl ether GPR RECTAPUR	Hydroquinone	2 mg/m3	Not Available	Not Available	Suspected carcinogen


New Zealand Workplace Exposure Standards (WES)	ethanol	Ethyl alcohol	1880 mg/m ³ / 1000 ppm	Not Available	Not Available	Not Available
New Zealand Workplace Exposure Standards (WES)	mineral oil	Oil mist, mineral	5 mg/m ³	10 mg/m ³	Not Available	Sampled by a method that does not collect vapour.
New Zealand Workplace Exposure Standards (WES)	carbon dioxide	Carbon dioxide	9000 mg/m ³ / 5000 ppm	54000 mg/m ³ / 30000 ppm	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
gasoline	Gasoline	Not Available	Not Available	Not Available
ethanol	Ethyl alcohol; (Ethanol)	Not Available	Not Available	Not Available
carbon dioxide	Carbon dioxide	30,000 ppm	30000 ppm	50000 ppm

Ingredient	Original IDLH	Revised IDLH
gasoline	Not Available	Not Available
Diethyl ether GPR RECTAPUR	Not Available	Not Available
ethanol	15,000 ppm	3,300 [LEL] ppm
mineral oil	Not Available	Not Available
carbon dioxide	50,000 ppm	40,000 ppm
NOTE: Manufacturer has supplied full ingredient	Not Available	Not Available
information to allow CHEMWATCH assessment.	Not Available	Not Available

Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.</p>
Personal protection	
Eye and face protection	<p>No special equipment for minor exposure i.e. when handling small quantities.</p> <p>OTHERWISE: For potentially moderate or heavy exposures:</p> <ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ NOTE: Contact lenses pose a special hazard; soft lenses may absorb irritants and ALL lenses concentrate them.
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▸ No special equipment needed when handling small quantities. ▸ OTHERWISE: ▸ For potentially moderate exposures: ▸ Wear general protective gloves, eg. light weight rubber gloves. ▸ For potentially heavy exposures: ▸ Wear chemical protective gloves, eg. PVC. and safety footwear.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▸ Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area. [AS/NZS ISO 6529:2006 or national equivalent] ▸ Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted. [AS/NZS 1715 or national equivalent] ▸ Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely.
Thermal hazards	Not Available

Recommended material(s)

GLOVE SELECTION INDEX

Respiratory protection

Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000)

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:
CRC 5040 Jump Start (NZ)

Material	CPI
BUTYL	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PE/EVAL/PE	C
PVA	C
PVC	C
TEFLON	C
VITON	C
VITON/NEOPRENE	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

& 149:2001, ANSI Z88 or national equivalent)
Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Required minimum protection factor	Maximum gas/vapour concentration present in air p.p.m. (by volume)	Half-face Respirator	Full-Face Respirator
up to 10	1000	AX-AUS / Class1	-
up to 50	1000	-	AX-AUS / Class 1
up to 50	5000	Airline *	-
up to 100	5000	-	AX-2
up to 100	10000	-	AX-3
100+			Airline**

* - Continuous Flow ** - Continuous-flow or positive pressure demand
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	22aer Clear water white flammable liquid with an ethereal odour; partially miscible with water. Supplied in an aerosol pack. Contents under PRESSURE. Contains carbon dioxide propellant.		
Physical state	Liquid	Relative density (Water = 1)	0.75
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	<500
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	35	Molecular weight (g/mol)	Not Applicable
Flash point (°C)	-45	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE.	Oxidising properties	Not Available
Upper Explosive Limit (%)	48.0	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	1.9	Volatile Component (%vol)	95
Vapour pressure (kPa)	39.9	Gas group	Not Available
Solubility in water (g/L)	Partly Miscible	pH as a solution (1%)	Not Applicable
Vapour density (Air = 1)	>1	VOC g/L	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▸ Elevated temperatures. ▸ Presence of open flame. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	<p>Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.</p> <p>There is some evidence to suggest that the material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.</p> <p>When inhaled, diethyl ether can cause rapid loss of consciousness, and with continuous exposure, respiratory muscle weakness, stoppage of breathing and death.</p>
Ingestion	<p>Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733)</p> <p>Accidental ingestion of the material may be damaging to the health of the individual.</p> <p>Ingestion of petroleum hydrocarbons can irritate the pharynx, oesophagus, stomach and small intestine, and cause swellings and ulcers of the mucous. Symptoms include a burning mouth and throat; larger amounts can cause nausea and vomiting, narcosis, weakness, dizziness, slow and shallow breathing, abdominal swelling, unconsciousness and convulsions.</p>
Skin Contact	<p>Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.</p> <p>Spray mist may produce discomfort</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Aromatic hydrocarbons may produce sensitivity and redness of the skin. They are not likely to be absorbed into the body through the skin but branched species are more likely to.</p> <p>The material may cause severe inflammation of the skin either following direct contact or after a delay of some time.</p>
Eye	<p>There is some evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Moderate inflammation may be expected with redness; conjunctivitis may occur with prolonged exposure. Not considered to be a risk because of the extreme volatility of the gas.</p> <p>Direct eye contact with petroleum hydrocarbons can be painful, and the corneal epithelium may be temporarily damaged.</p>
Chronic	<p>There is sufficient evidence to suggest that this material directly causes cancer in humans.</p> <p>Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.</p> <p>There is some evidence from animal testing that exposure to this material may result in reduced fertility.</p> <p>There is some evidence from animal testing that exposure to this material may result in toxic effects to the unborn baby.</p>

CRC 5040 Jump Start (NZ)	TOXICITY	IRRITATION
	Not Available	Not Available
gasoline	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >1900 mg/kg ^[1]	Eye (man): 500ppm/1h moderate
	Inhalation (guinea pig) LC50: 300 mg/L/5M ^[2]	Eye (man): 140ppm/8h mild
	Inhalation (mouse) LC50: 300 mg/L/5M ^[2]	
	Inhalation (rat) LC50: 300 mg/L/5md ^[2]	
	Oral (rat) LD50: >4500 mg/kg ^[1]	
Diethyl ether GPR RECTAPUR	TOXICITY	IRRITATION
	Not Available	Not Available
ethanol	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 17100 mg/kg ^[1]	Eye (rabbit): 500 mg SEVERE
	Inhalation (rat) LC50: 64000 ppm/4h ^[2]	Eye (rabbit):100mg/24hr-moderate
	Oral (rat) LD50: >11872769 mg/kg ^[1]	Skin (rabbit):20 mg/24hr-moderate
		Skin (rabbit):400 mg (open)-mild
mineral oil	TOXICITY	IRRITATION
	Not Available	Not Available

carbon dioxide	TOXICITY	IRRITATION
	Inhalation (mouse) LC50: 200000 ppm/2H ^[2]	Not Available
	Inhalation (mouse) LC50: 361 mg/L/2H ^[2]	
	Inhalation (rat) LC50: 470000 ppm/30M ^[2]	
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's msds. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

GASOLINE	Oral (unspec) LD50: 500 - 5000 mg/kg [Manufacturer] Substance has been investigated as a tumorigen.
ETHANOL	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
MINERAL OIL	<p>Toxicity and Irritation data for petroleum-based mineral oils are related to chemical components and vary as does the composition and source of the original crude.</p> <p>A small but definite risk of occupational skin cancer occurs in workers exposed to persistent skin contamination by oils over a period of years. This risk has been attributed to the presence of certain polycyclic aromatic hydrocarbons (PAH) (typified by benz[a]pyrene).</p> <p>Petroleum oils which are solvent refined/extracted or severely hydrotreated, contain very low concentrations of both.</p>
CARBON DIOXIDE	- pulmonary effects IDLH: 50,000 ppm
CRC 5040 Jump Start (NZ) & GASOLINE	<p>for petroleum:</p> <p>This product contains benzene which is known to cause acute myeloid leukaemia and n-hexane which has been shown to metabolize to compounds which are neuropathic.</p> <p>This product contains toluene. There are indications from animal studies that prolonged exposure to high concentrations of toluene may lead to hearing loss.</p> <p>This product contains ethyl benzene and naphthalene from which there is evidence of tumours in rodents</p> <p>Carcinogenicity: Inhalation exposure to mice causes liver tumours, which are not considered relevant to humans.</p>

Acute Toxicity	☹	Carcinogenicity	✓
Skin Irritation/Corrosion	✓	Reproductivity	☹
Serious Eye Damage/Irritation	☹	STOT - Single Exposure	✓
Respiratory or Skin sensitisation	☹	STOT - Repeated Exposure	✓
Mutagenicity	✓	Aspiration Hazard	☹

Legend: ✓ – Data required to make classification available
✗ – Data available but does not fill the criteria for classification
☹ – Data Not Available to make classification

CMR STATUS

REPROTOXIN	carbon dioxide	ILO Chemicals in the electronics industry that have toxic effects on reproduction
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SECTION 12 ECOLOGICAL INFORMATION

Toxicity

Most ethers are very resistant to hydrolysis, and the rate of cleavage of the carbon-oxygen bond by abiotic processes is expected to be insignificant. Direct photolysis will not be an important removal process since aliphatic ethers do not absorb light at wavelengths >290 nm

For Hydrocarbons: log Kow 1. BCF~10.

For Aromatics: log Kow 2-3.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
ethanol	LOW (Half-life = 2.17 days)	LOW (Half-life = 5.08 days)
carbon dioxide	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
ethanol	LOW (LogKOW = -0.31)
carbon dioxide	LOW (LogKOW = 0.83)

Mobility in soil

Ingredient	Mobility
ethanol	HIGH (KOC = 1)
carbon dioxide	HIGH (KOC = 1.498)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none">▶ DO NOT allow wash water from cleaning or process equipment to enter drains.▶ It may be necessary to collect all wash water for treatment before disposal.▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.▶ Where in doubt contact the responsible authority.
	Ensure that the disposal of material is carried out in accordance with Hazardous Substances (Disposal) Regulations 2001.

SECTION 14 TRANSPORT INFORMATION

Labels Required

	
Marine Pollutant	NO
HAZCHEM	2YE

Land transport (UN)

UN number	1950				
Packing group	Not Applicable				
UN proper shipping name	AEROSOLS				
Environmental hazard	No relevant data				
Transport hazard class(es)	<table><tr><td>Class</td><td>2.1</td></tr><tr><td>Subrisk</td><td>Not Applicable</td></tr></table>	Class	2.1	Subrisk	Not Applicable
Class	2.1				
Subrisk	Not Applicable				
Special precautions for user	<table><tr><td>Special provisions</td><td>63;190;277;327;344</td></tr><tr><td>Limited quantity</td><td>See;SP 277</td></tr></table>	Special provisions	63;190;277;327;344	Limited quantity	See;SP 277
Special provisions	63;190;277;327;344				
Limited quantity	See;SP 277				

Air transport (ICAO-IATA / DGR)

UN number	1950														
Packing group	Not Applicable														
UN proper shipping name	Aerosols, flammable														
Environmental hazard	No relevant data														
Transport hazard class(es)	<table><tr><td>ICAO/IATA Class</td><td>2.1</td></tr><tr><td>ICAO / IATA Subrisk</td><td>Not Applicable</td></tr><tr><td>ERG Code</td><td>10L</td></tr></table>	ICAO/IATA Class	2.1	ICAO / IATA Subrisk	Not Applicable	ERG Code	10L								
ICAO/IATA Class	2.1														
ICAO / IATA Subrisk	Not Applicable														
ERG Code	10L														
Special precautions for user	<table><tr><td>Special provisions</td><td>A145A167A802</td></tr><tr><td>Cargo Only Packing Instructions</td><td>203</td></tr><tr><td>Cargo Only Maximum Qty / Pack</td><td>150 kg</td></tr><tr><td>Passenger and Cargo Packing Instructions</td><td>203</td></tr><tr><td>Passenger and Cargo Maximum Qty / Pack</td><td>75 kg</td></tr><tr><td>Passenger and Cargo Limited Quantity Packing Instructions</td><td>Y203</td></tr><tr><td>Passenger and Cargo Limited Maximum Qty / Pack</td><td>30 kg G</td></tr></table>	Special provisions	A145A167A802	Cargo Only Packing Instructions	203	Cargo Only Maximum Qty / Pack	150 kg	Passenger and Cargo Packing Instructions	203	Passenger and Cargo Maximum Qty / Pack	75 kg	Passenger and Cargo Limited Quantity Packing Instructions	Y203	Passenger and Cargo Limited Maximum Qty / Pack	30 kg G
Special provisions	A145A167A802														
Cargo Only Packing Instructions	203														
Cargo Only Maximum Qty / Pack	150 kg														
Passenger and Cargo Packing Instructions	203														
Passenger and Cargo Maximum Qty / Pack	75 kg														
Passenger and Cargo Limited Quantity Packing Instructions	Y203														
Passenger and Cargo Limited Maximum Qty / Pack	30 kg G														

Sea transport (IMDG-Code / GGVSee)

UN number	1950
Packing group	Not Applicable
UN proper shipping name	AEROSOLS

Environmental hazard	Not Applicable	
Transport hazard class(es)	IMDG Class	2.1
	IMDG Subrisk	Not Applicable
Special precautions for user	EMS Number	F-D , S-U
	Special provisions	63 190 277 327 344 959
	Limited Quantities	See SP277

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

This substance is to be managed using the conditions specified in an applicable Group Standard

HSR Number	Group Standard
HSR002517	Aerosols (Flammable, Toxic [6.7]) Group Standard 2006

gasoline(8006-61-9) is found on the following regulatory lists	"New Zealand Inventory of Chemicals (NZIoC)", "International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs", "New Zealand Workplace Exposure Standards (WES)"
Diethyl ether GPR RECTAPUR() is found on the following regulatory lists	"Not Applicable"
ethanol(64-17-5) is found on the following regulatory lists	"New Zealand Inventory of Chemicals (NZIoC)", "New Zealand Workplace Exposure Standards (WES)", "New Zealand Hazardous Substances and New Organisms (HSNO) Act - Classification of Chemicals"
mineral oil(Not avail) is found on the following regulatory lists	"International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs", "New Zealand Workplace Exposure Standards (WES)"
carbon dioxide(124-38-9) is found on the following regulatory lists	"New Zealand Inventory of Chemicals (NZIoC)", "New Zealand Workplace Exposure Standards (WES)", "New Zealand Hazardous Substances and New Organisms (HSNO) Act - Classification of Chemicals"

Location Test Certificate

Subject to Regulation 55 of the Hazardous Substances (Classes 1 to 5 Controls) Regulations, a location test certificate is required when quantity greater than or equal to those indicated below are present.

