Brookhurst Wood - Open Windrow Compost Facility

Environmental Permit Variation EPR/AB3700LS/V006 Technical Plan

Biffa Waste Services Ltd

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Quality information

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1. Introduction

1.1 Introduction

AECOM has been commissioned by Biffa Waste Services Limited ("the Operator" or Biffa) to prepare an application to develop a new Open Windrow Composting Facility (OWC) at Brookhurst Wood, Warnham, West Sussex. Given the locality of the new development on site, the new OWC will be added as an additional operation to the environmental permit (EPR/AB3700LS) for the Aggregate Treatment and Recycling Facility.

The new OWC facility is being developed to treat up to 60,000 tonnes per annum of green waste and 30,000 tonnes per annum of wood waste. .

This document provides Technical Details for the new OWC process which has been prepared to support the permit variation application. The report should be read in conjunction with other supporting application information.

1.2 Proposed Facility

There are no changes proposed to the existing Aggregate Treatment and Recycling Facility (ATRF) processes although a new crushing operation will be included, and some additional waste codes will be added to the permitted waste list including mixtures of waste from the mechanical treatment of wastes that contain a high proportion of recoverable aggregate.

The proposed OWC facility will comprise new plant to facilitate the receipt, shredding and subsequent composting of green waste and shredding of wood waste. Waste types accepted at the facility will be defined according to their List of Waste (LoW) Code and will generally consist of:

- wood waste;
- green waste;
- leaves;
- grass clippings; and
- horticulture type waste

The facility will not receive or accept any waste covered by the Animal By-Product (Enforcement) (England) Regulations 2013 (ABPR).

The new plant will be designed to effectively shred the constituent parts of the incoming green waste, which is then transferred to open air windrows for composting and maturation. Green waste will be treated through the composting process while wood waste will only be shredded.

The intention is to produce a PAS 100 compliant compost from the inputs and as such it will be deemed to have reached end of waste criteria and has achieved product status. The product can be utilised for a wide range of beneficial after-uses including; community projects within West Sussex and for agriculture.

2. Site Design and Infrastructure

2.1 Location

The new OWC facility will be sited adjacent to the southern/southeast landfill installation boundary and adjacent to the south and east of the existing ATRF. The addition of the new OWC and ATRF crushing plant will require an extension of the existing ATRF installation boundary as shown on Drawing BA235900 Proposed Site Layout and Installation Boundary (See Application Part 13 - Drawings and Plans).

The current weighbridge and associated office are located to the east of the proposed OWC facility, on the main landfill access road is currently shared between landfill, and ATRF plant traffic. This weighbridge will be replaced by a new weighbridge and associated office situated on the southern OWC access road which will be then shared for ATRF, Landfill and OWC requirements.

2.2 General Design Principles

The new OWC treatment area will be designed, constructed and commissioned by approved EPC contractor, who will be appointed by Biffa. Biffa Waste Services will operate the facility once the facility is commissioned.

The facility layout has been designed to make best use of the site and its topography, whilst considering, as far as practicable, the following requirements:

- Statutory requirements;
- Life expectancy;
- Maintenance;
- Health and safety;
- Location of the proposed facility and its surrounding environment; and
- Sustainability.

These are discussed in more detail in the sections to follow.

2.3 Site Infrastructure

2.3.1 Design Life

The overall operational lifespan of the facility is 20 years, although the life expectancy of individual components / elements may vary. The civil engineering elements and infrastructure will have a lifespan in excess of the planned facility lifespan, whereas components within the system may need replacement on multiple occasions within this timeframe.

2.3.2 New ATRF Crushing Process

The existing ATRF washing process which occupies an area of 0.6865ha to the south/southwest of the Brookhurst Wood landfill, will remain unchanged as part of this variation although the arrangement / orientation of the wash process and associated storage may be altered to facilitate efficient operation of the overall ATRF/OWC processes. The proposed overall layout of the ATRF and OWC processing areas is shown on Drawing BA235800 (see Application Part 13).

A new enclosed mechanical crushing plant will be added to the ATRF processing area to process oversize and a number of specific waste streams.

2.3.3 OWC Area

The new OWC facility will be operated in an L-shaped area as shown in Drawing BA235900 (see Application Part 13 and will occupy an area of approximately 2.84 ha.

The site where the OWC is proposed is currently comprises a large, generally flat area of existing compacted soil/stone and hardstanding. The OWC Site will be prepared by grading the land to the required formation levels and installing a new impermeable base of concrete, which will be designed to enable incidental rainfall to drain to a new surface water perimeter drainage system – which in turn will drain to one of the lined lagoons as shown in Drawing BA0313400 (see Application Part 13).The OWC treatment area will comprise.

- 8 no. concrete bays approximately 3.5 m tall to store green waste and wood waste (five bays for green waste and three bays for wood);
    - a building to house the screening and separation plant of about 420 m^2, the building will be approximately 10 m tall and will comprise a steel frame with single skimmed box profile sheeting and pitched roof (and associated roof water storage tank);
    - mobile plant lay down area with space for up to 6 no. loading shovels or dozers;
    - a mobile tracked shredding machine which can move to directly place shredded materials in a designated bay or to form windrows; and
    - a maturation and stabilisation area where windrows will be formed.
- The proposed new infrastructure for the storage tanks, lagoons and drainage will be designed and constructed in line with CIRIA C736 standards.

2.3.4 Mechanical and Electrical Specifications

All M&E plant associated with the shredding and screening equipment will be designed to appropriate British Standards or equivalent European (EN) Standards.

2.3.5 Roads and Pavements

Vehicles will access and egress the site using the existing site access road from its junction with Langhurstwood Road, and no changes are proposed to this site access road as part of this application.

Access into the OWC and ATRF treatment areas from the wider site access road will be via a new internal access road to the south of the OWC development. Vehicles will be directed to the OWC reception area to the southwest side of the OWC area and by following the new access road further west to the ATRF reception access point.

2.3.6 Weighbridge

The existing landfill weighbridge will continue to be utilised by the ATRF until such times as the new OWC facility is constructed. Post OWC construction, the ATRF and the OWC deliveries/collections will utilise, and new incoming and outgoing weighbridges located on the new internal access road adjacent to the south of the OWC treatment area.

Weighbridge operations will be coordinated from a new weighbridge office adjacent to the weighbridges and operational control arrangements will be in place at the weighbridge to ensure that all vehicles are directed to the correct treatment location, i.e., OWC or ATRF.

2.3.7 Fencing and Security

The wider landfill site is enclosed by a continuous fence preventing access other than via the main site entrance, which is secured by a gate during non-operational hours.

A new chain link fence will be provided along the eastern and northern boundaries of the OWC site.

The OWC and ATRF will be monitored in accordance with existing landfill site security arrangements and no changes are therefore proposed to the existing site security arrangements.

The ATRF and OWC will continue to share the welfare facilities at the adjacent landfill site offices.

2.3.8 Lighting

The majority of operations will be carried out in daylight. When working during low light conditions (e.g., winter months), the new OWC Facility will be provided with low level lighting through a series of downcast LED floodlights. Lighting will be turned off when the Site is not operating and will be proportional to the size and scale of the Proposed Development.

2.4 Drainage

2.4.1 OWC

2.4.1.1 Flood Risk

The EA Flood Map for Planning shows the entire Site to be located in Flood Zone 1 (i.e., low probability of fluvial and tidal flooding). Sites in Flood Zone 1 have a less than 1 in 1000 annual probability (<0.1% AEP) of flooding in any given year.

2.4.1.2 Surface Water Management

There are no surface water courses within the OWC site and currently the area has no drainage system to manage surface water runoff. A new dedicated OWC surface water drainage system will be provided to accommodate the OWC treatment facility which is largely split into two main catchment areas (see Drainage Scheme in Appendix A).

Biffa has determined that all runoff from the Site, excluding from the east-west access road, will be treated as grey water to be used for dust suppression and process, and as such the Site will be designed to hold surface water runoff within the site installation boundary, with no discharge to off-site surface water systems or watercourses.

Storage is to be provided using two lagoons as shown in 'BA23590 Proposed Site Layout and Installation Boundary' (see Application Part 13).

a. Surface water from the windrows will drain into an open culvert network, consisting of cascading channels, along the eastern length of the site. Shallow dish drains will help to divert flow overground towards the open culvert. The culvert channel will lie at a suitable gradient to allow for natural drainage towards the lagoon to the south of the windrows.

b. Surface water runoff from the green and wood reception bays and the vehicle turnaround area will drain into gullies and through an underground pipe network, into the north lagoon.

Flow will be generally held in the attenuation lagoon/pond (with the exception of flows from the east-west access road) and this water will be used for conditioning of the windrows and dust suppression as needed. During times when this water cannot be used, to ensure capacity in the system, it will be pumped forward to two new storage tanks situated to the north of the OWC treatment area. If the water in the tanks can't be reused on site, then this water will in turn ultimately be removed from site by tanker for offsite treatment.

Biffa will potentially at some future point be able to discharge into the foul sewer at the discharge point from the landfill leachate treatment plant (LTP) at a different time to LTP discharges or be accepted for treatment through the LTP. These future options will require variation of the relevant permit at that time and relevant applications and H1 assessments will be prepared and submitted to facilitate this change in future.

Run-off from the east-west access road will be attenuated in underground oversized pipes onsite and discharged into a separate existing surface water drainage system along the existing main access road, to the MBT lagoon (see Drainage Plan in Appendix A). As such, the discharge rate from the east-west drainage system is limited to a proportion of the whole site greenfield run off rate, relative to the impermeable catchment area, giving a discharge rate of 1.12 l/s.