Hazard Class	Quantity beyond which controls apply for closed containers	Quantity beyond which controls apply when use occurring in open containers
2.1.2A	3 000 L (aggregate water capacity)	3 000 L (aggregate water capacity)

Approved Handler

Subject to Regulation 56 of the Hazardous Substances (Classes 1 to 5 Controls) Regulations and Regulation 9 of the Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations, the substance must be under the personal control of an Approved Handler when present in a quantity greater than or equal to those indicated below.

Class of substance	Quantities
6.7A	10 kg or more, if solid 10 L or more, if liquid
2.1.2A	3 000 L aggregate water capacity

National Inventory	Status
Australia - AICS	N (mineral oil)
Canada - DSL	N (mineral oil)
China - IECSC	N (mineral oil)
Europe - EINEC / ELINCS / NLP	N (mineral oil)
Japan - ENCS	N (gasoline; mineral oil)
Korea - KECI	N (mineral oil)
New Zealand - NZIoC	N (mineral oil)
Philippines - PICCS	N (mineral oil)
USA - TSCA	N (mineral oil)

Legend:

Y = All ingredients are on the inventory N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)

SECTION 16 OTHER INFORMATION**Other information****Ingredients with multiple cas numbers**

Name	CAS No
gasoline	8006-61-9, 86290-81-5

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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TEL (+61 3) 9572 4700.

Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name : Shell TELLUS OIL S 46
Uses : Hydraulic oil

Manufacturer/Supplier : SOPUS Products
PO BOX 4427
Houston, TX 77210-4427
USA

MSDS Request : 877-276-7285

Emergency Telephone Number

Spill Information : 877-242-7400

Health Information : 877-504-9351

2. COMPOSITION/INFORMATION ON INGREDIENTS

Highly refined mineral oils and additives.

The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

3. HAZARDS IDENTIFICATION

Emergency Overview	
Appearance and Odour	: Amber. Liquid. Slight hydrocarbon.
Health Hazards	: High-pressure injection under the skin may cause serious damage including local necrosis.
Safety Hazards	: Not classified as flammable but will burn.
Environmental Hazards	: Not classified as dangerous for the environment.

Health Hazards : Not expected to be a health hazard when used under normal conditions.

Health Hazards Inhalation : Under normal conditions of use, this is not expected to be a primary route of exposure.

Skin Contact : Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.

Eye Contact : May cause slight irritation to eyes.

Ingestion : Low toxicity if swallowed.

Other Information : High-pressure injection under the skin may cause serious damage including local necrosis. Used oil may contain harmful impurities.

Signs and Symptoms : Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Local necrosis is evidenced by delayed onset of pain and tissue damage a few hours following injection. Ingestion may result in nausea, vomiting and/or diarrhoea.

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Aggravated Medical Condition	: Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Skin.
Environmental Hazards	: Not classified as dangerous for the environment.
Additional Information	: Under normal conditions of use or in a foreseeable emergency, this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

4. FIRST AID MEASURES

General Information	: Not expected to be a health hazard when used under normal conditions.
Inhalation	: No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.
Skin Contact	: Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention. When using high pressure equipment, injection of product under the skin can occur. If high pressure injuries occur, the casualty should be sent immediately to a hospital. Do not wait for symptoms to develop. Obtain medical attention even in the absence of apparent wounds.
Eye Contact	: Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion	: In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.
Advice to Physician	: Treat symptomatically. High pressure injection injuries require prompt surgical intervention and possibly steroid therapy, to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthetics, and wide exploration is essential.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point	: Typical 218 °C / 424 °F (PMCC / ASTM D93)
Upper / lower Flammability or Explosion limits	: Typical 1 - 10 %(V)(based on mineral oil)
Auto ignition temperature	: > 320 °C / 608 °F
Specific Hazards	: Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds.

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- Suitable Extinguishing Media** : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
- Unsuitable Extinguishing Media** : Do not use water in a jet.
- Protective Equipment for Firefighters** : Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe all relevant local and international regulations.

- Protective measures** : Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.
- Clean Up Methods** : Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.
- Additional Advice** : Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

- General Precautions** : Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
- Handling** : Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used.
- Storage** : Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Storage Temperature: 0 - 50 °C / 32 - 122 °F
- Recommended Materials** : For containers or container linings, use mild steel or high density polyethylene.
- Unsuitable Materials** : PVC.
- Additional Information** : Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Occupational Exposure Limits**

Material	Source	Type	ppm	mg/m3	Notation
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Material Safety Data Sheet

Oil mist, mineral	ACGIH	TWA(Mist.)		5 mg/m3	
Oil mist, mineral	ACGIH	STEL(Mist.)		10 mg/m3	

- Exposure Controls** : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.
- Personal Protective Equipment** : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
- Respiratory Protection** : No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65 °C (149 °F)].
- Hand Protection** : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
- Eye Protection** : Wear safety glasses or full face shield if splashes are likely to occur.
- Protective Clothing** : Skin protection not ordinarily required beyond standard issue work clothes.
- Monitoring Methods** : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
- Environmental Exposure Controls** : Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Amber. Liquid.
Odour	: Slight hydrocarbon.
pH	: Not applicable.
Initial Boiling Point and Boiling Range	: > 280 °C / 536 °F estimated value(s)
Pour point	: Typical -30 °C / -22 °F
Flash point	: Typical 218 °C / 424 °F (PMCC / ASTM D93)
Upper / lower Flammability or Explosion limits	: Typical 1 - 10 %(V) (based on mineral oil)
Auto-ignition temperature	: > 320 °C / 608 °F
Vapour pressure	: < 0.5 Pa at 20 °C / 68 °F (estimated value(s))
Density	: Typical 876 kg/m ³ at 15 °C / 59 °F
Water solubility	: Negligible.
n-octanol/water partition coefficient (log Pow)	: > 6 (based on information on similar products)
Kinematic viscosity	: Typical 46 mm ² /s at 40 °C / 104 °F
Vapour density (air=1)	: > 1 (estimated value(s))
Evaporation rate (nBuAc=1)	: Data not available

10. STABILITY AND REACTIVITY

Stability	: Stable.
Conditions to Avoid	: Extremes of temperature and direct sunlight.
Materials to Avoid	: Strong oxidising agents.
Hazardous Decomposition Products	: Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	: Information given is based on data on the components and the toxicology of similar products.
Acute Oral Toxicity	: Expected to be of low toxicity: LD50 > 5000 mg/kg , Rat
Acute Dermal Toxicity	: Expected to be of low toxicity: LD50 > 5000 mg/kg , Rabbit
Acute Inhalation Toxicity	: Not considered to be an inhalation hazard under normal conditions of use.
Skin Irritation	: Expected to be slightly irritating. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Irritation	: Expected to be slightly irritating.
Respiratory Irritation	: Inhalation of vapours or mists may cause irritation.
Sensitisation	: Not expected to be a skin sensitiser.
Repeated Dose Toxicity	: Not expected to be a hazard.
Mutagenicity	: Not considered a mutagenic hazard.
Carcinogenicity	: Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC). Other components are not known to be associated with carcinogenic effects.

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Reproductive and Developmental Toxicity : Not expected to be a hazard.

Additional Information : Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible. High pressure injection of product into the skin may lead to local necrosis if the product is not surgically removed.

12. ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Acute Toxicity : Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.

Mobility : Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.

Persistence/degradability : Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.

Bioaccumulation : Contains components with the potential to bioaccumulate.

Other Adverse Effects : Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

13. DISPOSAL CONSIDERATIONS

Material Disposal : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.

Container Disposal : Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.

Local Legislation : Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. TRANSPORT INFORMATION

Material Safety Data Sheet**US Department of Transportation Classification (49CFR)**

This material is not subject to DOT regulations under 49 CFR Parts 171-180.

IMDG

This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)

This material is not classified as dangerous under IATA regulations.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Federal Regulatory Status**Notification Status**

EINECS	All components listed or polymer exempt.
TSCA	All components listed.
DSL	All components listed.

SARA Hazard Categories (311/312)

No SARA 311/312 Hazards.

State Regulatory Status**California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)**

This material does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

16. OTHER INFORMATION

NFPA Rating (Health, Fire, Reactivity)	: 0, 1, 0
MSDS Version Number	: 5.0
MSDS Effective Date	: 07/03/2008
MSDS Revisions	: A vertical bar () in the left margin indicates an amendment from the previous version.
MSDS Regulation	: The content and format of this MSDS is in accordance with the

Material Safety Data Sheet

- MSDS Distribution** : OSHA Hazard Communication Standard, 29 CFR 1910.1200.
: The information in this document should be made available to all who may handle the product.
- Disclaimer** : The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.



Safety Data Sheet

Liquefied Petroleum Gas (LPG)

Issued: March 2011

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

Product name:	Easigas Liquefied Petroleum Gas (LPG)
Product code:	1075
Product type:	Liquefied Petroleum Gas
Recommended uses:	LPG is used as a domestic, commercial, industrial and automotive fuel, a feedstock in chemical processes and as propellant in pressurised aerosol containers. If Shell Commercial Butane is used for other purposes, please contact the supplier as listed below.
Known misuses / abuses:	Sniffing from aerosols, lighter refills and cylinders by young people.
Address:	Gate 5, Hibiscus Road, Alrode, 1451
Contact numbers:	
Telephone:	(011) 389 - 7700
Fax:	(011) 864 - 9000
Emergency :	(011) 389 - 7700

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms:	Liquefied Petroleum Gas, LPG				
Preparation description:	Complex mixture of hydrocarbons consisting predominantly of a 50:50 mixture of Propane and Butane and some other C4 and higher hydrocarbons. Low concentrations of sulphur, hydrogen sulphide and mercaptans may be present. It may also contain one or more of the following additives: odourants (usually ethyl mercaptan), anti-icing agents, 1,3-butadiene, classified as a Category 1 carcinogen and a Category 2 mutagen, may be present at a concentration of less than 0.1 %(m/m).				
Dangerous components/constituents:	Component name	EINECS number	Content range	EU hazard	R phrases
	Petroleum gases, liquefied	270-704-2	>99 %(m/m)	F+	R12
	1,3-butadiene	203-450-8	<0.1 %(m/m)	F+, Carc Cat 1, Muta Cat 2	R12, R45, R46
	Ethyl mercaptan	200-837-3	<0.01 %(m/m)	F, Xn, N	R11, R20, R50, R53
	Note: CAS numbers for the substances listed above are as follows: Petroleum gases, liquefied - 68476-85-7; 1,3-butadiene - 106-99-0; Ethyl mercaptan - 75-08-1.				
	Dangerous Substances Directive, 67/548/EEC, Annex I numbers for the above substances are: Petroleum gases, liquefied - 649-202-00-6; 1,3-butadiene - 601-013-00-X; Ethyl mercaptan - 016-022-00-9.				

3. HAZARDS IDENTIFICATION

EU Classification:	Extremely flammable
Human health hazards:	Prolonged exposure to vapour concentrations may affect the central nervous system. May cause frost burns due to low boiling point.
Safety hazards:	Extremely flammable liquefied gas. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Environmental hazards:	No specific hazards under normal use conditions.

4. FIRST AID MEASURES

Symptoms and effects:	Liquid may cause skin and eye burns. Prolonged exposure to vapour concentrations above the recommended occupational exposure standard may cause headache, dizziness, weakness, nausea, confusion, blurred vision, asphyxiation, cardiac irregularities, unconsciousness and even death.
Protection of first aiders:	Take appropriate steps to avoid fire, explosion and inhalation hazards.
First Aid - Inhalation:	Remove to fresh air. Keep warm and at rest. If the casualty is stuporous, some physical restraint may be necessary to prevent injury. If breathing but unconscious, place in the recovery position. If breathing has stopped, apply artificial respiration. If heartbeat absent give external cardiac compression.) Monitor breathing and pulse. OBTAIN MEDICAL ATTENTION IMMEDIATELY.
First Aid - Skin:	Drench affected parts with water. Remove contaminated clothing, rings, watches, etc., if possible, but do not attempt to do so if they are adhering to the skin. Do not attempt to reheat the affected parts rapidly - reheat slowly. Cover with a sterile dressing. Do not apply ointments or powders. Note that contaminated clothing may be a fire hazard. Contaminated clothing should be soaked with water before being removed. It must be laundered before reuse.
First Aid - Eye:	DO NOT DELAY. Flush eye with copious quantities of water. Cover eye with a sterile dressing. OBTAIN MEDICAL ATTENTION IMMEDIATELY.
First Aid - Ingestion:	In the unlikely event of ingestion, obtain medical attention immediately.
Advice to physicians:	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Specific hazards:	Hazardous combustion products may include: carbon monoxide, oxides of nitrogen, oxides of sulphur, unburnt hydrocarbons. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Sustained fire attack on vessels may result in a Boiling Liquid Expanding Vapour Explosion (BLEVE).
Extinguishing media:	Shut off supply. If not possible and no risk to surroundings, let the fire burn itself out. Large fires should only be fought by properly trained fire fighters. Dry powder, carbon dioxide may be used for small fires. Water fog should be used to assist the approach to the source of the fire. All containers subject to fire or to radiant heat should be cooled by spraying with water.
Unsuitable extinguishing media:	Water in a jet. Use of Halon extinguishers should be avoided for environmental reasons.
Other information:	Keep adjacent containers cool by spraying with water. All storage areas should be provided with adequate fire fighting facilities.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Vapour can travel along the ground for considerable distances. Remove all possible sources of ignition in the surrounding area and evacuate all personnel. Shut off leaks, if possible without personal risk. Do not enter confined spaces. Ventilate contaminated area thoroughly. Do not breathe: vapour. Avoid contact with: skin, eyes and clothing. Take off immediately all contaminated clothing - but do not attempt to do so if clothing adhering to the skin. Contaminated clothing may be a fire hazard and therefore should be soaked with water before being removed.
Personal protection:	Wear: monogoggles, chrome leather; neoprene or nitrile rubber gloves, safety shoes or boots.
Environmental precautions:	No specific measures.
Clean-up methods - small spillage:	Allow to evaporate. Do not disperse liquid using water.
Clean-up methods - large spillage:	Attempt to disperse the vapour or to direct its flow to a safe location, for example by using water fog sprays. Otherwise treat as for small spillage.
Other information:	Test atmosphere for vapours to ensure safe working conditions before other personnel are allowed into the area. Local authorities should be advised if significant spillage's cannot be contained. Observe all relevant local regulations.

7. HANDLING AND STORAGE

Handling:	This product is intended for use in closed systems only. Do not use in confined areas. When using do not eat, drink or smoke. Do not breathe: vapour. Take precautionary measures against static discharges. Use cylinders in the upright position only - unless specially designed for use in other orientations.
Storage:	Store only in purpose-designed, appropriately labelled pressure vessels or cylinders. Store outdoors or in adequately ventilated storerooms. Locate pressure vessels or cylinders away from heat and other sources of ignition. Do not store in the vicinity of cylinders containing compressed oxygen or other strong oxidisers. All storage areas should be provided with adequate fire fighting facilities. Keep out of reach of children.
Specific uses:	Fuel for use in suitably designed domestic and industrial combustion equipment (e.g. heating, drying), domestic and commercial cooking appliances and motor vehicles. Also used as an aerosol propellant and a feedstock for the petrochemical industry. This product must not be used in applications other than the above without first seeking the advice of the supplier.
Product transfer:	Electrostatic charges may be generated during pumping. Ensure electrical continuity by bonding all equipment. Avoid contact with equipment in view of the risk of cold burns. Do not use compressed air for filling, discharging or handling.
Tank cleaning:	Cleaning, inspection and maintenance of storage tanks is a specialist operation which requires the implementation of strict procedures and precautions. These include issuing of work permits, gas-freeing of tanks, using a manned harness and lifelines and wearing air-supplied breathing apparatus. Prior to entry and whilst cleaning is underway, the atmosphere within the tank must be monitored using an oxygen meter and/or explosimeter.
Recommended materials:	For containers use: mild steel. For seals and gaskets, use: compressed asbestos fibre, or other materials specifically approved for use with this product. Spirally wound metal gaskets are also suitable.
Unsuitable materials:	With respect to metals, aluminium should not be used if there is a risk of caustic contamination of the product. Certain forms of cast iron are unsuitable. With respect to non-metallic materials, natural rubbers must not be used. Nitrile rubbers and certain plastics may also be unsuitable, depending on the material specification and intended use.
Other information:	Ensure that all local regulations regarding handling and storage facilities are followed. Where large quantities of liquefied petroleum gas are stored, emergency and disaster plans must be developed in conjunction with local authorities.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering control measures:	Use only in well ventilated areas. Provide adequate ventilation in storage areas.			
Occupational exposure standards:	ACGIH threshold limit values are given below. Lower exposure limits may apply locally.			
	<i>Component name</i>	<i>Limit type</i>	<i>Value</i>	<i>Unit</i> <i>Other info</i>
	Liquefied petroleum gas	TWA	2500	ppm
	Butane	TWA	800	ppm
	1,3-butadiene	TWA	2	ppm
	Hydrogen sulphide	TWA	10	ppm
	Hydrogen sulphide	STEL	15	ppm
	Ethyl mercaptan	TWA	0.5	ppm
Note: ACGIH - 'Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices', American Conference of Governmental Hygienists, Cincinnati, Ohio, 1996 edition.				
Respiratory protection:	Not normally required. Inhalation of LPG vapours should be minimised. If there is a risk of exposure to high vapour concentrations, respiratory protection / breathing apparatus should be worn.			
Hand protection:	Wear neoprene or nitrile rubber gloves or chrome leather to EN 374 and EN 420. Gloves must maintain flexibility down to the atmospheric boiling point of this product. It may be necessary to increase frequency of changing gloves if immersion or prolonged contact is likely.			
Eye protection:	If splashes are likely to occur, wear goggles or full-face visors to EN 166.			
Body protection:	Protective footwear to EN 345 should be worn when handling cylinders. If splashes are likely to occur, wear long-sleeved overalls made of cotton (100%) or other natural fibres.			
Environmental exposure controls:	No specific measures. Because of its high volatility, LPG is unlikely to cause ground or water pollution.			
Other information:	PPE should be certified according to EC examination and be 'CE' marked.			

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquefied gas
Colour:	Colourless
Odour:	Distinctive and unpleasant if stench ed, odourless if unstench ed
Boiling point:	circa - 45°C Propane and 0°C Butane
Vapour pressure:	circa 650 kPa at 20°C
Density:	circa 555 kg/m ³ at 15°C
Vapour density (air=1):	circa 1.8 at 15°C
Flash point:	-104°C
Flammability limit - lower:	2.2 %(V/V)
Flammability limit - upper:	10 %(V/V)
Auto-ignition temperature:	> 450°C
Explosive properties:	In use, may form flammable/explosive vapour-air mixture
Oxidising properties:	Not applicable
Solubility in water:	Data not available
n-octanol/water partition coefficient:	log P _{ow} = 2.3 (estimated value)
Evaporation rate:	Data not available

10. STABILITY/REACTIVITY

Stability:	Stable.
Conditions to avoid:	Heat, flames and sparks.
Materials to avoid:	Strong oxidising agents.
Hazardous decomposition products:	The substances arising from the thermal decomposition of these products will largely depend upon the conditions bringing about decomposition. The following substances may be expected from normal combustion: carbon dioxide, carbon monoxide, polycyclic aromatic hydrocarbons, unburnt hydrocarbons, unidentified organic and inorganic compounds, particulate matter, nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

Basis for assessment:	Toxicological data have not been determined specifically for this product. Information given is based on data on the components and the toxicology of similar products.
Acute toxicity - oral:	Data not available.
Acute toxicity - dermal:	Data not available.
Acute toxicity - inhalation:	LC ₅₀ >5 mg/l (Gas).
Eye irritation:	Not irritating. Liquid causes cold burns.
Skin irritation:	Not irritating. Liquid causes cold burns.
Respiratory irritation:	Not irritating (Gas).
Skin sensitisation:	Not expected to be a skin sensitizer.
Carcinogenicity:	This product has not been evaluated in long-term chronic exposure tests. May contain 1, 3-butadiene, classified as a Category 1 carcinogen at a concentration of less than 0.1% (m/m). Other components are not known to be associated with carcinogenic effects.
Mutagenicity:	This product has not been evaluated in long-term chronic exposure tests. May contain 1, 3-butadiene, classified as a Category 2 mutagen, at a concentration of less than 0.1% (m/m). Other components are not known to be associated with mutagenic effects.
Human effects:	See Section 4 for information regarding acute effects to humans.

12. ECOLOGICAL INFORMATION

Basis for assessment:	Ecotoxicological data have not been determined specifically for this product. Information given is based on data on the components and the toxicology of similar products.
Mobility:	Evaporates extremely rapidly from water or soil surfaces. Disperses rapidly in air.
Persistence/degrad ability:	Oxidises rapidly by photochemical reactions in air.
Bioaccumulation:	Does not bioaccumulate.
Ecotoxicity:	Low acute toxicity to mammals.
Sewage treatment:	Not applicable.
Other information:	In view of the high rate of loss from solution, the product is unlikely to pose a significant hazard to aquatic life.

13. DISPOSAL CONSIDERATIONS

Precautions:	See Section 8.
Product disposal:	Given the nature and uses of this product, the need for disposal seldom arises. If necessary, dispose by controlled combustion in purpose-designed equipment. If this is not possible, contact the supplier.
Container disposal:	Return part-used or empty cylinders to the supplier.
Local legislation:	(To be provided by the Easigas on request)

14. TRANSPORT INFORMATION

UN Number:	1075
UN Class/Packing Group:	2.1, Packing Group not applicable
UN Proper Shipping Name:	Hydrocarbon Gas Mixture, Liquefied, n.o.s. (Propane Butane Mixture)
UN Number (sea transport, IMO):	1075
IMO Class/Packing Group:	2.1, Packing Group not applicable
IMO Symbol:	Flammable Gas
IMO Marine Pollutant:	No
IMO Proper Shipping Name:	Hydrocarbon Gas Mixture, Liquefied, n.o.s. (Propane Butane Mixture)
ADR/RID Class/Item:	2F
ADR/RID Symbol:	Flammable Gas Shunt With Care (RID only)
ADR/RID Kemler Number:	23-1965
ADR/RID Proper Shipping Name:	Hydrocarbon Gas Mixture, Liquefied, n.o.s. Mixture AO1, Mixture AO2 and Mixture AO (Trade name: butane)
ADNR Class/Item:	(To be provided by the supplier)
UN Number (air transport, ICAO):	1075
IATA/ICAO Class/Packing Group:	2.1, Packing Group not applicable
IATA/ICAO Symbol:	Flammable Gas
IATA/ICAO Proper Shipping Name:	Hydrocarbon Gas Mixtures, Liquefied, n.o.s. (Propane Butane Mixture)
Local regulations:	(To be provided by the supplier)
Other information:	UN Number 1075 is an AEGPL recommendation. Other numbers may be required to be used locally. Transport of this product on passenger aircraft is forbidden.

15. REGULATORY INFORMATION

EC Label name:	Contains propane and butane
EC Classification:	Extremely Flammable

EC Symbols:	F+
EC Risk Phrases:	R12 Extremely flammable
EC Safety Phrases:	S2 Keep out of the reach of children. S9 Keep container in a well-ventilated place. S16 Keep away from sources of ignition - No Smoking.
EINECS (EC):	All components listed
National legislation:	SABS 087 Standards
Other information:	Mobile gas cylinders containing butane, propane or liquid petroleum gas are currently exempt from the health labelling provisions of European Commission Directive 67/548/EEC.

16. OTHER INFORMATION

Relevant R phrases:	R12 Extremely flammable
Uses and restrictions:	Fuel for use in suitably designed domestic and industrial combustion equipment, domestic cooking appliances and motor vehicles. Also used as an aerosol propellant and a feedstock for the petrochemical industry. This product must not be used in applications other than the above without first seeking the advice of the supplier. Abuse involving repeated and prolonged exposures to high concentrations of vapour ('sniffing') may cause death by either asphyxiation or cardiac arrest. Abuse involving direct ingestion of the liquefied gas may cause death by freezing the larynx and causing the lungs to fill with fluid - an effect similar to drowning.
Technical contact pt.:	Easigas (PTY) Ltd.
Technical contact number:	
Telephone:	(011) 389 7700
Fax:	(011) 864 9000
SDS history:	Edition number: 3. First issued: May 24, 1996. Revised: September 24, 1996, 27 January 2003
Revisions highlighted:	Section 2: List of dangerous components added. Section 3 and 7: Editorial changes. Sections 6 and 8: Revised personal protection. Section 12: Estimated Ecotoxicity data deleted. Changes indicated by vertical bar to left of text.
SDS distribution:	This document contains important information to ensure the safe storage, handling and use of this product. The information in this document should be brought to the attention of the person in your organisation responsible for advising on safety matters.
Other information:	The meaning of the Risk phrases quoted in Section 2 of this safety data sheet that relate to the classification of 1,3-butadiene and ethyl mercaptan but that do not apply to the classification of this product are: R20 Harmful by inhalation R45 May cause cancer R46 May cause heritable genetic damage R50 Very toxic to aquatic organisms R53 May cause long-term adverse effects in the aquatic environment Useful references include the following: The Institute of Petroleum, London, 'Model Code of Safe Practice', Part 9, current edition. The UK LP Gas Association Codes of Practice. CONCAWE, Brussels, 'Liquefied petroleum gas'. Product Dossier No 92/102, 1992.
References:	

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not be construed as guaranteeing any specific property of the product.

Annex 7: Employee Induction Programme

Induction Program for New Employees

Name:

Subject Tackled	Date	Trainer	Trainee
Company History			
Company Mission & Values			
Product/Service Knowledge			
Office & Facilities Familiarization (Site Visit)			
Introduction to Colleagues			
Company Rules (e.g. timeliness, housekeeping, discipline, energy saving methods, environmental issues, leave booking, sick leave reporting, injury at work, car maintenance etc)			
Conditions of Employment			
Basic Health & Safety Guidelines			
Basic Awareness of QMS			
Understanding Quality Policy			
Understanding Quality Objectives			
Understanding Customer Satisfaction			
Awareness of procedures			

I confirm that the above induction program has been completed for the above employee:

Signature of Managing Director or other authorized officer.