2.4.1.3 Rainwater

In addition to surface water collection and reuse, provision has been made for the collection of rainwater from the separation and screening building roof. This is still subject to detailed design but in line with Building Regulation Guidance it is estimated that approximately 190 m^3 storage will be provided adjacent to the building. This water would also be used to facilitate dust suppression and process needs at the ATRF and the OWC.

2.4.1.4 Foul Water Management

There is no foul drainage within the OWC installation boundary. The OWC will share the welfare facilities with the ATRF at the adjacent landfill office.

2.4.1.5 Leachate Management

Although the intention is that leachate and contaminated run-off water will be reused to irrigate windrows where possible, it is proposed that any excess leachate will be tankered offsite for treatment or for use as an organic fertiliser – the intention is that this option would be used in the early stages of operation as the OWC facility is being established and under emergency conditions when the option to discharge via one of the other two routes is not available in the future (e.g., during maintenance).

Future options for leachate management being considered include:

- export to the adjacent landfill where it will be accepted for treatment by the existing Leachate Treatment Plant (LTP) for treatment under the LTP permit prior to discharge to the existing foul sewer. The LTP is already permitted to accept incoming leachate and liquor but would require a further variation to the LTP permit for the compost liquor; or
- pump from OWC storage tanks under a separate discharge consent to the LTP discharge pipe without treatment for discharge to the existing foul sewer at a different time to the LTP discharge. OWC leachate would be kept separate from the LTP output and be subject to its own monitoring and discharge limits. This would require a variation to the ATRF/OWC permit and an application to the Sewerage Treatment Undertaker.

If either option is pursued at a later date then the accompanying applications would be supported by the relevant H1 assessment at that time.

2.4.2 ATRF

2.4.2.1 Flood Risk

The flood risk at the ATRF is the same as that given for the OWC above.

2.4.2.2 Surface Water Management

The surface water drainage for the ATRF is designed to ensure clean and dirty water separation.

Clean water (i.e. from the non-process related areas of the site), is drained under gravity flow, using the surface water management system with discharge off-site via Culvert C to the Boldings Brook. This is not a permitted activity.

The use of an appropriately sized Class 1 Separator (in accordance with Environment Agency Guidance PPG3) ensures that discharge waters are controlled in an acceptable manner.

The discharge from this area did not require an application for a discharge consent, as the discharge of clean water is not considered an activity which requires permitting.

The surface water management drainage is a separate dedicated system servicing the ATRF area only and no changes are proposed as part of this variation.

2.4.2.3 Dirty Water Management

Potentially dirty water, (i.e. from around the plant, and as intercepted adjacent to the storage bays), will form an input into the existing closed-loop process system, with excess discharged off-site by road tanker. The drainage arrangements include:

- Linear drainage channels (Aco Multidrain MD100D or equivalent) to the front of the storage bays, which will drain to a drainage slot drain;
- Slot drains which will collect surface water from the yard area and storage bay drainage channels, which will drain into one of three below-ground, collection sumps, as indicated in the Drainage Plan (Appendix A); and
- The total capacity of the 3 sumps has been estimated at between 100 cubic metres (WinDes Micro-drainage software use, assuming winter conditions and a factor of 0.97) and 120 cubic metres (Wallingford, Modified Rational Method, M5-60 method, using a 5-year return-period 48-hour storm

of 60 minutes duration, giving an average point intensity of 1.25mm/hr for an M5-48hr storm) depending on the method used, assuming a 'catchment' of 0.2Ha. A total of 120 cubic metres of capacity is provided; half as Sump A, and a quarter each as Sumps B and C.

The above sumps / tanks are constructed on in situ cast reinforced concrete, thus isolating them from the surrounding sub-surface environment, and fitted with covers / grills, so that run-off from the 'dirty' side can flow into them under gravity, and as required, water can be removed by pump, for re-use in the plant via the hydro-grade..

The ATRF plant operates on a closed loop system, with the process water being treated and recirculated around the treatment process as much as practicable. The system was initially charged from the mains water system (or other clean water source), and, although water treatment and recirculation takes place, some process losses (evaporation and in process outputs) occur as well as removal of heavily contaminated material collected in the drainage system. Approximately every 6 months the process water in the system is changed and taken off site via tanker.

Similar to the OWC, if Biffa wished to discharge any excess ATRF process water from site to foul sewer in the future then either of the options identified in 2.4.1.5 above could be pursued.

2.4.2.4 Rainwater

There is no specific rainwater collection or utilisation at the ATRF in addition to the surface water management.

2.4.2.5 Foul Water Management

The ATRF utilises the welfare and office facilities adjacent to the landfill site.

3. Open Windrow Composting Process

3.1 Quality Management System

Biffa propose to operate an open windrow composting operation from which a PAS 100 (2018) compliant product will be produced. In line with PAS requirements, the process will be managed in accordance with a defined management system.

Biffa will produce as standard operating procedure (SOP) governing the control of the process from waste inputs, to monitoring of the process and production of a compliant end product. This SOP will sit within the BS ISO EN 9001 certified Quality Management System (see Management Plan, Application Part 3) and will be developed in accordance with Hazard Analysis Critical Control Point Principles (HACCP) to ensure control of hazards that are significant for the production, storage, supply and use of compost without harm. This will include defining critical control points (CCPs) and critical limits (CL) and ensuring these are monitored, recorded, and evaluated, both before and after the process validation. Where corrective is required, this will be defined and recorded.

The proposed CCPs and CLs are identified in table below:

Table 1. Proposed Critical Limits and Critical Control Points

Parameter	Critical Limits
Sanitisation Phase	
Temperature	65 - 80 °C
Moisture content	3-4 on grip test scale
Minimum duration	7 not necessarily consecutive days* when temperatures and moisture are within the above ranges
Minimum number of turns	2 turns during the minimum duration above
Stabilisation Phase	
Temperature	45 - 80 °C
Moisture content	3-4 on grip test scale
Minimum duration	12 weeks when temperatures and moisture are within the above ranges (except during and up to 24 hours after each turn, if composting batches are turned during this phase)>
Minimum number of turns	4 turns during the minimum duration above

The Supervisor shall ensure that the critical control points and critical limits of the composting process continue to be effective for process management. If for any reason they are suspected or known to have become ineffective, a phase of Hazard Analysis and Critical Control Points evaluation and process validation shall be returned to

3.2 Input Materials

3.2.1 Annual Throughput

The site will accept up to 60,000 tpa of green waste for treatment in the open windrow composting process with a further 30,000 tpa of wood waste accepted for treatment by shredding only.

3.2.2 Type of Input Materials

In accordance with PAS 100, the OWC process will accept source-segregated biodegradable waste/ material types as specified in Appendix B of the Compost Quality Protocol (2012). The full list of waste and associated codes that will be acceptable under the environmental permit is presented in Appendix C although in practice the site anticipates that the majority of waste will be sourced from domestic green waste with a smaller amount of suitable material coming from commercial and transfer station.

The waste codes to be accepted for processing as wood waste are presented in Appendix D.

In terms of wastes, there is no connection between the OWC and the neighbouring MBT plant and no MBT wastes are accepted for treatment at the OWC.

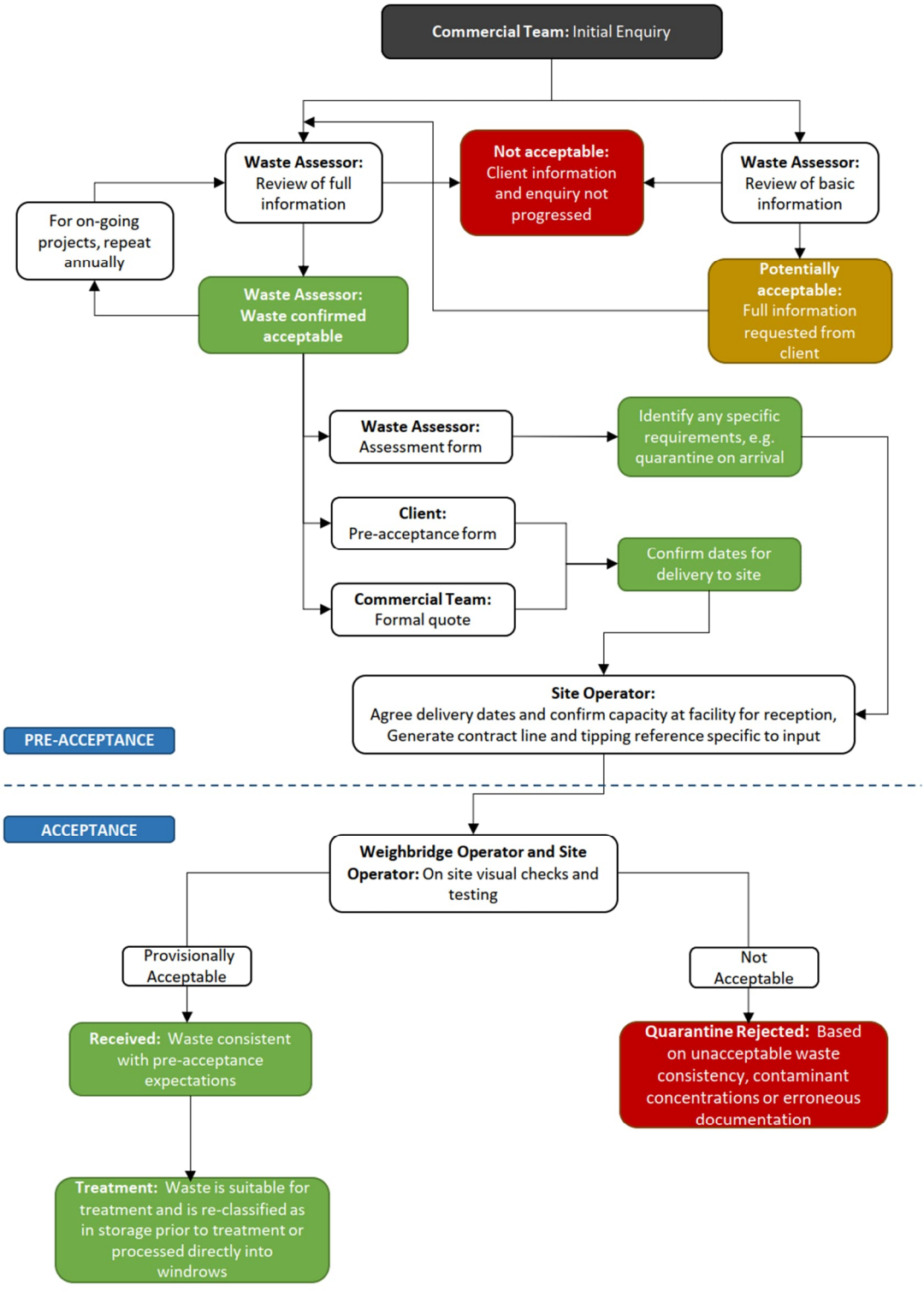
3.2.3 Contracts / Agreements / Communications With Suppliers

Sources of waste will be from Household Waste Recycling Centres (HWRCs), kerbside collections and a small number of landscape gardeners and agreed with the Regulator to be used to create BSI PAS 100:2018 compost. The majority of input materials are anticipated to be from HWRCs under specified contract conditions and it is likely that a large proportion of waste may be sourced through contracts with local waste collection authorities (WCAs).

3.3 Waste Acceptance Arrangements

As outlined in the Management Plan, section 3.6 the site requirements for waste pre-acceptance and acceptance are defined in a written procedure which will be developed to comply with the requirements specified in “Biological waste treatment: appropriate measures for permitted facilities” and “PAS 100:2018 Specification for composted materials. The procedure will be subject to ongoing review and revision as appropriate, and the current version will be available for inspection on site. The procedure will cover pre-acceptance, acceptance, quarantine and rejection procedures and can be represented by the flow chart in figure 1 on the following page.

Figure 1. Waste Acceptance Procedure Flowchart



3.3.1 Waste Pre-Acceptance

Where a contractual arrangement is made with a waste supplier, it shall include criteria for acceptance / rejection of loads delivered for composting. For material accepted for composting the acceptance criteria are those defined in Table 2 below along with corrective actions if a load exceeds the specific criteria.

Table 2. Acceptance Criteria

Contaminant content	Acceptance criteria (critical limit) and load inspection score	Control activity and associated record
Physical contaminants (e.g., plastic bags, non-compostable packaging and plastics, metals, concrete and consolidated mineral fragments (e.g., rocks and stones), etc	Score 0 = VERY GOOD = load delivered is very clean	Load accepted. Score and action logged on the 'Input Load Inspection Record Sheet'.
	Score 1 = GOOD = load delivered has negligible physical contaminant content	Load accepted. Score and action logged on the 'Input Load Inspection Record Sheet'.
	Score 2 = MEDIUM = physical contaminant content is quite high, but still below 5 % plastics / packaging items unsuitable for composting evaluated by subjective assessment	Load accepted. Plastic shall be removed as far as practically possible and placed into a 'rejects' container stored on site. The container's contents shall regularly be removed for disposal.
	Score 3 = POOR = physical contaminant content is above 5 % plastics / packaging items unsuitable for composting evaluated by subjective assessment	Load rejected. Score and action recorded on 'Input Load Inspection Record Sheet'. It contains more than the equivalent of 10 domestic black bin bags worth of litter/contrary material unsuitable for composting (e.g., glass, metal, plastic, building rubble) per 26.4m3
Weeds / plant invasive species	Japanese Knotweed absent from all input loads accepted for composting	Actions recorded on '*Input Load Inspection Record Sheet'./Rejected Loads*
Plants containing toxins (rhododendron, yew, ragwort, hemlock)	e.g., Rhododendron, yew, ragwort, hemlock etc. we will remove large clumps only, well distributed or small quantities will remain within the input mass.	Actions recorded on '*Input Load Inspection Record Sheet'*

With regard to plant pathogens, waste suppliers shall be instructed within the contractual arrangements or within written communication records to exclude plant materials known or suspected to contain such plant pathogens.

Feedback on the poor quality of feed stocks delivered to the site shall be provided to each waste supplier when necessary.

3.3.2 Waste Acceptance Procedures

The operator will collect the following information prior to accepting waste onto site:

- Type of waste;
- Source of waste;
- Specific process from which the waste is derived;
- Quantity of waste (tonnes);
- Waste Transfer Note number; and

- Vehicle registration.

Onsite verification checks will be undertaken by site personnel in line with the defined procedure. The general requirements of the checks are outlined below:

- All vehicles entering the site must stop and report to the weighbridge where they will receive further instruction from the weighbridge operative.
- Vehicles entering the site must provide a waste transfer note which details the source, location and description of the waste (including LoW code number) they are carrying for Duty of Care purposes; these notes will be held at the site office;
- The weighbridge operative will question drivers about the waste description to ensure compliance with the requirements of the permit. A visual check will be made, to ensure adequate description has been provided;
- If the weighbridge operative is satisfied that the waste is acceptable for receipt at the site within the terms of the permit, the contractor will be provided with a tipping form and will be directed to the OWC facility's waste reception area;
- A site operative shall ensure the waste carrier takes it to the correct input materials storage area. The waste carrier will tip the waste so as not to merge / contaminate it with any input materials already being stored.
- A site operative shall spread and inspect each load deposited at the storage area. The outcome of a representative percentage of these inspections shall be recorded on the Input Load Inspection Record Sheet in the Weighbridge
- If the weighbridge operative is not satisfied by either the waste description or the content of the incoming load, further checks will be required. Should further information on the incoming waste be required before acceptance, some, or all of the following personnel will be contacted:
    a. Designated Technically Competent Person (TCP)
    b. Waste producer to confirm the nature of the waste load;
    c. Waste carrier's office location, who will have information relating to the waste that is being transferred to the site; and
    d. Environment Agency.
- If the weighbridge operative deems that the waste is unacceptable under the terms of the permit, entry to the site will be refused and the registration number of the vehicle recorded separately in the site diary.

Wastes shall only be accepted on site if it:

- Is of a type and quantity listed in the site permit;
- Conforms with specified acceptance criteria;
- Conforms to the description in the transfer documentation; and
- Conforms to the Environmental Permit.

Each accepted load shall be assessed to identify the processing requirements and any potential problems.

Any input materials stored for incorporation to future batches (e.g., woody material kept for mixing into loads delivered in spring, that tend to contain high proportions of soft, sappy, putrescible plant tissues and require amendment) shall carry a batch code marker. A batch record sheet shall be created and maintained for such stockpiled material so that it is traceable when mixed with recently delivered input materials that form new composting batches.

3.3.3 Waste Quarantine and Rejection

The waste acceptance procedure will identify those waste materials which can be accepted at the site in accordance with its Environmental Permit and the staff on site shall be made aware of the acceptance / rejection criteria, any contractual arrangements and control measures which have been set. Materials which cannot be accepted will be rejected. Reasons for rejecting a waste load will include:

- Waste type is not on the permitted waste list for the site;
- Specified waste criteria are not met;
- Highly odorous waste; and
- Insufficient storage capacity at the facility.

Whenever the criteria specified in table 1 above and/or in a contractual arrangement are not met, this shall be clearly communicated to the waste supplier and records of the communication shall be kept.

Improved instructions, reminders of the composter's acceptance / rejection criteria, contractual arrangements (if applicable), control measures, and further clarification of any of the above shall be sent to the relevant waste supplier(s) when deemed appropriate by the site. These shall be recorded on the rejection note or when ok, within the weighbridge held record.

The site shall cease accepting loads from a particular source of contamination has occurred repeatedly, yet the supplier has not attempted corrective action, or, in the composter's opinion, the action taken has been ineffective.

3.4 Material Storage

3.4.1 General Storage Arrangements

Site infrastructure arrangements for storage have been designed to satisfy the requirements of relevant HSE and EA guidance. In relation to the proposed processes consideration has been given to:

- Storage areas will be located on impervious surfaces resistant to the material being stored, and with sealed construction joints. The OWC treatment area will be constructed from impermeable concrete and are designed to facilitate ease of plant maintenance and cleaning; Provision for management and control of fire risk has been developed in line with current statutory requirements; and
- In relation to vehicles and pedestrian access at the facility:
    a. The site is monitored by CCTV;
    b. Access is through a secure entrance requiring reporting to site reception;
    c. All non-waste vehicles are required to be parked in designated car park situated away waste storage areas;
    d. Areas of the process are designated as "restricted access" as necessary; and
    e. Pedestrian routes are marked to/from the car park.

3.4.2 Management of Waste Storage Area

Waste storage areas will be inspected daily for:

- spillage around internal storage areas;
- odour, dust and litter release from external storage areas; and
- signs of smoke or fire.

Site inspections will be recorded in the site operational log. Any issues logged will addressed as soon as practicable (i.e., same day for external issues) and the action taken will also be recorded.

3.4.3 Waste Storage Periods

The material storage arrangements on site are detailed in the table below. The stockpiles will form a trapezoidal shape and therefore the dimensions shown below are the maximum size at ground level.

The maximum storage duration for input materials prior to shredding shall not exceed 5 days. However, on occasions the environmental impacts, particularly odour, may need to take priority in the hierarchy of site controls.

Waste accepted and stored for composting shall not be stockpiled in a quantity that exceeds 1000 tonnes before shredding.