.....

Date.....

The completed documentation was received and recorded in accordance with the Data Protection Act

Annex 8: Employee Training Record Form

Employee Record

Personal Details:

Name:

Address:

Tel No:

Mob No:

Married/Single: If married, give name of wife/husband and no. of children

Date of Employment:

Education:

Primary School: School Name

Attended From

To

Secondary School: School Name

Attended From

To

O'Level Passes in: Subjects

A'Level Passes in: Subjects

Any Other Courses or Certificates:

Previous Employer	Nature of Work	Date

Induction Training Provided:

Date Conducted:

Areas Covered:

Trainer Signature:

<u>Training Type</u>	<u>Date From-To</u>	<u>Trainer</u>	<u>Trainee</u>	<u>Verification of Training</u>

Annex 9: Test Report for Wood from Old TVs

SAL Ref : 484824
Client Ref : R Cortis

**Hazardous Property Assessment
Waste (England and Wales) Regulations 2011**

**Sample SAL Ref 494824-001
Client Ref TV Wood Chips**

Sample Description : wood chips-natural appearance

<i>Hazard Group</i>	<i>Definition</i>	<i>Assessment Method Ref WM2 3rd edition Appendix C :Environment Agency</i>	<i>Result</i>	<i>Conclusion</i>
H1	Explosive	EC Test Method A14, C1.7.1	Not explosive after 5mins. treatment with open flame.	Not hazardous
H2	Oxidising	EC Test M C2.7.	No oxidising action action after 5 mins. treatment with open flame.	Not hazardous
H3A and H3B	Flammable	Information supplied by client	Flash point >55 C	Not hazardous
H4	Irritant	probe	pH=7	Not Irritant
H5	Harmfull	GC MS SVOC scanning run Total Metal concentration ICP OES analysis	Total SVOC content 0.05% Worst case threshold not exceeded Total metals less than generic cut off 0.1 %	Not Hazardous Threshold not exceeded Not hazardous

SAL Ref : 484824
Client Ref : R Cortis

Hazardous Property Assessment Waste (England and Wales) Regulations 2011

<i>Hazard Group</i>	<i>Definition</i>	<i>Assessment Method Ref WM2 3rd edition Appendix C :Environment Agency</i>	<i>Result</i>	<i>Conclusion</i>
H6	Toxic	Not tested	See Harmful	Not hazardous
H7	Carcinogenic	See H5	Thresholds not exceeded for worst case situation (0.1%)	Not hazardous
H8	Corrosive	probe	pH 7	Not Hazardous
H9	Infectious	Not tested	No evidence from process or products used to indicate any hazard.	Not Hazardous
H10	Toxic for Reproduction	Not tested	No evidence from process or products used to indicate any hazard. See H5	Not Hazardous
H11	Mutagenic	Not tested	No evidence from process or products used to indicate any hazard. See H5	Not Hazardous
H12	Toxic Gas Production	C12.5	No evidence of gas production -stable aqueous suspension	Not Hazardous
H13	Sensitizing	GC and ICP analysis	No evidence to suspect sensitizing products present.	Not Hazardous
H14	Eco-toxicity	Direct testing on biological organism not carried out	Chemical evidence suggests no ecotoxicity.	Not Hazardous
H15	Waste capable of forming another on disposal	Review of all results	Technically insignificant risk	Not Hazardous
Overall Conclusion			Wood chips with no contamination of concern.	Not Hazardous EWC Waste Classification 03-01-05 MN

SAL Ref : 484824
Client Ref : R Cortis

Hazardous Property Assessment **Waste (England and Wales) Regulations 2011**

This assessment is based on the laboratory test data which forms part of this report and the information provided by the client.

Assessment prepared by; W A Cohen bcohen@salltd.co.uk 07778 595814
Date of Assessment: 24th June 2015

Risk phrases used in this assessment are taken from Chemicals (Hazard Information and Packaging for Supply) Regulations 2009.

Note; The assessment conclusions are based on protocols published in: Environment Agency (England and Wales) : Hazardous Waste: Interpretation of the definition and classification of hazardous waste (3rd Edition) 2013

A “Not Hazardous” means that thresholds for the Waste Regulations are not exceeded. This does not necessarily imply that the waste does not pose a risk to human health or the environment.



Scientific Analysis Laboratories Ltd

Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Scientific Analysis Laboratories is a
limited company registered in England and
Wales (No 2514788) whose address is at
Hadfield House, Hadfield Street, Manchester M16 9FE

Report Number: 484824-1

Date of Report: 24-Jun-2015

Customer: Robert Cortis
7
Little Danny Fl.2
Dun Xand Cortis Str
Birkirkara BKR 1530
Malta

Customer Contact: Mr Robert Cortis

Customer Job Reference:

Date Job Received at SAL: 08-May-2015

Date Analysis Started: 11-Jun-2015

Date Analysis Completed: 24-Jun-2015

The results reported relate to samples received in the laboratory
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with Section 25 of the SAL Quality Manual

Report checked
and authorised by :
Bianca Prince
Project Management

Issued by :
Bianca Prince
Project Management

SAL Reference: 484824 Customer Reference: Bulk Product Analysed as Bulk Product Miscellaneous					
SAL Reference				484824 001	
Customer Sample Reference				TV Wood Chippings (476118/001)	
Date Sampled				06-MAY-2015	
Determinand	Method	Test Sample	LOD	Units	
SVOC (Top 10 screen)	T16	AR	10	mg/kg	Bis (2-ethylhexyl)phthalate (100) 380
					Di-n-butylphthalate (100) 110
					No other compounds detected above (100) 20

SAL Reference: 484824 Customer Reference: Bulk Product Analysed as Bulk Product Metals (15) Ni,Zn,Cd,Pb,Cr,As,Hg,Sb,Mn,Tl,Be,Co,Se,Te,V					
SAL Reference				484824 001	
Customer Sample Reference				TV Wood Chippings (476118/001)	
Date Sampled				06-MAY-2015	
Determinand	Method	Test Sample	LOD	Units	
Antimony	T6	AR	10	mg/kg	<10
Arsenic	T6	AR	1	mg/kg	<1
Beryllium	T6	AR	10	mg/kg	<10
Cadmium	T6	AR	1	mg/kg	<1
Chromium	T6	AR	1	mg/kg	<1
Cobalt	T6	AR	10	mg/kg	<10
Lead	T6	AR	1	mg/kg	3
Manganese	T6	AR	1	mg/kg	85
Mercury	T6	AR	1	mg/kg	<1
Nickel	T6	AR	1	mg/kg	<1
Selenium	T6	AR	10	mg/kg	<10
Tellurium	T6	AR	10	mg/kg	<10
Thallium	T6	AR	10	mg/kg	<10
Vanadium	T6	AR	10	mg/kg	<10
Zinc	T6	AR	1	mg/kg	15

Index to symbols used in 484824-1

Value	Description
AR	As Received
100	LOD determined by sample aliquot used for analysis
N	Analysis is not UKAS accredited

Notes

These samples have been analysed exceeding recommended holding times for SVOC analysis. It is possible therefore that the results provided may be compromised.

Method Index

Value	Description
T6	ICP/OES
T16	GC/MS

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
SVOC (Top 10 screen)	T16	AR	10	mg/kg	N	001
Antimony	T6	AR	10	mg/kg	N	001
Arsenic	T6	AR	1	mg/kg	N	001
Beryllium	T6	AR	10	mg/kg	N	001
Cadmium	T6	AR	1	mg/kg	N	001
Chromium	T6	AR	1	mg/kg	N	001
Cobalt	T6	AR	10	mg/kg	N	001
Lead	T6	AR	1	mg/kg	N	001
Manganese	T6	AR	1	mg/kg	N	001
Mercury	T6	AR	1	mg/kg	N	001
Nickel	T6	AR	1	mg/kg	N	001
Selenium	T6	AR	10	mg/kg	N	001
Tellurium	T6	AR	10	mg/kg	N	001
Thallium	T6	AR	10	mg/kg	N	001
Vanadium	T6	AR	10	mg/kg	N	001
Zinc	T6	AR	1	mg/kg	N	001



Annex 10: End-of-Waste Permit for Wood



Application No: EoW 001/15

Date: 13 July 2015

Applicant:

Name: Mr. Charles Galea
o.b.o. Electronic Products Ltd

Address: Electronic Products Ltd
Ta' Maggi Industrial Estate
Zabbar

Company Registration No.: C21306

Environmental Permit No.: EP009/10

Application Type: End-of-waste status

Date Received: 3 June 2015

Proposal: Application for end-of-waste criteria for waste wood
to be used as animal bedding and absorbent

The Authority hereby acknowledges end-of-waste status for waste wood (animal bedding) in terms of the Waste Regulations, 2011, as published by Legal Notice 184 of 2011, in accordance with the application described above, subject to the conditions specified in this document numbered from pages 1 to 7.

Approved by:

A handwritten signature in black ink, appearing to read 'Perit Vincent Cassar', with a large, sweeping initial 'V'.

Perit Vincent Cassar

Chairman

Malta Environment and Planning Authority

1. Officer's Report

Background

In accordance with sub-regulation (2) of regulation 6 laid down in The Waste Regulations, L.N. 184 of 2011, where end-of-waste criteria have not been set at Community level, it is up to the competent authority to decide on a case by case basis whether a certain waste has ceased to be a waste.

For a waste to cease to be a waste it must comply with the provisions laid down in regulation 6 of L.N. 184 of 2011, quoted hereunder for ease of reference:

"6. (1) Waste shall cease to be waste within the meaning of regulation 4 when it has undergone a recovery, including recycling, operation and complies with the following conditions:

- (a) the substance or object is commonly used for specific purposes;
 - (b) a market or demand exists for such a substance or object;
 - (c) the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products;
 - (d) the use of the substance or object will not lead to overall adverse environmental or human health impacts; and
 - (e) the substance or object shall be accompanied by a declaration as set out in Schedule 10.
- (2) Where end-of-waste criteria have not been set at Community level, the competent authority shall decide on a case by case basis whether a certain waste has ceased to be a waste and may also develop specific criteria for certain waste streams. The criteria developed by the competent authority shall include limit values for pollutants where necessary and shall take into account any possible adverse environmental effects of the substance or object.
- (3) In cases where, legislation and standards applicable to products do not exist for a recovered waste, the holder is to declare that legislation and standards applicable to products do not exist for that substance or object.
- (4) In cases where, the substance or object is to be further treated to remove foreign materials prior to being used as a raw material in an industrial process, that substance or object shall not cease to be a waste within the meaning of regulation 4.
- (5) Waste which ceases to be waste in accordance with sub-regulation (1) of this regulation, shall also cease to be waste for the purpose of the recovery and recycling targets set out in the Packaging and Packaging Waste Regulations, 2006, Electrical and Electronic Equipment Regulations, 2007, End of Life Vehicles Regulations, 2004 and Batteries and Accumulators Regulations, 2010 and other relevant Community legislation when the recycling or recovery requirements of that legislation are satisfied."

Policy Context

The relevant policy documents are:

- L.N. 184 of 2011 and amendments thereto as laid down in S.L. 504.37

Consultations

No consultations were carried out.

Position

Following the review of the documentation submitted by the applicant it was concluded that:

- since the recycling operation is carried out in an authorised facility;
- since the substance is commonly used for specific purposes;
- since a market exists for such a substance;

the material may be declassified from being a waste and therefore no longer subject to legislation regulating waste, further provided that:

- (i) the recycled animal bedding resulting from the treatment process complies with the requirements laid down in section 2 to this report and any other applicable standards;
- (ii) the recycled animal bedding fulfils the technical requirements for the specific purposes and meets existing national and Union legislation and standards applicable to animal bedding products; and
- (iii) the use of the substance or object as animal bedding will not lead to overall adverse environmental or human health impacts.

Furthermore, as end-of-waste criteria for wood to be used as animal bedding have not yet been set on a European Level, the end-of-waste approval by the Malta Environment and Planning Authority does not automatically imply that the recycled wood is not a waste for other EU Member States and third countries.

In this context, in the case of exports the applicant is to ensure that the countries of transit and country of destination do not classify the substance as waste under their national legislation.

Conclusion

In view of the documentation received and the comments and issues mentioned above, recycled wood waste to be used as animal bedding may no longer be considered as waste.