Table 3 Material Storage

Materials	Site Location	Dimensions (m)			Volume (m^3)	Particle Size	Retention Time
		Length (at floor level)	Width (at floor level)	Height (at max.)			
Incoming Green Waste	Bay 7 & 8	13.2	11.26	3.5	521 per bay	>150mm	5 days
Incoming Wood Waste	Bays 5 & 6	13.2	11.26	3.5	521 per bay	>150mm	5 days
Composting Windrows	1 – 17	65	8	4	1170 per windrow	30 – 50mm	84 days
Final Compost Product Bay	Bays 5 – 8	13.2	11.26	3.5	521 per bay	<30mm	6 months

3.5 Material Screening and Separation

3.5.1 Introduction

The proposed screening and separation process is designed to process up to 200 m^3 per hour up to an annual throughput of 90,000 tonnes and is situated within a building at the north side of waste reception/storage area.

The plant is designed to treat the incoming material both green and wood waste to provide a mechanism for the removal of contaminants and also for further treatment of the composting process output to produce the relevant product size fractions.

The plant comprises modular mechanical equipment which includes the following main modules which are shown on the process flow diagram and explained further below.

- Primary feed hopper.
- Taker Dosing Unit.
- Sorting Cabin and sorting belt.
- Splitter Units.
- Multi-Star Screens.
- Windsifter for plastics removal.

Other associated equipment includes; conveyors, a process control cabin, and generators. The supporting infrastructure includes an impermeable concrete surface with associated drainage control, incoming material storage areas and storage for segregated recycled materials and waste outputs. The movement of waste through the plant is illustrated in the process flow diagram (Figure 2 below).

The screening and separation plant is equipment designed specifically for processing the materials that are being processed. The plant will be deployed with a full operations and maintenance manual and operated and maintained by trained and competent personnel. A record of staff competency and training records will be available from site.

All plant, including static plant and mobile equipment, will be subject to a regular inspection and maintenance programme including regular inspections, servicing and planned preventative maintenance

to ensure all plant and equipment is functioning optimally and in accordance with manufacturer's instructions.

Figure 2. Screening and Separation Plant Flow Diagram

3.5.2 Loading

Loads of green or wood waste will be visually inspected during off-loading any unsuitable (e.g., litter or oversized >300mm) materials will be removed if necessary. Waste will then be pushed into the relevant reception stockpile or loaded directly into the screening/separation plant shredder.

All unsuitable and/or oversized materials that cannot be utilized in the ongoing process will be placed in skips for onward transportation to a suitably licensed recovery or disposal facility.

In respect of hot loads, a quarantine area will be maintained within the yard area at all times to facilitate the separation of burning material from material which has not ignited. This area will move to facilitate the formation and management of compost windrows however, it will always be sited at least 6m from incoming waste and outgoing product stockpiles.

3.5.3 Feed Hopper

Waste inputs will be transferred by mobile plant from the reception stockpiles or from windrows which have completed the composting stage to the primary feed hopper. The arrangement will include a raw feed hopper with which will remove >150mm "oversize" materials which will be conveyed to a separate stockpile. The discharged material, ≤150mm, will be fed onto a variable speed conveyor belt to transfer material to the next stage.

Output: Oversize >300mm, stockpiled for futher assessment. Dependant on the waste assessment and contaminants present, the following options exists:

- Shredding and mixing with new input material if further treatement deemed beneficial.
- Removal from site as a waste for recycling and recovery by others.

3.5.4 Taker Dosing Unit

The TAKER intake doser is used for the intake and dosed delivery of materials to downstream conveyors. The unit is situated after the intake hopper with material falling onto the vibrating transport conveyor. The conveying system speed is adjusted to ensure the optimal dosing behaviour/volume and throughput for the material being treated.

3.5.5 Sorting Cabin and Sorting Belt

Manual sorting to remove contaminants would be undertaken in the sorting cabin which will be equipped with appropriate air ventilation and exhaust. The sorting cabin will be used to separate different fractions like litter, metals and plastics manually and it consists of a picking belt with two discharge chutes.

3.5.6 Splitter 325 Unit

Self-cleaning screening deck which combines the action of a spiral shaft directing the material laterally with the roller effect moving the material in the conveying direction to distribute the materials effectively. Waste materials are sorted into different fractions based on their size, weight, shape and physical dimensions.

On the system that is proposed fractions with a size of < 80mm will be passed to the splitter unit and separates into 80/120mm fractions.

3.5.7 Multi-Star 2SE

The star screen comprises 2 screening decks and the rotating shaft of the deck moves the material in a horizontal direction and anything that cannot pass through the defined gap between the stars will be separated off as the coarser material. Material that passes through the screen moves onto the fine screen deck equipped with smaller stars and divides the material into a fine and medium fraction using the same separation principle. Particle size is controlled by varying the rotation speed of the star shafts.

On the system that is proposed fractions with a size of < 80mm will be passed to the star screen and separates into 0/10mm and 10/25mm fractions.

3.5.8 Hurrikan S Windsifter

The Hurrikan S is a pressure-suction system which results in effective removal of light materials (e.g., plastic film) from the screen overflow. The pressure blower separates the material and light materials settle onto the remaining fraction before being pulled away by a suction blower.

A radial fan generates the flow of compressed air, and the suction performance can be adjusted to material by variation of fan speed, fan distance and vent flaps. The system has a separation efficiency of up to 95 percent.

Electric drive of all components ensures top efficiency while offering many control possibilities.

3.5.9 Overband Magnet

The inclined feed conveyor will be equipped with a permanent suspended overband magnet fitted to the feed end of the conveyor in the direction of transport. The magnetic will hold ferrous elements contained in the material stream to the conveyor belt, while the non-ferrous bulk falls off. Ferrous materials are separated from the belt on the return, collecting metals into a skip. The recovered metals will be recycled.

3.5.10 Conveyers

The system will be equipped with a number of conveyors to transport various fractions including:

- Splitter feed belt
- Oversize cross belt
- Undersize collection belt
- Sorting belt.

These belts will be equipped with troughing rollers and with both crowned tail and head drums, which will assist with belt tracking. To assist with minimising spillage, the belts will be equipped with a polyurethane spring tensioned primary belt scraper and adjustable skirting rubbers.

3.6 Shredding

The green feedstock or wood material will be placed in the shredder by a front-end loading shovel and/or a 360° excavator – normally within 120 hours of receipt.

Shredding will reduce the waste to between 30 – 50mm particle size. The type of shredder that is being considered is a Ecotec's TBG 630 High Speed Shredder. This open fronted feeder uses heavy duty drag chains, a powerful feed wheel and an unrestricted feeder design to effectively utilise the 1,100mm diameter x 1,750mm wide swinging hammer rotor. This robust rotor comes with a wide selection of hammer designs and customisable screens which ensure end product material specification is met. The system also uses an intelligent screen opening system to discharge contaminants such as metals.

Shredded wood waste will be placed in the relevant wood waste bay for further screening and removal of metal before export.

Moisture checks will be carried out on shredded green waste and moisture adjusted by adding water or fibrous material and/or structuring agents, as required. The water will be sourced from one of the drainage lagoons or from rainwater tank provided in the composting area. At this stage no composting additives are planned to be used, however, in the event that an additive will be needed REAL approved additives will the first choice.

Uncontaminated oversize material from the shredding and/or screening processes may be re-shredded and mixed with new input material.

Contaminant material rejected from the shredder will be placed in skips or similar containers and removed from site for recovery, treatment or disposal.

3.7 Green Waste Composting

3.7.1 Sanitisation and Stabilisation

After initial processing, batches will be formed into windrows (around 8m wide, 4m high and 6- - 70 m long). Waste is picked up and loaded into the shredder and the shredded material will be used to form a windrow by moving the shredder forward accordingly. The typical batch size is expected to be around 1,000 m^3 or 600 tonnes but windrows may vary from 200 m^3 to 1,500 m^3 and formation of the windrow starts the composting phase.

Once the windrow has been completed it will be identified by a marker that displays its unique batch number and is easily visible to operatives moving materials on the site. In the event that batches are combined during the composting process, the 'on-going' batch code(s) shall be recorded on each of the corresponding batch record sheets and the record for one of these batches shall be used as the on-going record.

For each batch the sanitisation phase will normally occur during the first two weeks of the twelve-week total minimum composting period. Sanitisation will be complete when the minimum time has been completed and the batch temperatures, moisture and turning have been kept within critical limits.

The stabilisation period will occur for the following three weeks and will be completed when the minimum time has been completed and the batch temperatures, moisture and turning have been kept within critical limits.

The waste material will start to naturally decompose reaching temperatures of 65-80 degrees Celsius. After an initial 2-week period, temperatures will be maintained at above 45 degrees Celsius until the end of the stabilisation phase. Each windrow will be turned once every two weeks using the front-end loading shovel and/or a 360° excavator. The batches will be mechanically turned down the yard and turned in a sequence that allows the material to end up as near to the screening area as possible.

The temperature and moisture content of the windrow will be monitored and recorded once a week, using a probe inserted at least 0.5m into the windrow.

The following information shall be recorded during the stabilisation and maturation stages:

- Temperature;
- Time spent in windrows;
- Moisture content; and
- Turning/mixing as required.

During the subsequent final maturation stage, the feedstock will either be retained in windrows or be formed into separate stockpiles and the temperature will further decrease. The end of the maturation phase is reached when batch temperatures, moistures and turning remain within critical limits for a specified minimum period.

Stabilisation/maturation will then be marked as complete by recording the completion date on the Batch Appraisal Record Sheet. If any composting batches are combined during maturation, the corresponding records shall include the codes of the combined batches, and the overall code assigned to them.

Once the green waste has satisfactorily achieved the minimum composting period/critical limits it will be subject to further processing in screening and separation plant which is situated within a building at the north side of waste reception/storage area.

3.7.2 Final Product Processing

Once the material has satisfactorily achieved the minimum composting period it will be screened to achieve:

- *0 – 30 mm, soil improver, certified to PAS 100 & CQP*
- *0 – 25 mm, soil improver, certified to PAS 100 & CQP*
- *0 – 10mm, soil improver, certified to PAS 100 & CQP*

This product will then be classed as finished product and stored in the product despatch area where it awaits bulk collection or bagging.

Some compost screened to a 0-10mm grade will be allowed to mature and be either directly bagged or blended with imported sands and soils (non-waste materials) to create a topsoil mix in line with PAS 100 requirements. Bags could range from 25 litre up to a 1- ton builders' bag. Any small bags will be palletised and shrink wrapped and stored outside until despatch. At this end stage of the process the composting has been completed and left the permitted area.

Coarse woody particles from screening can be dispatched for disposal, supplied as non-PAS 100 confirming material or reprocessed if physical contamination is low or reduced before processing.

3.8 Process Monitoring

3.8.1 Monitoring and Analysis

Monitoring and analysis will ensure that the waste does not become highly odorous throughout the composting process. Site monitoring arrangements include:

- ***Mixing and Batch Formation*** - Moisture checks will be carried out and adjusted by adding water or fibrous material, as well as structuring agents, as required.
- ***Sanitisation and Stabilisation*** - Monitoring of temperature and moisture content will ensure that aerobic conditions within the open windrows is maintained and that anaerobic conditions do not develop, which will increase the potential for emissions from the facility. The monitoring will be completed as follows:
    a. temperature of the windrow will be monitored and recorded once a week by use of a probe inserted into a minimum of 0.5m depth into the windrow. The site temperature probe will be subject to calibration annually.
    b. Moisture of the material will be assessed at least weekly using the 'squeeze test' which involves grasping and clenching the sample in a gloved hand for approximately 10 seconds and then comparing the moisture against the table below:

Table 4. Moisture Assessment Index

Index Number	Sample Moisture Behaviour	Interpretation
1	Water seeps out	Too wet
2	More than one droplet appears	Too wet
3	One droplet appears	OK
4	Compost particles remain packed together and no droplets appear	OK

Index Number	Sample Moisture Behaviour	Interpretation
5	Compost particles fall away from each other	Too dry

Scores will be verified regularly by comparison with quantitative results (% mass/mass) obtained with an onsite balance-rapid method or calibration by off-site checks.

- ***Daily site inspections*** to assess weather conditions (rain, drizzle, hail, snow, wind direction), odour, noise, fugitive emissions, housekeeping and security; corrective action will be undertaken as necessary;
- ***Odour checks*** will be undertaken on all waste loads during acceptance checks, if necessary, a waste load will be rejected in the event that a strong odour is detected;
- ***Site specific environmental noise monitoring*** has been undertaken at the closest noise sensitive receptors surrounding the site and accompanies the planning application. The predicted noise levels associated with the proposed development are below both existing and derived noise limits at all receptor locations, and therefore no adverse noise effects are predicted as a result of the OWC facility, no specific noise mitigation measures are considered necessary; and
- ***The complaint procedure*** for the site will record any complaints associated with the site - should complaints be received consideration will be given to boundary monitoring as appropriate.

Compost will be sampled and tested at various stages of the composting process including:

- After any product preparation;
- Before any blending of the compost with other materials, composts, products or additives; and
- When the batch has completed the composting process (including any maturation applicable to the grade/product type) to ensure that the outgoing product will meet the requirements for PAS 100.

3.8.2 Trigger Levels and Actions

The trigger levels and values are presented in Table below.

Table 5. OWC Trigger Values and Actions

Parameter	Monitoring Frequency	Critical Value	Corrective
Moisture Levels	Weekly	40 – 60% depending on phase – this equates to a 3 – 4 on the grip test.	• To low add water • To high add/mix in fibrous material and/or structuring agents.
Temperature	Weekly	43 – 80 ^{O}C depending on phase	• Adjust frequency of windrow turning as appropriate
Particle size	As processed	< 50mm for windrows	• Material to be reprocessed through shredder, screening and separation processes as required.
Site Monitoring	Daily	• As per the tigger values in the DEMP and OMP	• Implement the actions in the DEMP and OMP

3.8.3 Process Validation

Process validation will be carried out when first evaluating conformity with Publicly Available Specification 100 (BSI PAS 100 (2018)) for composted materials and the Compost Quality Protocol and any additional compost quality criteria subscribed to (see criteria in Appendix E). Process validation will also be carried out when decided necessary as a result of regular or change-triggered management reviews.

A minimum of three batches will be assessed for process validation against the following:

- Composted for the minimum times;
- Appraised against the specified critical limits; and

- Graded and sampled promptly when such composting has been completed.

Each sample of compost grade under assessment will be representative of the batch from which it is taken and sent for testing at an AfOR Approved Laboratory within 1 week after the batch has completed its minimum composting period.

The responsible person will ensure the critical control points and critical limits of the composting process have been verified to consistently result in compost of the quality subscribed to in the quality policy. The duration and outcome of process validation will be recorded on the process Validation Record Sheet.

Any batch or part-batch that have failed to comply with the quality criteria subscribed to for the corresponding compost grade will be subject to the following:

- Undergo corrective action and then be re-sampled and tested;
- Undergo re-composting with or without addition of further input material as appropriate; or
- Be dispatched for use, processing elsewhere or disposal, and the recipient and regulator notified of the nature of its non-conformity with PAS 100.

3.8.4 Process Tracking Records

A record system shall be maintained connecting sources of wastes with delivery dates and weights. This is achieved via the use of a weighbridge system, the duty of care information collected for every load that arrives and the resulting site weighbridge ticket.

Composting batches are created one at a time. Batch formation ‘start’, and ‘finish’ dates are recorded in the ‘Batch Formation and Monitoring Record Sheet’. All waste loads that arrive at the weighbridge between these two dates therefore have gone into that batch, and thus can be traced back to source.

Each batch shall be given a unique number /code when being formed, clearly identifiable by a post with a marked board, or similar. This stays with the batch during the composting process.

When batch formation is completed, batch monitoring begins and its monitoring start date is recorded on the corresponding ’Batch Formation and Monitoring Record Sheet’, all information during active composting is logged on this sheet.

For each composting batch, the minimum composting process duration shall be calculated from the date the monitoring of that batch commences.

The site will operate a computerised information management system that provides:

- Batch data records for types, quantities, sources of waste received at the site;
- Activities carried out when forming the batch e.g., shredding, mixing, wetting etc.;
- Formation start and finish dates;
- The composting batch code assigned;
- Shredding and processing data (temperature and moisture for each batch); and
- Final end product screening and quality characterisation.

3.9 Output Management and Export

3.9.1 Compost Products

Up to45,000 tonnes of compost will be produced each year which complies with the Publicly Available Specification 100 (BSI PAS 100 (2018)) for composted materials and the Compost Quality Protocol.

The final PAS100 approved compost products achieving the required grades will be taken off site in bulk loads and sold to third parties.

Vehicles used to transport compost off-site will be loaded using the front-end loading shovel. After sheeting each vehicle will proceed to the wheel wash before going over the weighbridge - where it will be weighed off and issued with a weighbridge ticket.

3.9.2 Wood Output

Up to 30,000 tonnes of shredded wood will be produced each year which will be produced from shredding activities following by screening to remove metals.

Wood product will be exported for processing into to recycled products or for use in biomass.

4. ATRF Crushing Unit

4.1 Introduction

The processes at the ATRF facility will be supplemented with a new crushing unit designed to allow for crushing over oversize treatment residues or specific incoming waste streams on a campaign basis. Each campaign is estimated at 2 -3 weeks and is expected to occur quarterly.

Due to the nature of the incoming waste streams and treatment residues, the removal of fines during the initial stages of the wash process and the relatively high moisture content of any residual fines content of the oversize, the handling, storage and crushing of the oversize material is not considered to be an inherently dusty process (ref. Process Guidance Note 3/16(12) Statutory guidance for mobile crushing and screening).

As oversize materials are generated, they will be characterised to determine the waste classification, and to identify the need for crushing as a further processing stage of these post-treatment residues.

Sources materials, or input streams, for crushing have been added to the revised ATRF waste list which is presented at Appendix B.

Storage arrangements for materials prior to crushing are:

- Total 410 m^3 storage in 2 no. 3-sided storage bays. This material will comprise >150mm from the ATRF primary feed hopper and/or >100mm from the ATRF sizing screen.
- 400 m^3 storage in the 3-sided bay, this would be only from the ATRF sizing screen and will have had fines removed during the wet screening process;
- Up to 301 m^3 additional storage in a three side bay. This material will comprise mixtures of waste from the mechanical treatment of wastes that contain a high proportion of recoverable aggregate and glass as the crusher incoming waste stream.

Crushing will be undertaken in a dedicated area of the ATRF by a mobile enclosed mechanical crusher as shown on the Proposed Layout and Installation Boundary plan BA235900 and will benefit from the infrastructure and control measures inherent to the wider ATRF treatment facility.

4.2 Materials Acceptance

Materials being accepted for treatment by crushing will be subject to the same pre-acceptance and waste acceptance controls as currently permitted for the ATRF.

Outputs from the ATRF permitted into the crushing plant will include non-hazardous oversize materials rejected from the primary feed hopper and sizing screen. No further acceptance criteria are required as materials would have been initially assessed as inputs into the ATRF. However, the oversize waste must be assessed accordance with WM3 to confirm its classification and allow appropriate storage and handling.

4.3 Crushing Process

Mobile enclosed mechanical crushing plant will be mobilised to site to crush stockpiled volumes of oversize materials or specified incoming waste streams. The crushing plant will be located in the designated crushing area under a temporary structure, and includes the following main components:

- Hopper and vibrating feeder, loaded by loading shovel and with water mist.
- Enclosed crushing unit
- Bypass conveyor (may not always be required but when present will allow any fines loosened from the >150mm oversize to bypass the crushing unit).