2. Recommendation

APPROVE – subject to the following conditions:

- a) This procedure/approval would no longer be valid once end-of-waste criteria for waste wood to be used as animal bedding and absorbent would be established by the EU.
- b) This procedure/approval is valid only for the processing of the following EWC code: 19 12 07 wood (other than that mentioned in 19 12 06) deriving from mechanical treatment of waste.
- c) The applicant shall maintain a record for each consignment by issuing a "Statement of Conformity with the End-of-Waste Criteria" (Annex I) with each consignment. These documents shall be kept for a minimum of three years and made available on request to the Competent Authority.
- d) The applicant is to submit a copy of all the Statements of Conformity as laid down in Annex 1 issued in a particular year together with the facility's annual report to be submitted to MEPA in accordance with EP009/10
- e) The applicant shall ensure that the wood resulting from the recovery operation is of grade A¹, that is "clean" recycled wood.
- f) The applicant shall ensure that the percentage of the non-wood component² in the material is less than or equal to 0.5% of the air dry weight for particles less than 1 mm in any dimension. There shall be no particles in the tested sample that are greater than 1 mm in any dimension.
- g) The applicant shall ensure that the recovered wood, shall not display any of the hazardous properties listed in Annex III to Directive 2008/98/EC. The recovered wood shall comply with the concentration limits laid down in Commission Decision 2000/532/EC, and not exceed the concentration limits laid down in Annex IV of Regulation 850/2004/EC of the European Parliament and of the Council.
- h) The applicant shall ensure that the recovered wood does not contain absorbed oil, solvents, paint, nails or other metal fixings that can be detected by visual inspection.
- i) The applicant shall ensure that hazardous waste shall not be used as input.
- j) The applicant shall ensure that the input waste approved by this application should have been treated to separate the wood from the non-wood components. The wood resulting from these operations shall be kept separate from any other waste.
- k) All treatment (sorting, separating, cleaning, shredding) needed to prepare the waste wood for direct use as animal bedding and absorbent shall have been completed.
- l) The quality of the recovered wood to be used as animal bedding shall comply with the following parameters³:

¹ WRAP PAS111 (2012): Specification for the requirements and test methods for processing waste wood

² A **non-wood component** is any material different from wood, which is present in recovered wood, and can be separated using dry sorting techniques. Examples of non-wood components are metals, plastic, glass, textiles, earth, sand, ash, dust, wax, bitumen, ceramics, rubber, fabric, paper and cardboard and synthetic organic substances.

³ WRAP (2007), Recycled plasterboard paper as animal bedding - Plasterboard technical report, UK.

Parameter	Content	Note
Particle size	To be agreed with the customer.	<i>The producer should ensure that material size does not cause discomfort to animals when trodden on.</i>
Moisture content	Less than 15%	<i>All bedding should be dry as harmful bacteria require a damp environment to proliferate. Straw bedding typically has a moisture content of 15%. The moisture content can be derived from the percentage dry oven matter.</i>
Biological contamination	<ul style="list-style-type: none"> • Escherichia coli (E. coli) • Salmonella spp. <p>in the recovered wood shall not exceed the upper limits laid down in table 1 - Biological testing – Test methods and upper limits.</p>	<p><i>Pathogens present in recycled wood can pose a risk to human and animal health.</i></p> <p><i>Salmonella spp. and Escherichia coli (E. coli) are commonly used indicator species for human and animal pathogens.</i></p> <p><i>Sample biological testing for the presence of pathogens shall be carried out on recycled wood intended for animal bedding and porous surface applications only.</i></p> <p><i>Where sample testing is to be carried out, it should be carried out by an independent third party laboratory.</i></p>
Chemical contamination	<ul style="list-style-type: none"> • No detectable contamination (e.g. by oils, solvents, wet paint). • Heavy metal content shall not exceed the thresholds laid down in Table – 2: Maximum tolerable level for heavy metal concentrations in cattle diets in point m. 	
Other materials	<p>Non-wood component in the material shall less than or equal to 0.5% of the air dry weight for particles less than 1 mm in any dimension.</p> <p>There shall be no particles in the tested sample that are greater than 1 mm in any dimension.</p>	<i>Physical contaminants such as sharps, metal objects, glass, wood shards, plastic straps or ties, plastic film or bags, foil or plastic membranes on the wood not only have the potential to cause injury to the cows, but could also create litter when spreading the resulting slurry.</i>

- m) For every 200 kg of waste wood treated, a test so as to determine whether the recovered wood complies with the parameters laid down in section 2(m) is to be carried out by an independent laboratory.

If the cows ingest heavy metals from the contaminated recovered wood, there could be potential for harm to the cows and for heavy metals to be transferred to the milk⁴.

Table 1: Biological testing – Test methods and upper limits⁵

Parameter	Test method	Unit	Upper limit
Escherichia coli (E. coli)	ISO 16649-2	CFU/g fresh mass	1,000 (One Thousand)
Salmonella spp.	Schedule 2, Part II of EN ISO 6579	25g fresh mass	Absent

Table 2: Maximum tolerable level for heavy metal concentrations in cattle diets⁶

Heavy metal	Maximum tolerable level (ppm)
Cadmium	0.5
Copper	115
Lead	30
Mercury	2

3. Duration of approval

- 3.1 This approval shall be valid as from its date of issuance until 31 December 2017.
- 3.2 Approval shall be valid until the period referred to in point 3.1, but shall be withdrawn in the event of untimely reporting or any other breach of the conditions laid down in this document. An application for renewal shall be submitted to the Authority not less than thirty (30) working days before the expiry of the validity of this approval.
- 3.3 Before this approval can be wholly or partially surrendered, an application for this surrender of the Approval shall be made by the Holder.

⁴ WRAP (2007), Recycled plasterboard paper as animal bedding - Plasterboard technical report, UK.

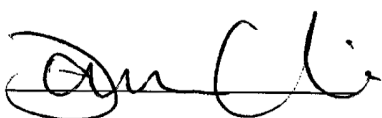
⁵ WRAP PAS111 (2012): Specification for the requirements and test methods for processing waste wood

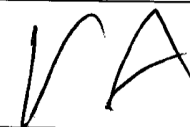
⁶ Source: AFES Circular 126, Agricultural & Forestry Experimental Station, University of Alaska Fairbanks.

This report to the Chairperson of the Malta Environment and Planning Authority has been prepared and endorsed by:

Officer: DARREN GORDINA

Endorsed by: KEVIN MERCIECA

Signature: 

Signature:  Kevin Mercieca
Unit Manager

Date: 29 JULY 2015

Date: 29 JULY 2015

Annex I

Statement of Conformity with the End-of-Waste Criteria

1.	Producer/importer of the recovered paper: Name: Address: Contact person: Telephone: Fax: E-mail:
2.	a) Content of non-wood components, in percentage points of air dry weight: b) Origin of the material (tick where appropriate) <input type="checkbox"/> Multi-material origin, such as from comingled collection <input type="checkbox"/> Mono-material origin, such as from source-separated collection
4.	Quantity of the consignment in kg.
5.	This consignment meets the criteria/conditions referred to in Approval EOW 001/15.
7.	The material in this consignment is intended exclusively for the use of animal bedding, and where applicable, also for the use as an absorbent.
8.	Declaration of the producer of the recovered wood: I certify that the above information is complete and correct and to my best knowledge: Name: Signature: Date:

Annex 11: Mercury Content of Crushed Fluorescent Tube Glass



Scientific Analysis Laboratories is a
limited company registered in England and
Wales (No 2514788) whose address is at
Hadfield House, Hadfield Street, Manchester M16 9FE

Scientific Analysis Laboratories Ltd

Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2404

Report Number: 318946-1

Date of Report: 15-Mar-2013

Customer: Robert Cortis
7
Little Danny Fl.2
Dun Xand Cortis Str
Birkirkara BKR 1530
Malta

Customer Contact: Mr Robert Cortis

Customer Job Reference: Crushed Glass
Date Job Received at SAL: 01-Mar-2013
Date Analysis Started: 05-Mar-2013
Date Analysis Completed: 15-Mar-2013

The results reported relate to samples received in the laboratory
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with QP22

Report checked
and authorised by :
Mary Drury
Project Manager

Issued by :
Mary Drury
Project Manager

SAL Reference: 318946 Customer Reference: Crushed Glass Bulk Product Analysed as Bulk Product Miscellaneous					
SAL Reference				318946 001	
Customer Sample Reference				CRUSHED GLASS	
Test Sample				AR	
Determinand	Method	LOD	Units	Symbol	
Mercury	CVAFS	0.5	mg/kg	N	<0.5

Index to symbols used in 318946-1

Value	Description
AR	As Received
N	Analysis is not UKAS accredited



Annex 12: Example Wastewater Treatment Systems

Filtri automatici Dual Media

Filtri chiarificatori con lavaggio automatico in controcorrente del letto filtrante. Il contenitore è in vetroresina (resina poliestere rinforzata con fibra di vetro). Il letto filtrante è costituito da vari strati di quarzite selezionata di tipo sferoidale, a granulometria differenziata, ed antracite come coadiuvante di filtrazione. La forma sferoidale dei singoli grani di quarzite, al contrario del letto filtrante di tipo tradizionale, non frantumano le singole gocce di acqua, facilitando il flusso di acqua e consentendo una più efficace azione di filtrazione anche a velocità di flusso più elevate. Il controlavaggio e la chiarificazione del letto filtrante avvengono automaticamente a pre-fissati intervalli di tempo. L'automatismo integrale è costituito da una valvola monoblocco a 3 fasi (esercizio-controlavaggio-chiarificazione), costruita in robusto ABS Bayer, atossico, e da un programmatore elettronico a microprocessori, per la selezione sia dell'ora che della frequenza della rigenerazione (24 h - 14 gg). Il programmatore computerizzato consente inoltre di programmare anche i tempi delle singole fasi di lavaggio in funzione della applicazione specifica.

Funzionamento semiautomatico

Indipendentemente dalle programmazioni effettuate, in qualsiasi momento è possibile avviare manualmente il controlavaggio e la chiarificazione, mediante la semplice pressione di un pulsante, con completamento automatico dello stesso e ritorno in fase di esercizio.

Automatic Dual Media filters

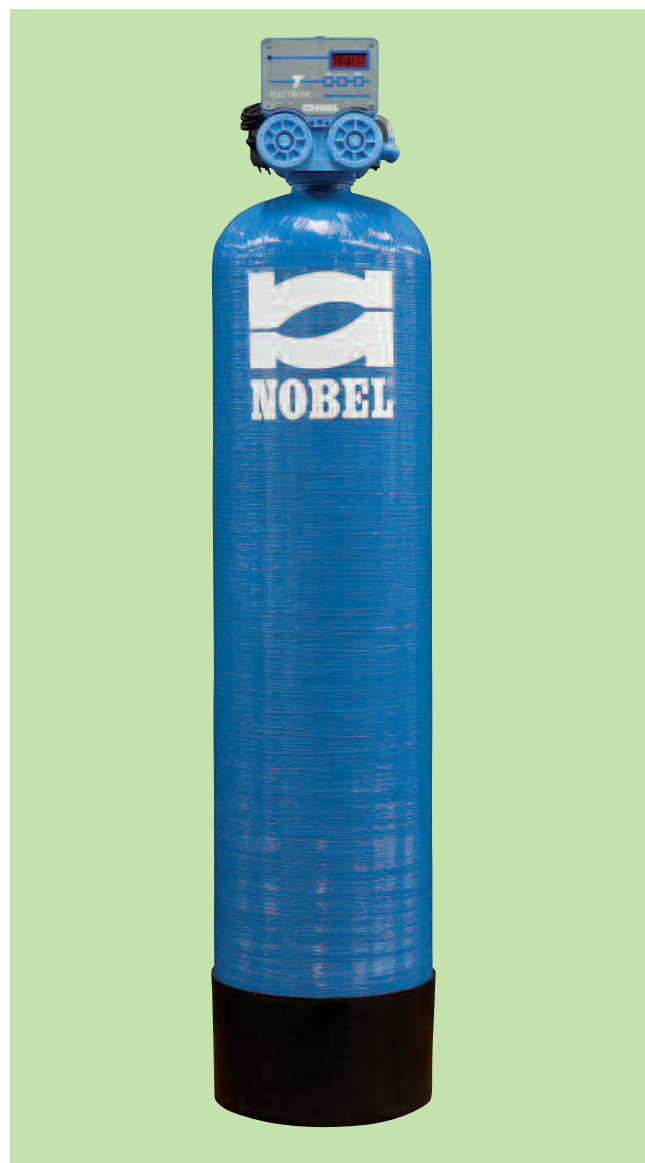
Sand filters with automatic backwash of the filtering bed. The vessel is made in fiberglass (fiberglass reinforced polyester resin), the media filter includes several layers of selected quartzsand with different grain-size, and anthracite as upper layer. The spheroidal shape of the single grain of quartz-sand avoids the crushing of the single water drops, as happens with other commonly used sand, allowing an easy flushing of water and a better filtration feature even with higher linear flow. The backwashing and clarification of the media filter is automatically controlled by time schedule.

The control valve is compact type, made in strong no-toxic ABS Bayer, 3-cycles working (service -backwashing-clarification). The electronic computerized programmer (24 hours-14 days) allows to set the regeneration at the pre-set time and on day(s) in which backwash is desired. The electronic programmer allows also to set all steps of the regeneration, according to specific applications.

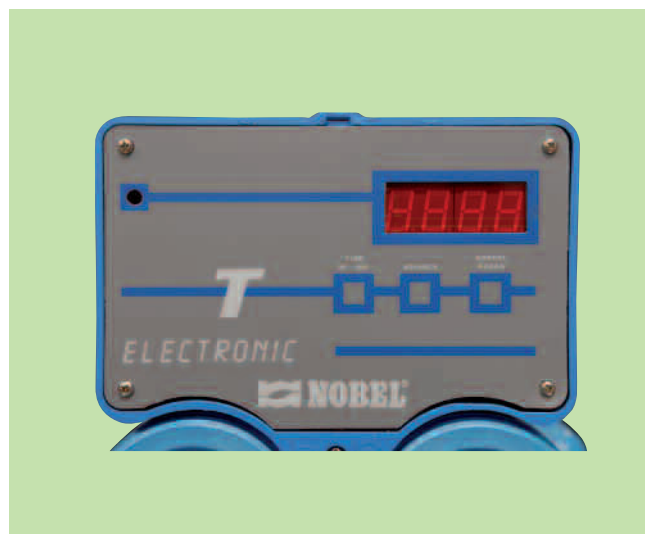
Semi-automatic working

Auxiliary push-button regeneration start, regardless of any pre-set automatic programme.