- Product conveyor covered and with minimal drop height to product stockpile and serviced by facility dust suppression arcs.
- Engine, the crusher will be a diesel engine not requiring any input form the facility electrical supply.

4.4 Emissions

The following emissions are considered specific to the crushing process. As the defined input streams and proposed treatment methodology comprise a “dry” operation in which no liquid effluent is produced (with the exception of rainwater collection), no specific water emissions are considered from the crushing operation which are not already detailed for the ATRF.

Table 6. Crusher Emissions

Emissions	Potentially Impacted Media	Abatement Methods
Particulates	Air, Land	Prior to movement into the crushing plant, materials will be visually inspected and if deemed necessary additional moisture content assessments made to assess the need for further damping of stockpiles prior to movement and loading into the crusher. Crushing of oversize materials will use an enclosed mechanical crusher with the following additional controls: • Minimising drop heights when material is being loaded into and discharged from the crusher. • Use of misting in and around the crushing area, and in particular on the feed hopper and conveyors. • Completed under a temporary structure mobilised for the duration of the crushing campaign.
VOCs	Air	Input stream materials unlikely to have elevated VOCs due to WAC. No further abatement controls required beyond those listed to mitigate particulate emissions.
Odours	Air	Materials received for treatment will have an “earthy” odour which may be more prevalent for >150mm oversize where more fines particles will be present. No further abatement controls required beyond those listed to mitigate particulate emissions.

4.5 Crusher Output Specification and Verification Testing

Post-crushing materials may be destined for a number of re-use or disposal scenarios.

- Where crushed materials are directly suitable for recovery and considered a “treated gravel fraction” as opposed to requiring any further treatment, sampling and assessment will be undertaken as per section 6.1.
- Where additional treatment is required to facilitate recovery of a sand and gravel aggregate, crusher outputs will re-enter the wash plant as a new input.
- In the unlikely event that crusher outputs require disposal, they would be required to be compliant with the disposal criteria for the relevant disposal facility as included in current UK regulations. Sampling and chemical analysis is therefore required to demonstrate compliance with the appropriate waste classification, which will be undertaken as per section 6.1.

5. Processing 19 12 12 Wastes

5.1 Waste Description

The Operator is requesting to update the ATRF permitted waste list to include the addition of EWC 19 12 12 "Other Wastes including mixtures of materials from the mechanical treatment of wastes".

The source of this waste is the glass fines reject stream from Ford MRF which Biffa own and operate. The material has been analysed and confirmed as non-hazardous and is currently sent to landfill (see analysis in Appendix F). In order to move this waste stream up the hierarchy, Biffa propose to accept the waste stream and process it in batches through the ATRF separately from the road sweepings with the intent to recycle the glass product to receive the Packaging Recovery Notes (PRNs) for this material. The waste will be subject to the normal ATRF wash processes and further detail on this is provided below.

5.2 Processing

As outlined above, the 19 12 12 waste will be accepted and processed in individual batches through the ATRF separate from any other ATRF accepted wastes. The main processing stages of the ATRF remain unchanged from what is currently permitted and are outlined below.

5.2.1 Waste Acceptance

It is anticipated the annual throughput of this waste stream will be circa 5000 tonnes which will be accepted as part of the current overall permitted ATRF throughput.

One of the aggregate/sand bays will be cleared of material, ahead of the 19 12 12 waste being received at the site and all incoming 19 12 12 waste that is accepted will be tipped into this bay.

5.2.2 Trommel Pre-screen/Feeder System

Incoming 19 12 12 wastes will be removed from the designated waste reception bay by a small front loader, and transferred directly to the reception feed hopper of the trommel screen.

The feed hopper base is equipped with a variable speed screw feeder which controls the feed rate of the material directly into the trommel. The feed rate is at a rate of 20 – 25 tph.

The 40 – 100mm trommel is constructed with a punched plate type heavy duty barrel with adjustable screening angle. As the material passes through the trommel, fines will be collected on an under drum collection conveyor and passed onto the main incline conveyor for further processing. Although the material is unlikely to contain any oversize fraction, any which are detected will discharged from the rear of the trommel onto a 180 degree radial oversize conveyor and stockpiled.

The system has been designed with an extra wide under drum collection conveyor which eliminates material bridging and has an innovative feeder design that allows ease of drum removal for maintenance.

5.2.3 Feed Conveyor

Material will be transported on 17m static inclined conveyor equipped with an 800mm belt. The belt is self-supporting, on stanchions, with a feed boot to receive the incoming material from the feed hoper.

The belt is equipped with troughing and return rollers, and with both crowned tail and head drums which assists with belt tracking. To assist with minimising spillage, the belt is equipped with a polyurethane spring tensioned primary belt scraper and adjustable skirting rubbers.

There is a galvanised walkway along one side and around the head section, complete with handrail and high kick flat to provide safe access for maintenance. An emergency pull-cord is situated along the walkway to facilitate emergency stopping of the plant.

5.2.4 Ferrous Metal Recovery

The inclined feed conveyor is equipped with a permanent suspended overband magnet with cross belt self-cleaning design. The magnet is fitted to the feed end of the conveyor in the direction of transport.

The strong magnetic field will attract any ferrous elements which maybe contained in the material stream, and holds them to the conveyor belt, while the non-ferrous bulk falls off. When the belt separates from the pulley on the return, the ferrous is pulled from the field into a separate pile. Higher belt speed levels improve the separation.

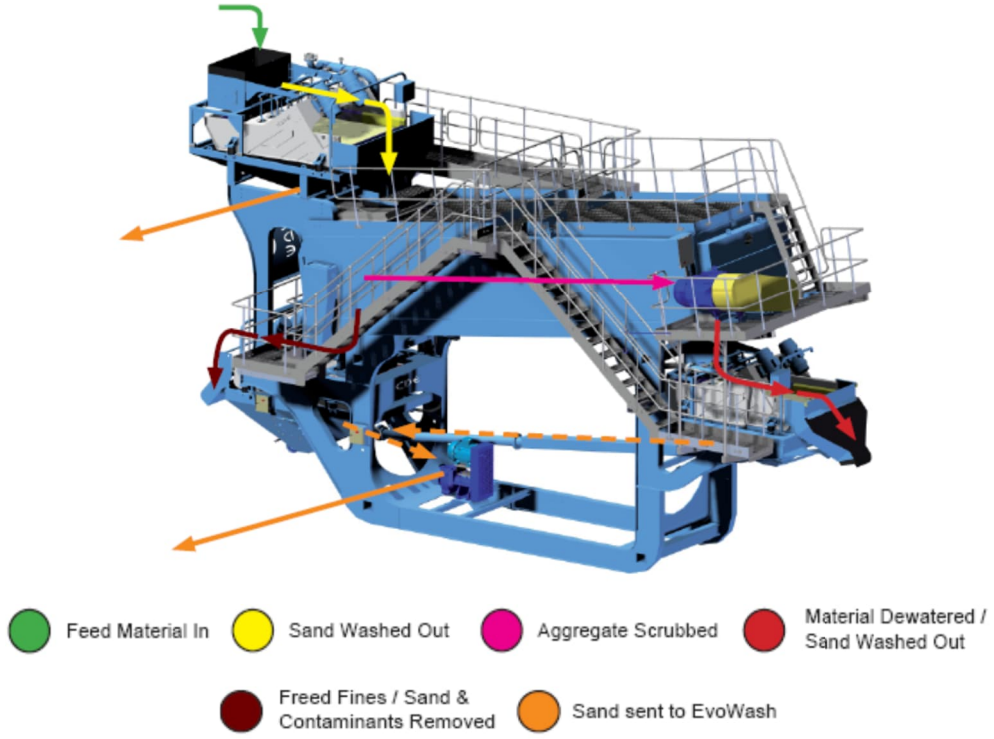
5.2.5 Attrition System

The attrition system is comprised of two main stages of particle separation, to segregate the incoming waste into its component fractions.

5.2.5.1 AggMax 80R Wash System

The feed conveyor transports the waste to a rubber lined feed chute, which passes the waste into the centre of the AggMax system. This system comprises heavy duty counter-rotating twin spiral shafts which are used to break up the waste material, and then the integrated water supply is used to wet the waste and wash the aggregates through a mechanism of abrasion and rotation. The process flow is shown below.

Figure 3. AggMax 80R Process Flow



The system is designed with central feed point and low 'transmitted vibration' which allows screens to be incorporated in 3 specific locations. In addition to the main discharge point, the system also incorporates side and rear discharge points for removal of water, sand, silt and organics, with minimal contaminants reaching the main discharge point.

Valves are fitted as standard to control water requirements, and retention time can be adjusted by altering the rotational speed to optimise process efficiency

5.2.5.2 Recovery of Organics/Lightweight Materials

As the waste passes through the above AggMax system, organic material and other lightweight wastes are removed, screened, dewatered and transported to the organics storage bay. The separated materials are removed from the back of the machine using an integrated upward flow classification system. This is adjustable to ensure the optimum flotation point is achieved. The lightweight and organic materials are discharged onto the Aggmax lightweights dewatering screen to remove excess water before discharged onto the lightweights stockpile conveyor.

5.2.5.3 Recovery of Aggregate

A double-deck screen on the front of the Aggmax is used to screen the aggregate into two washed products, and remove the sand. The system comprises a vibrating double deck rinsing screen, and sump with integrated wash system. High pressure spray nozzles direct the wash water directly onto the aggregate, to ensure the maximum capture of sand and/or removal of contaminants.

The larger aggregate particles (>6mm) are scrubbed to break up clays and clean the stone, before being dewatered. The clean aggregate is discharged from the front of the machine into the aggregates storage bay.

Sand is returned to the sump in the fines washing section below the lightweights dewatering screen, via internal pipework to ensure optimum product output. The sand and process water are pumped from this sump to the Evowash unit.

5.2.5.4 Evowash 71 System

The finer aggregate particles (<6mm) are collected and pumped to the Evowash system which comprises:

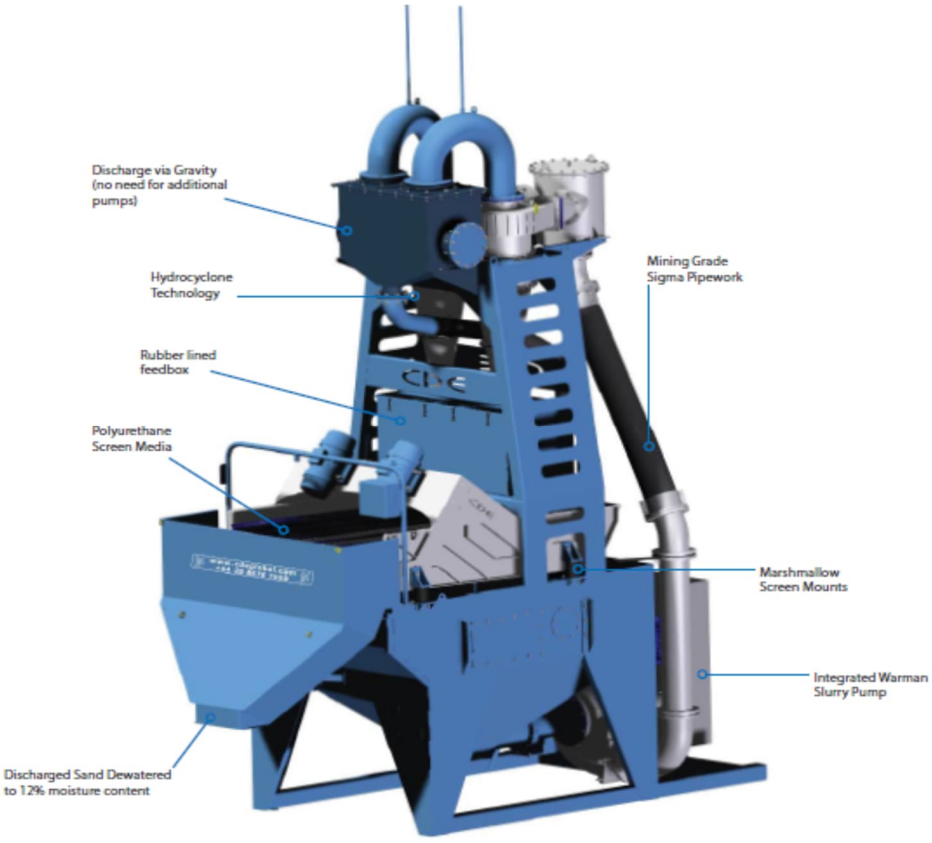
1. Variable concentration hydrocyclone;
2. Dewatering screen;
3. Sump; and
4. Slurry pump.

The material enters the sump of the Evowash, and is pumped to the hydrocyclone where the waste water and silt are separated from the sand.

This system uses centrifugal forces to separate the particles on the basis of the density differential between the solids and the liquid, and separation relies heavily on particle size.

The overview of the system is shown in figure 4 below.

Figure 4. Evowash System



The centrifugal forces cause the coarser sand material to separate out and migrate downwards to the bottom of the cyclone, where it is discharged onto a dewatering screen to remove excess water. The dewatered sand (typically 12 – 15% moisture) is then discharged from the front of the dewatering screen onto the sand stockpile conveyor.

The finest material (<75µm) remains within the wastewater, which exits through the top of the cyclone, and is sent to the water treatment plant for processing. The cyclone has a typical cut point of D95 @ 75µm, i.e. 95% of the particles in the overflow would be smaller than 75um.

Operational efficiency is optimised through:

- Positioning of the rubber lined feed box to allow for the cyclone underflow to be discharged across the full width of the dewatering screen thus maximising screen area and ensuring high efficiency dewatering;
- Using marshmallow screen mounts to transfer 10 – 15% more energy to the dewatering screen thus increasing the dewatering achieved;
- Using cyclones which discharge directly to the next phase of processing reduces fines loss; and
- The system is equipped with a splash cover which ensures water is retained within the circuit rather than splashing onto the site.

5.2.5.5 Stockpile Conveyors

Materials recovered in the AggMax system are transported from the processing plant to the stockpile via designated conveyors.

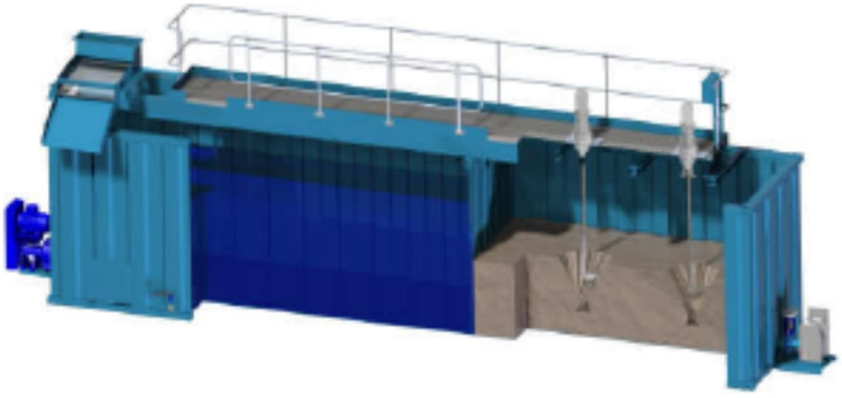
These belts are equipped with troughing rollers and with both crowned tail and head drums, which assists with belt tracking. To assist with minimising spillage, the belts are equipped with a polyurethane spring tensioned primary belt scraper and adjustable skirting rubbers.

5.2.6 Water Treatment

5.2.6.1 Containerised Combined Buffer Tank

Wastewater is discharged into a containerised buffer tank, which is equipped with a sludge recirculation pump, a water recycle pump, an ultrasonic probe for measuring the water level, and associated pipework. The positive displacement pump is used to feed the material into the centrifuge.

Figure 5. Containerised Buffer Tank



5.2.6.2 Polyelectrolyte Plant

The basic operation of the Polyplant is to prepare a flocculent dosing solution by mixing flocculent powder (polyelectrolyte powder) into solution, which is transferred to a storage tank before being use to dose wastewater from the buffer tank. The flocculent is used to agglomerate the fine particles together, to assist with their separation from the water.

Dosing of the wastewater takes place at several points along the pipeline from the buffer tank to the centrifuge, and the operation sequence of the Polyplant is fully automatic, controlled by level probes, located inside each tank.

The Polyplant settings for the Screw Feeder, Dosing pump and mixing times are fully controllable by a PLC control panel located in the Main control panel. The system is also fitted with an alarm system in order to ensure early troubleshooting.

The raw Polyelectrolyte is in powder form; for correct management and storage this will be stored in the supplied cabin.

5.2.6.3 Centrifuge Decanter

The centrifuge offers a final dewatering process to separate the fine solid material from the wastewater. The centrifuge operates on the principle of gravitational separation, whereby the centrifuge cylinder is rotated at high speed about its central line to produce a high centrifugal 'G' force on the liquid/solids, which in turn results in rapid sedimentation of those particles which are denser than the liquid.

The clean water which is produced overflows from the rear of the centrifuge into a recycled water storage tank for recirculation around the system. The solids are concentrated into a waste product (typically 50% dry solids), which is discharged to a stockpile underneath the centrifuge. The centrifuge has been designed with a solids capacity of 3,000 kg dry solid per hour, variable speed and a flushing water line to minimise the risk of blockage.

5.2.6.4 Hydrocarbon Removal Filter

Water being removed from the centrifuge will pass through an inline 'SmartSponge' filter system to remove hydrocarbons & reduce heavy metal concentrations.

The filter is designed using a synthetic polymer to provide a very porous structure with hydrophobic and oleophilic characteristics, capable of selectively removing hydrocarbons. This means the hydrocarbons become permanently bonded within the chemical matrix of the filter, and cannot be washed out or leached out. The filter swells as hydrocarbons are absorbed, but continues to maintain its porosity and filtering characteristics. The absorbed pollutants are transformed into a stable solid form, which can be easily removed for recycling / recovery.

The system has been designed with:

- A cassette assembly, which enables quick and easy removal for filter replacement; and
- An integrated galvanised walkway, to provided full access to all key maintenance areas.

5.2.7 Crushing

After processing the glass waste in the ATRF, the intention is to crush it and then combine it with the ATRF sand product prior to sale. There will be no change to the how the wash waters from the ATRF process are managed as a result of this new waste stream, the will be treated in the integral water treatment section of the ATRF and recycled for reuse.

6. Resource Management

6.1 Raw Material Management

Raw materials at the site will comprise the use of lubricants etc. for plant maintenance and gas oil for mobile plant use. The composting process and new ATRF crushing process does not require the addition of chemical reagents or other raw materials. Therefore, raw materials use is relatively low.

6.1.1 Material Selection and Procurement

Raw materials will be selected and procured in accordance with defined IMS procedural requirements, taking into consideration:

- The environmental impact of materials across their entire life cycle;
- The impact on human health by considering harmful or hazardous properties;
- Sourcing from renewable and sustainable sources, where practicable;
- Sourcing from local sources, where practicable; and
- The quality of the materials to be used, and the efficient use on site.