The regeneration will be automatically completed and the unit will turn on service mode.



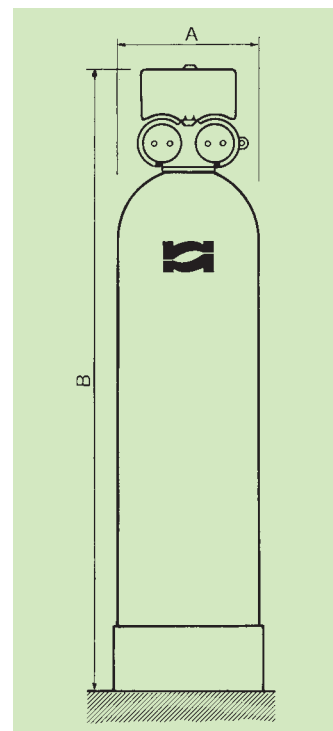
FCV/T



DIMENSIONI (mm) & PESI - DIMENSIONS (mm) & WEIGHT

	A		B		Attacchi Connections	Peso (*) Weight (*) kg
	mm	inches	mm	inches		
FCV 01/T	250	8"	1400	55"	1"	75
FCV 02/T	255	10"	1600	63"	1"	140
FCV 03/T	330	13"	1600	63"	1"	210
FCV 04/T	355	14"	1900	75"	1"	240
FCV 05/T	400	16"	1900	75"	1 1/2"	340
FCV 07/T	460	18"	1900	75"	1 1/2"	400
FCV 11/T	610	24"	2300	91"	2"	660
FCV 18/T	760	30"	2400	94"	2"	960

(*) peso alla spedizione – shipping weight

Pressione esercizio/Working pressure: 2.0 ÷ 6.0 bar (20*0 ÷ 600 kPa)**Temperatura esercizio/Working temperature:** 5 ÷ 40°C (41 ÷ 104°F)**Alimentazione elettrica/Power supply:** 220 V 50 Hz 10 w**Tensione di funzionamento:** 12 V 50 Hz con trasformatore incorporato**Working tension:** 12 V 50 Hz with built-in transformer**CARATTERISTICHE TECNICHE - TECHNICAL FEATURES****Composizione del letto filtrante – details of filtering bed**

	Portata esercizio Service flow	Portata di punta Peak flow	Portata di controlavaggio Backwash flow rate	Letto filtrante Filtering bed			
				quarzite- quartz-sand (kg)			antracite anthracite (lt)
				0.4÷0.7(*)	1÷2 (*)	2÷3(*)	
	m³/h	m³/h	m³/h				
FCV 01/T	0,7	1,5	1,1	20	6	5	6
FCV 02/T	1	2	1,5	40	12	10	10
FCV 03/T	1,7	3,4	2,5	60	20	15	18
FCV 04/T	2	4	3,5	70	20	15	20
FCV 05/T	2,5	5	3,6	75	50	25	35
FCV 07/T	3,2	6,4	4,8	100	50	25	35
FCV 11/T	5,6	11,2	8,4	175	75	50	52
FCV 18/T	9	18	13,5	250	125	75	66

(*) granulometria in mm - grain-size in mm

Velocità lineare alla portata esercizio**Linear flow at service flow rate:**

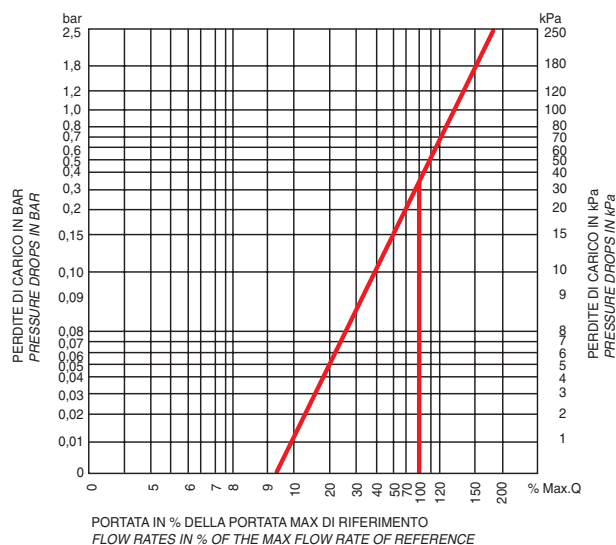
20 m³/m²/h

Velocità lineare alla portata di punta:**Linear flow at peak flow rate:**

40 m³/m²/h

Il grafico a fianco mostra le perdite di carico, in bar e kPa, alle diverse portate, espresse in % della portata max di riferimento

The diagram shows the pressure drop, in bar and kPa, at the different flow rates, which are indicated as % of the max flow rate of reference.



AUTOMATIC ACTIVATED CARBON FILTERS

Filtri a carbone attivo con lavaggio automatico in controcorrente del letto filtrante. Il contenitore è in vetroresina (resina poliestere rinforzata con fibra di vetro). Il letto filtrante è costituito da uno strato di carbone attivo supportato da uno strato di quarzite selezionata di tipo sferoidale. Il carbone attivo è di tipo granulare a granulometria differenziata, specifico per il trattamento dell'acqua e con elevata capacità di azione fisica (filtrazione meccanica), chimica (ossidazione-riduzione), chimico-fisica (adsorbimento). Il controlavaggio del letto filtrante avviene automaticamente a pre-fissati intervalli di tempo. L'automatismo integrale è costituito da una valvola monoblocco a 3 fasi (esercizio-controlavaggio-lavaggio equicorrente), costruita in robusto ABS Bayer, atossico, e da un programmatore elettronico a microprocessori, per la selezione sia dell'ora che della frequenza della rigenerazione (24 h - 14 gg). Il programmatore computerizzato consente inoltre di programmare anche i tempi delle singole fasi di lavaggio in funzione della applicazione specifica.

Funzionamento semiautomatico

In qualsiasi momento ed indipendentemente dalle programmazioni effettuate, è possibile avviare manualmente la rigenerazione, mediante la semplice pressione di un pulsante. La rigenerazione si completerà automaticamente con ritorno alla fase di esercizio.

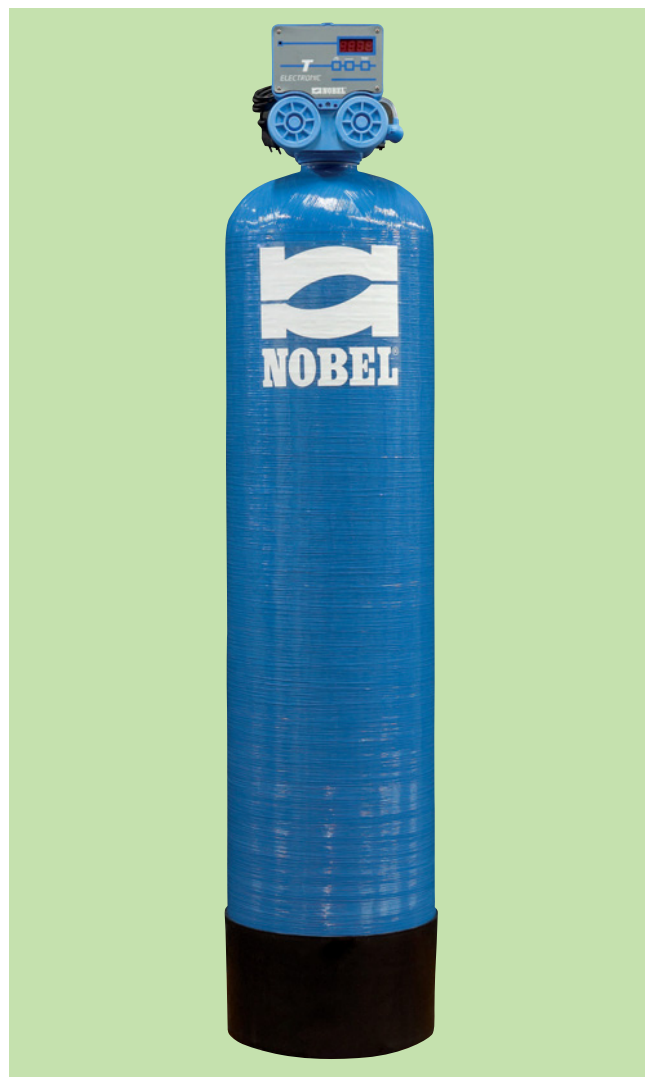
La portata massima dei filtri a carbone attivo è funzione del tempo di contatto fra acqua e carbone stesso, richiesto dalla specifica applicazione. Ad elevate portate corrispondono tempi di contatto brevi, a bassa portata e parità di quantità di carbone attivo, i tempi di contatto si allungano. Le portate massime indicate si riferiscono ad un tempo di contatto di 2 minuti, che corrisponde al valore richiesto nelle più comuni applicazioni dei filtri a carbone attivo. Particolari condizioni di impiego (in relazione alle sostanze da rimuovere, alla loro concentrazione etc.) possono richiedere tempi di contatto diversi, necessari affinché si esplichi l'azione di adsorbimento (vedi Relazione Informativa RI 20, "I carboni attivi"). Dal grafico sul retro si ricavano, per tempi di contatto variabili da 2 a 60 minuti, le corrispondenti portate espresse in percentuale della portata massima di riferimento.

Activated carbon filters with automatic backwash of the filtering bed. The vessel is made in fiberglass (fiberglass reinforced polyester resin); the media filter includes a layer of Activated Carbon supported by a layer of selected quartz-sand. The Activated Carbon is granular type, with different grain-size, and selected for water treatment, with high capacity in physical action (filtration), chemical (reduction) and chemical-physical (adsorption) ones. The backwashing and co-flow rinse of the media filter is automatically controlled by time schedule. The control valve is compact type, made in strong no-toxic ABS, 3-cycles working (service-backwashing-co-flow rinse). The electronic computerized programmer (24 hours-14 days) allows to set the hours and how often the regeneration runs. The electronic programmer allows also to set all steps of the regeneration, according to specific applications.

Semiautomatic working

Out of the preset automatic workings, control valve is equipped with auxiliary "push-button" regeneration start. Regeneration will be automatically completed, and the system turns on service.

The max flow rate of an activated carbon filter depends on the contact time of the water flowing through the filtering bed of activated carbon. If the quantity of activated carbon remains the same, as high flow rates of service are accorded with short contact time, as low flow rates with long contact time. The indicated max flow rates are stated according to a minimum contact time of 2 minutes, that is normally required performance for the applications in which A. C. filters are commonly



used (dechlorination).

Naturally, a shorter or a longer contact time could be required for special applications, according to the substances to be removed, their concentration, etc, in order to have the desired actions of adsorption, catalysis, filtration. (see "Activated Carbon" Bulletin).

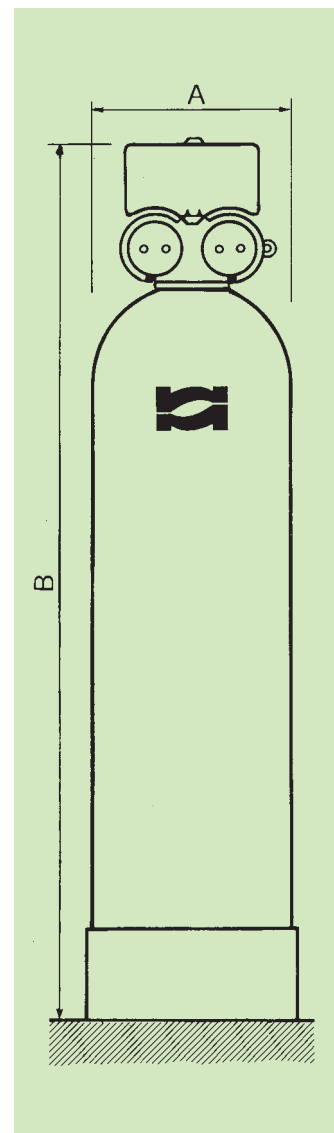
The diagram below shows how to calculate the flow rate according to a contact time from 2 to 60 minutes.

The flow rates are expressed as % of the max flow rate of reference.

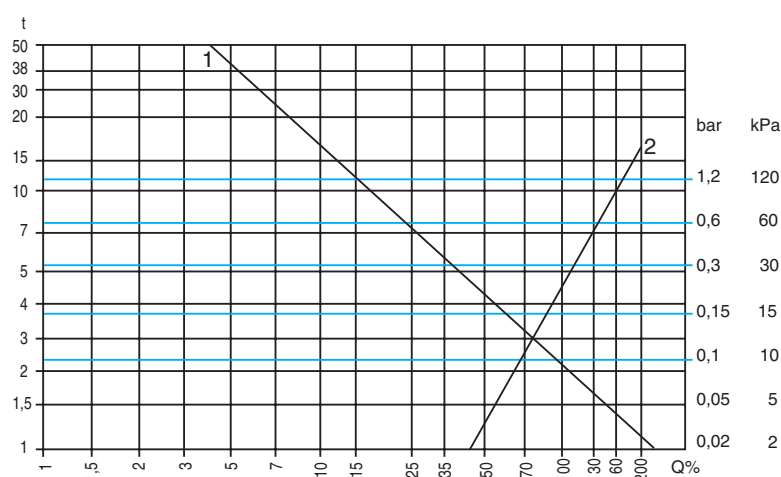
DIMENSIONI (mm) & PESI - DIMENSIONS (mm) & WEIGHT

	A		B		Peso (*) Weight (*)
	mm	inches	mm	inches	kg
FACV 01/T	255	10"	1600	63"	45
FACV 02/T	330	13"	1600	63"	70
FACV 03/T	355	14"	1900	75"	90
FACV 04/T	400	16"	1900	75"	110
FACV 07/T	610	24"	2300	90"	230
FACV 11/T	760	30"	2400	94"	340
FACV 15/T	920	36"	2500	98"	460

(*) peso alla spedizione – shipping weight

Pressione esercizio/Working pressure: 2.0 ÷ 6.0 bar (200 ÷ 600 kPa)**Temperatura esercizio/Working temperature:** 5 ÷ 40°C (41 ÷ 104°F)**Alimentazione elettrica/Power supply:** 220 V 50/60 Hz 10 w**Tensione di funzionamento:** 12 V 50/60 Hz con trasformatore incorporato**Working tension:** 12 V 50/60 Hz with built-in transformer**CARATTERISTICHE TECNICHE - TECHNICAL CHARACTERISTICS**

	Portata max Max flow rate		Letto filtrante Filtering bed		attacchi connections
			Quarzite Quartz-sand	Carbone attivo Activated carbon	
	m³/h	GPM	kg	lt	
FACV 01/T	1,5	6,6	10	35	1"
FACV 02/T	2,4	10,5	15	70	1"
FACV 03/T	3,0	13,2	20	100	1"
FACV 04/T	4,0	17,6	25	130	1"
FACV 07/T	7,0	31,0	60	230	1½"
FACV 11/T	10,6	47,0	90	350	2"
FACV 15/T	15,0	66,0	120	500	2"



t = tempo di contatto in minuti

Q = % portata max

1 = curva delle variazioni della portata al variare del tempo di contatto

2 = perdita di carico in Bar e kPa alle varie portate

Caratteristiche e dimensioni non vincolanti

t = minutes of contact time

Q = % of max flow

1 = max flow rates at different contact time

2 = pressure drops at different flow rates in Bar and kPa

Not binding sizes and data

REVERSE OSMOSIS SYSTEMS

RO/D

Apparecchiature dalle eccellenti prestazioni tecniche e progettate secondo criteri di semplicità e robustezza. La linea è compatta e funzionale e tutti i componenti sono a vista per facilitare il posizionamento, l'installazione e gli interventi di diagnosi e manutenzione. L'accurata selezione dei componenti, le soluzioni tecniche adottate ed i severi collaudi effettuati garantiscono la massima affidabilità e la più lunga durata ad un minor costo di esercizio.

Lo skid di sostegno, la pompa ad alta pressione ed i contenitori delle membrane sono tutti in acciaio inox.

Il funzionamento del sistema è gestito da un programmatore elettronico computerizzato a microprocessori.

L'apparecchio è completo della strumentazione ed accessori necessari per il controllo dei parametri operativi e la corretta gestione del sistema stesso.

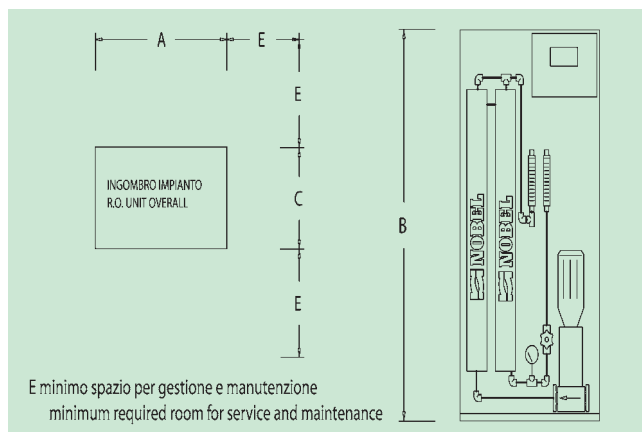
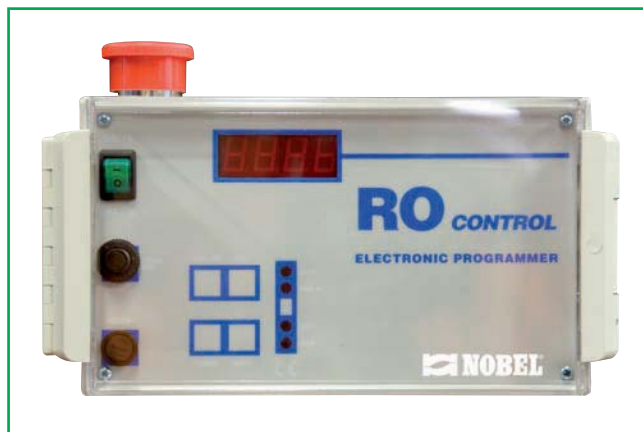
RO/D

Equipment with excellent performance, designed in order to realize simple, strong and reliable unit.

The line construction is compact and functional, all components are installed well-in-view to make easier the commissioning, installation, servicing and maintenance operations.

These units, as well as all Nobel systems, use high quality components, are continuously rigorously tested, and designed for reliability and long wear. The holding frame, the high-pressure booster pump and membrane housings are all made in stainless steel. The working of the unit is controlled by an electronic computerized programmer with micro-processor.

The equipment is complete with all instruments and accessories for the control of the operating features and the proper handling of the system.

**DIMENSIONI (mm) - DIMENSIONS (mm)**

Modello Model	A	B	C	E	Kg (*)
RO221D	400	750	350	600	24
RO201D	460	1300	350	600	32
RO202D	460	1300	350	600	36
RO203D	460	1300	350	600	47

(*) peso alla spedizione - shipping weight

CARATTERISTICHE TECNICHE - TECHNICAL CHARACTERISTICS

acqua in ingresso		inlet water
TDS	≤ 1000 ppm	TDS
SDI	≤ 3	SDI
temperatura	10÷40°C	temperature
pressione	2.0÷5.0 bar (200÷500 kPa)	pressure (bar – kPa)
carica batteria	assente - NIL	bacteria
cloro libero	≤ 0.1 ppm Cl	free chlorine
ferro	≤ 0.1 ppm Fe	iron
durezza	in funzione del pre-trattamento depending on pre-treatment	hardness
acqua prodotta		product water
TDS acqua prodotta (#)	≤ 5 %	TDS product water(#)
pressione esercizio	10 bar (1000 kPa)	operating pressure
pressione max ammessa	15 bar (1500 kPa)	max allowable pressure
recupero acqua	50 ÷ 75 %	water recovery rate

- (#) La percentuale indicata si riferisce alla salinità dell'acqua prodotta rispetto a quella dell'acqua in ingresso; essa è funzione delle caratteristiche chimico-fisiche dell'acqua da trattare, del tasso di recupero e dei parametri operativi del sistema.
The mentioned percentage is referred to TDS of treated water and of the raw water; it depends on chemical-physical characteristics of raw water, recovery rate and operating features of the system.

modello model	acqua prodotta product water l/h (t=15°C)	acqua alimento feed water l/h	membrane membranes n. Ø	potenza power kW	attacchi connections I O-S
RO221D	45	120 ÷ 250	1 2,5"	0.37	3/4" 1/4"x6
RO201D	90	180 ÷ 400	1 2,5"	0.37	3/4" 1/4"x10
RO202D	180	360 ÷ 600	2 2,5"	0.55	3/4" 1/4"x10
RO203D	270	540 ÷ 800	3 2,5"	0.55	3/4" 1/4"x10

- I ingresso acqua da trattare – inlet raw water
O uscita acqua prodotta (permeato) – outlet product water (permeate)
S uscita acqua scarico (concentrato) – outlet drain water (concentrate)

Alimentazione elettrica - Power supply: 230 V 50 Hz

	RO/D	
filtro ingresso 5 µm	●	sediment filter 5 µm
filtro ingresso carbone attivo	●	activated carbon filter
pompa in acciaio inox AISI 304	●	pump in stainless steel AISI 304
contenitori membrane in AISI 316	●	membrane housing in stainless steel AISI 316
valvola regolazione pressione in ottone	●	pressure regulating valve in brass
valvola regolazione pressione in AISI316	○	pressure regulating valve in stainless steel AISI 316
sistema di ricircolo regolabile	●	adjustable recirculating system
flussaggio automatico (*)	●	automatic flushing (*)
elettrovalvola di ingresso	●	inlet solenoid valve
manometro ingresso filtri	●	manometer (filter inlet)
manometro ingresso membrane	●	manometer (membrane inlet)
pressostato di minima	●	min pressure switch
conduttimetro digitale	●	digital conductivity-meter
allarme qualità acqua non soddisfacente	●	unsatisfactory quality water alarm
programmatore elettronico	●	electronic programmer
flussimetro concentrato (*)	●	flowmeter concentrate (*)
flussimetro permeato (*)	●	flowmeter permeate(*)
predisposizione collegamento sistema livelli serbatoio esterno	●	arrangement for connection to level system external tank
predisposizione interfaccia apparecchiature pre-trattamento	●	arrangement for connection to pre-treatment equipments
skid in acciaio inox AISI 304	●	frame in stainless steel AISI 304
linea bassa pressione in PVC	●	low pressure line in PVC
linea alta pressione in acciaio inox AISI316	●	high pressure line in stainless steel AISI 316

- allestimento di serie - standard arrangement
○ disponibile su richiesta – available upon request
(*) non disponibile per modello RO221D – not available for model RO221D

Annex 13: Achievable Emission Levels for Mercury



To whom it may concern,

The Client 'Electronic Products Ltd' will be installing two special carbon filters as follows. The F-55 unit will be filled with sulfur impregnated carbon and the Dorex unit will be filled with activated carbon. The sulfur impregnated carbon will adsorb mercury until the effluent mercury concentration is less than 0.001 ppb.

The F-55 unit will be placed inside the crusher room. With an air pick-up hose located close to the crusher for good air capture, any mercury laden air will be pulled through the F-55 unit where the sulfur impregnated carbon will remove the mercury from the air to a level exceeding a 99% removal efficiency. The room will have an exhaust fan that will create a negative pressure in the room. The fan will push the room air through a Dorex filter containing activated carbon which will remove any remaining mercury from the air.

In order to control if the F-55 Drum carbon should be replaced, the said unit needs to be weighted every week. When it reaches 85 lbs. of additional weight, the carbon should be replaced.

The above installation gives a 99+% mercury capture.

Regards,

Kristen Ascione

Kristen Ascione
Sales Engineer
General Carbon Corp.
973-523-2223

Annex 14: Specification Sheets for Air Abatement Components

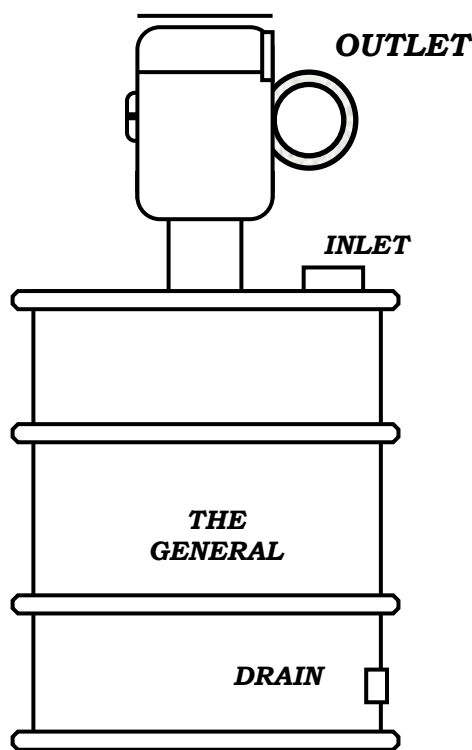


F - SERIES

vapor adsorber and fan a simple air pollution solution

GENERAL CARBON CORP, has added a fan to their user friendly Air Pollution Control Barrels to provide a quick and easy solution for simple VOC and odor control applications. The high volume aluminum fan mounted on the top of the General provides efficient control of minor point source pollution problems.

The **F-SERIES** units are available in three sizes that cover a wide range of airflow requirements. The F-55 is our basic unit and will move 125 CFM of air at 4" WC static pressure. The motor is 115/230 VAC, 1 Ph, 60 Hz, TEFC and is weather proof. Wiring of the motor is not included to provide adaptability to site requirements. Loading the unit with impregnated carbon can improve the removal efficiency for Hydrogen Sulfide, Mercaptans, ammonia, formaldehyde, or other problem contaminants.



<u>UNIT</u>	<u>DRUM SIZE</u>	<u>LBS. CARBON</u>	<u>FLOW RATE</u>	<u>INLET</u>	<u>OUTLET</u>
F-55	55 Gallon	150	75-125 CFM	4" FPT	4"
F-85	85 Gallon	300	100-210 CFM	4" FPT	4"
F-110	110 Gallon	400	120-350 CFM	4" FPT	5"

AVAILABLE OPTIONS: Special Application Carbons, Polyethylene Drum Liners, Damper, OSHA Safety Guards, Custom Inlet/Outlet Sizes, Full Selection of NEMA Rated Motors, Corrosion Resistant FRP Fans, Remote Mounted Fans, and more...

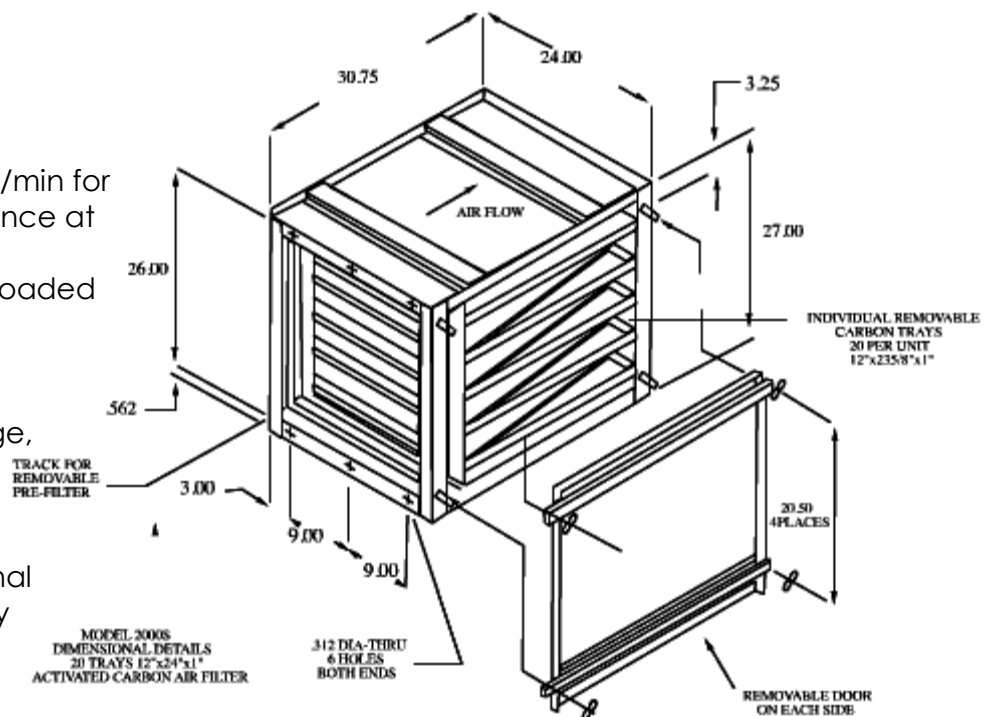


DOREX 2000S & 2000S2

side access carbon filters

Features:

- High single-pass efficiency
- 500 ft/min design velocity
- 0.25 wg resistance at 500 ft/min for 1" trays and 0.75 wg resistance at 500 ft/min for 2" trays
- Trays can be loaded or unloaded from either side of housing
- Units contain a two inch pre-filter track
- Standard trays are 14 gauge, cold rolled steel with a black powder coat finish. Stainless steel and galvanized trays are optional
- Units can be bolted directly together or stacked to fill individual needs



Specifications:

The 2000S and 2000S2 are side access housing which are used to treat high airflow rates containing limited levels of contaminants. They are both unique in design and versatility. Being modular in design they can be bolted together or stacked like building blocks to fill various needs. While in this configuration, all filter tracks will align so the side-loading feature will not be lost. The 2000S2 is similar to the 2000S, but holds more carbon for increased removal capacity.

Unit Designation	Number of Carbon Trays	Rated Flow at .25 W.G.	Lbs. of Carbon (Approximate)
2000S	10	2000 C.F.M.	90
2000S2	8	2000 C.F.M.	132



GC-IPSp

pelletized impregnated activated carbon

GC IPSp is a pelletized, steam activated carbon is impregnated with sulfur. This product provides superior mercury removal when treating natural gas, air, hydrogen or other gas streams. The impregnation process utilizes the S2 form of sulfur only and the sulfur is uniformly distributed throughout the carbon pores. This allows the carbon to have the following characteristics:

- Greater total capacity for mercury adsorption.
- Near virgin CCL₄ activity of the impregnated carbon for superior organic removal.
- Greater stability of the mercuric sulfide formed on the carbon ensures that mercury will not leach into the environment from the spent carbon.
- Superior moisture resistance ensures product performance on high humidity waste streams.
- Superior temperature resistance ensures product performance at elevated temperatures.
- Improved adsorption kinetics allows for faster adsorption and less carbon is required on-line.

Specifications:

Pre-impregnation:

Particle Size, mm:	4
Surface Area (pre-impregnated), m ² /gm:	1000 (min)
Carbon Tetrachloride Activity, % (base)	60 (min)
Hardness, %:	97 (min)

Post-impregnation:

Moisture, % (as packed)	3 (max)
Sulfur Content, %	13 (min)
Apparent Density, g/ml:	0.50-0.57
Typical Mercury Capacity, %:	65 (weight)

Standard packaging is in 55 lb. bags. Other packaging is available upon request.

Caution!

Wet activated carbon removes oxygen from air causing a severe hazard to workers inside carbon vessels. Confined space/low oxygen procedures should be put in place before any entry is made. Such procedures should comply with all applicable Local, State and Federal guidelines.

Model 400 Portable Floor Sentry

Model # SS-400-PFS

Product Specifications

BASE UNIT DIMENSIONS

22.5" Length, *Including Control Box*
20" Width
19.5" Height

ARM DIMENSIONS

6" Dia., 72" Long Fire-Retardant Flex Hose (10.5" Dia. Round Hood)

CABINET MATERIAL

16 ga. Carbon Steel

WEIGHT

Approx. 50 lbs. - 100 lbs.
Varies Depending on Filter Media Installed

AIR VOLUME

Variable Speed Control Standard on 115V
700 CFM High, Down to 50 CFM Low
On/Off Toggle Switch Standard on 220V

ELECTRICAL

115/1/60, 2.5 amps
220/1/50, 1.5 amps
8' grounded power cord with NEMA 5-15P Plug

SOUND LEVEL

Approx. 72 dba @ 3'

FILTRATION

Depending on the Application:

- HEPA [up to 99.97% efficient on particles 0.3 microns and larger]
- ASHRAE [up to 95% efficient on particles 0.5 microns and larger]
- ACTIVATED CARBON
- SPECIALTY-BLENDED FILTER MEDIA [i.e. Acid Gas, Mercury, Aldehyde, Ammonia]

WARRANTY

Limited two-year warranty from date of shipment on defects due to materials or workmanship.
PATENT #5,843,197



Dimensions are Approximate
Shown with Optional Accessories



Product Features

- Variable Speed Controller *Included*
- Portable Handle *Included*
- Quiet Operation
- Reliable, Low Maintenance Operation
- Self Supportive, Flexible Arm
- Simple, Quick "No Tool" Filter Change
- Low Power Consumption
- Optional Magnehelic Gage
- Optional Hour Counter

The **Portable Floor Sentry fume extractor** is used as a respiratory safety control for a variety of industrial applications that require the capture and filtration of airborne contaminants and chemical fumes. This source-capture fume extractor features quiet operation, a powerful fan, a flame-retardant and self-supportive flex arm, and a variety of high-quality filtration media.

Typical applications for this unit include: welding fume control, chemical fume extraction, solvent and epoxy fume control, particulate extraction, powder filling, soldering, light grinding, clean room applications, and a variety of applications involving chemical fumes and dust.

Several filter media options are available for this unit and include: HEPA filtration [up to 99.97% efficient on particles 0.3 microns and larger, ASHRAE filtration [up to 95% efficient on particles 0.5 microns and larger], Activated Carbon, and specialty-blended filter media [i.e. Acid Gas, Mercury, Aldehyde, Ammonia]. The Portable Floor Sentry allows multiple filter media to be housed inside the filter chamber for applications that emit both particulate and fume.

Other unit features include a variable speed controller, portability handle, 360-degree swivel arm, simple and quick "no-tool" filter change, and optional accessories including a magnehelic gage, digital hour counter, and quick change pre-filter.

A smaller model [SS-300-PFS] and two larger models [SS-450-PFS & SS-500-BU-MP1] are also available.



1.800.799.4609
www.sentryair.com
sales@sentryair.com



Annex 15: Sound Level Meter Calibration Certificates

Certificate of Calibration

Certificate No.: 473679921

Object: Sound Analyser Nor140

Supplier: Norsonic AS

Type: Nor140

Serial number: 1406005

Client: CA Stock

Calibration complies with the following standard(s)

IEC 61672-1:2002 class 1
IEC 60651 type 1
IEC 60804 type 1
IEC 61260 class 1
ANSI S1.4-1983 (R2001) with amd. S1.4A-1985 class 1
ANSI S1.43-1997 (R2002) class 1
ANSI S1.11-2004 class 1
DIN 45 657, Applicable parts
Norsonic production standard set for the Nor140

Instrumentation used for calibration traceable to:

Electrical Parameters: MT, Norway
Acoustical Parameters: PTB, Germany
Environmental Parameters: IKM, Norway. Justervesenet, Norway

Adjustments: None

Comments: None

Date of calibration: 2014-06-10
Calibration interval recommended 2 years

The environmental parameters applicable to this calibration are kept well within limits ensuring negligible deviation on obtained measurement results.

Calibrated by:

Sign.



 **Norsonic**
P.O. BOX 24, N-3421 LIERSKOGEN, NORWAY

Norsonic AS, P.B 24, 3421 Lierskogen. Visitor address: Gunnersbråtan 2, Tranby, Norway
Phone +47 32858900 Fax: +47 32852208 email: info@norsonic.com

Warranty

Norsonic products are thoroughly inspected before they leave the factory. Carefully check the shipment for any physical damage in transit. Notify the factory or the distributor and file the claim with the carrier if there is any such damage.

Product type: Sound Analyser Nor140

Serial no.: 1406005

Power: 11-15 Volt DC

Option included: 67,68

Option description:

- 00: Tmax 5 and Leq1 according to German standards
- 01: 1/1 octave real time frequency filters 0,5 - 16.000Hz
- 02: Reference spectrum comparison with digital Go/No Go TTL output
- 03: 1/3 octave real time filters 0,4 - 20.000Hz, require opt 2
- 04: Statistical Calculations for weighting network and 1/n octave filters
- 05: Parallel calculation of F, S, I time constants
- 06: Profile, L/I measuring mode w / multi spectrum if opt 2 or 3 are installed
- 07: Enhanced profile including 4 markers and time resolution from 50ms
- 08 Sound recording
- 09: Reverberation time decay and calculation of T20 and T30
- 10: Noise generator with pink or white noise
- 11: Building acoustic mode according to ISO140, ISO10052 and ISO717/1 & /2
- 12: SweptSine measurement technique
- 13: Speech Transmission Index mode
- 14: FFT measuring mode with absolute units 8000 lines,
- 15: Survey Sound Power mode for LwA measurements according to ISO-3746
- 16: Enhanced global trigger
- 17: Audiometer calibration with measurement of Lzeq, frequency and distortion
- 18: Extended measurement range to 150dBpeak including self noise compensation
- 19: Special options for Noise Monitoring

Application version:

3.0.1793 2014-02-03 13:30r

Id no.: 3679921

Accessories: Preamplifier 1209 Serial No.: 20041
Microphone 1225 Serial No.: 208101

Related to order: SO1423029

Checked and approved by: *AK*

Date: 2014-06-10

 **Norsonic**
P.O. BOX 24 N-3421 LIERSKOGEN, NORWAY

Warranty statement

Norsonic products are warranted against defects in material and workmanship. This warranty applies to 36 months from date of delivery.

Norsonic AS will repair or replace equipment, which proves to be defective during the warranty period. This warranty includes labour and parts. Equipment returned to the factory, for repair must be shipped freight prepaid. Repair due to misuse of the equipment and/or use of hardware, software or interfacing not provided by Norsonic AS are not covered by this warranty.

No other warranty is expressed or implied, included, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Norsonic AS shall not be liable for consequential damages

Norsonic

Certificate of Calibration

Certificate No.: CAL 022-2014-4649



Test object: Sound Calibrator
 Manufacturer: Norsonic
 Type: 1251
 Serial no: 34129

Customer:

	Level	Level Stability	Frequency	Frequency Stability	Distortion
Measurement Results:	113,99 dB	0,04 dB	1000,35 Hz	0,00 %	0,41 %
Expanded Uncertainty:	0.11 dB	0.02 dB	1.0 Hz	0.1 %	0.2 %

The stated level is relative to 20 μ Pa.

The stated level is valid at reference conditions. The following correction factors have been applied during the measurement:

Pressure: 0,0005 dB/kPa Temperature: 0,000 dB/ $^{\circ}$ C Relative humidity: 0,000 dB/%RH Load volume: 0,0003 dB/mm³

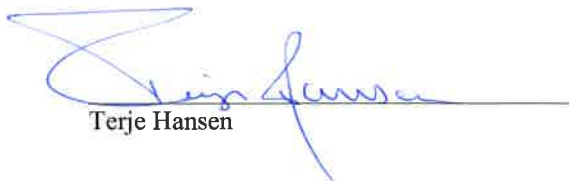
The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k, which for a t-distribution with the reported effective degree of freedom corresponds to coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA publication EA-4/02.

Records: L:\PROJECTS\CALLAB\PROGRAM\Cal\2014\NOR1251_34129_M1.nmf

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101,325 kPa	23,0 $^{\circ}$ C	50 %RH
Measurement conditions:	98,313 \pm 0,015 kPa	24,5 \pm 0,4 $^{\circ}$ C	48,0 \pm 2,8 %RH

Date received for
calibration:

Date of calibration: 2014-07-01
 Date of issue: 2014-07-01
 Engineer: Terje Hansen
 Supervisor:


 Terje Hansen

This certificate of calibration is issued by a laboratory accredited by Norwegian Accreditation (NA). NA is one of the signatories to the EA Multilateral Agreement for mutual recognition of calibration certificates (European Co-operation for Accreditation). The accreditation states that the laboratory meets the NA requirements concerning competence and calibration system for all the calibrations contained in the accreditation. It also states that the laboratory has a satisfactory quality assurance system and traceability to accredited or national calibration laboratories. This certificate may not be reproduced other than in full.