6.1.2 Material Management

Raw materials will be stored in the designated storage areas outside the OWC installation boundary and relevant chemical data sheets will be held by the Site Manager and will be located in the Site Office.

6.1.3 Raw Material Inventory Environmental Impact of Oils and Lubricants

Accumulation Potential

Information currently available on typical oils and lubricants indicates that they are unlikely to show any bioaccumulation or food chain concentration toxicity potential.

Environmental Fate

This material is brought onto site in small quantities which is stored in a designated storage area which will include the provision of containment/drip trays. The material will be used to lubricate/fuel fixed and mobile plant, therefore the potential for release of the material to atmosphere, land or to water would be due to accidental release and the risk of this occurring is felt to be low. However, in the event of an accidental release the following is the expected environmental fate.

- Releases to air – none expected;
- Release to land would be related to potential spillages during material handling and storage and leaks from fixed/mobile plant. These are expected to be minimal and localised to the site. Containment will be provided for all containers, and spill kits will be available on site. Any spillage would be removed and used absorbent/spill containment materials will be bagged and removed offsite for treatment/recycling. The likelihood of any material being deposited outside the site boundary on unmade ground is expected to be extremely low; andRelease to water would be the same as release to land, with the same level of controls employed. All spillages would be localised to the site and the potential for offsite release is very low as such material would be captured in enclosed drainage system and the material removed via tanker.

6.2 Water Use

Water supply for maintaining the appropriate moisture content required for the composting process or for dust suppression will be provided by collecting runoff from the OWC sealed drainage systems and recirculating it through the waste mass (where necessary).

The ATRF plant operates on a closed loop system, with the process water being treated and recirculated around the treatment process as much as practicable. Water requirement for the system is around 10.0 m3/hr as follows:

- 40 – 50% of the requirement is potable (or similar) water for the FlocStation supply; and
- 50 – 60% of the requirement is recycled/lagoon water for system top-up.

7. Residue Management

7.1 Management of Treatment Outputs

Recycled materials and residual waste treatment products generated from the OWC and crushing treatment processes are summarised in Table 7 below along with the storage arrangements and intended re-use or waste management routes.

Table 7 Recycled Materials and Residual Waste Products

Material	Source	LoW Code	Storage Arrangements	Intended Waste Management Route
Aggregate	ATRF crushing	End of Waste or 19 12 09	Storage bay	• Expected to achieve end of waste status and sold as product. • Where EoW not viable material will be recycled where possible; or • Use for landfill engineering; or • Re-entry into wash plant to further enable sand and aggregate recovery
Glass	ATRF Treatment and Crushing	19 12 05	Storage bay	• Expected to achieve end of waste status and sold as product. • Where EoW not viable material will be recycled where possible; or • Use for landfill engineering; or • Re-entry into wash plant to further enable sand and aggregate recovery
Sand/Glass Mix	Blending of output products	End of Waste or 19 12 09	Storage bay	• Expected to achieve end of waste status and sold as product. • Where EoW not viable material will be recycled where possible; or • Use for landfill engineering; or • Re-entry into wash plant to further enable sand and aggregate recovery
Oversize	OWC shredding, screening and Separation	19 12 10 19 12 12	Storage bay	• Send to suitable treatment facility for further processing or to landfill for disposal
Rejects	OWC shredding, screening and Separation	19 12 10 19 12 12	Quarantine Area	• Send to suitable treatment facility for further processing or to landfill for disposal
Organic fraction	Biological treatment processes.	PAS Compliant or 19 05 03	Storage bays or On Landfill if that is the end-use location	• PAS compliant product suitable 3rd party sale • Reuse as soil enhancer for Landfill or; • Soil treatment facility at Redhill Landfill
Wood	OWC shredding, screening and Separation	19 12 07	Storage bays	• Recycling or recovery
Plastics	OWC shredding, screening and Separation	19 12 04	Skips or RoRos	• Recycling or incineration
Metals	OWC shredding, screening and Separation	19 12 02 19 12 03	Skips or RoRos	• Recycling
Oil / Lubricants	Plant Maintenance / Leaks	13 01 11* 13 01 12*	Designated containers stored on	• Recycling

Material	Source	LoW Code	Storage Arrangements	Intended Waste Management Route
		13 02 06* 13 02 07* 13 07 01*	containment pallet	

Sampling and chemical analysis is required for all output materials (recovered aggregates, and compost products) to determine if the output meets end of waste status or the relevant post-treatment waste classification.

Prior to re-use or disposal of the product, samples will be taken from the materials produced as follows:

- The matured compost outputs will be subject to the controls and testing defined in the OWC Standard Operating Procedure in order for the materials to achieve end of waste (EoW) status and materials sold or exported as compost product for re-use elsewhere.
- The treated aggregate fractions which have the potential to meet End of Waste Status will be subject to the controls and testing defined in the established ATRF Factory Control Document in order for the materials to achieve end of waste (EoW) status and materials sold or exported for re-use elsewhere. Monthly composite samples will be submitted to an external laboratory for appropriate chemical analysis.

The final destination or use of the materials generated will be determined based on the analytical results.

7.2 Waste Handling and Storage

Site infrastructure arrangements for storage have been designed to satisfy the requirements of relevant EA guidance, and the general principles employed include:

- Ensuring that watercourses, including those connected directly to ground water, are protected through the use of a self-contained drainage system;
- Minimisation of double handling of waste materials, enabling the development of transport routes to provide for the direct transfer of material between process stages and to final storage arrangements;
- Ensuring all spillages due to equipment failure, or other accidental releases are logged, investigated and appropriate corrective action taken – to assist with spillage management, relevant spill response equipment will be situated at various locations around the site, designed for the particular hazard characteristics of the waste materials present;
- Specifying areas for waste operations, ensuring the safe unloading and discharge of accepted wastes and raw materials – the OWC and ATRF facilities are located on an impermeable surface to prevent contamination of groundwater;
- Completion of fire-risk assessments, with appropriate arrangements for alarms and dealing with fires having been put in place. This will be audited routinely to ensure continued effectiveness in relation to activities which present a defined fire risk; and
- Managing vehicle and pedestrian access at the Site, such that:
    a. Access to the site will be monitored by CCTV;
    b. Access is only through a secure entrance requiring reporting to site reception;
    c. All non-waste vehicles are parked in car park situated away from waste storage areas;
    d. Process areas are designated as “restricted access” as necessary; and
    e. Pedestrian and vehicle routes within the site are kept under review.

7.3 Application of Waste Hierarchy

In line with Regulation 4 of the Waste Framework Directive, the waste hierarchy will be applied to the management of residual treatment products and other wastes generated at site as follows:

7.3.1 Prevention

Minimisation techniques which will be employed at the site will include:

- Treatment of incoming waste streams to meet end of waste criteria/product standards;
- Routine inspections for early detection of leakage and other emission issues – this will be followed by prompt action to address any issues noted;
- Maintenance of high standard of housekeeping across the Site; while
- The aim of the operation as a whole is to reduce the overall volume of the waste material going to landfill.

7.3.2 Preparing For Reuse

Materials will be stored in designated areas, as defined in Table 7 above, such that material segregation is achieved, and the risk of damage/contamination is minimised. This will facilitate the reuse, recycling or recovery of materials where possible.

7.3.3 Recycling

Opportunities for recycling of residual treatment products and wastes will be identified and implemented where possible, to include:

- Recovery of organic material which does not meet PAS 100 standard will be sent for use on landfill as non-PAS soil enhancer or to third party users; and
- Collection of waste oils and lubricants from maintenance activities, which will then be sent to an off-site recycling facility or where this is not suitable to an off-site recovery facility.

7.3.4 Other Recovery

Where reuse and recycling of a material is not appropriate, alternative recovery options will be sought, including recovering the organic fraction for use as landfill engineering material or for similar use where possible.

7.3.5 Disposal

Materials sent for final disposal will be minimised where possible. Currently disposal is anticipated to be the option for general waste not suitable for reuse, recycling or recovery.

Options for materials sent for disposal will be kept under review to ensure that reuse, recycling and recovery opportunities are identified and used as they become available in the future.

8. Energy

8.1 Energy Efficient Management

Energy efficiency management for the will be implemented in line with the requirements identified in the IMS as detailed in section 6.2 of the Management Plan (ref: Application, Part 3).

8.2 Energy Consumption Requirements

8.2.1 Fuel Oil Consumption

Power consumption of the mobile crusher will be dependent on the final plant chosen. Typical crushing units are around 200 – 300 kw and powered by their own diesel power units. Allowing for crusher operations occurring for 10 hours per day each week of a campaign. the expected power consumption would be around 180 MWh.

8.2.2 Electricity Consumption

The power for the new OWC processing plant will be supplied from the existing site electricity supply. The main components of the OWC process utilising power include shredder, feed belts, drive motors, rollers, scrappers, overbelt magnet, splitter units, and motorised screens. The installed power is 100.5 kw with circa 435 kw being consumed each hour of operation assuming all plant operating. This equates to a maximum consumption of 397MWh per annum for the operational hours needed to treat 90,000 tpa.

The ATRF plant is connected into the existing site power supply and although actual power drawn will be variable dependant on running hours and throughput. Typical plant power consumption for individual elements is shown in the table below with an overall loading of 320kW expected.

Table 8. ATRF Plant Typical Power Consumption

Plant Item	kW rating
AggMax 80R	45
Feed Hopper	4
Conveyors	7.5
Evowash 71	37.2
P40 Floc Station	2.78
Centrifuge	128

It is anticipated that annual consumption based on the annual throughput will be around 768 MWh for up to the 2,400 operational hours the plant is anticipated to run.

8.2.3 H1 Assessment of Energy Consumption

An assessment of the energy consumption for the new processes based on an annual waste intake of 100,000 tpa for the OWC and 60,000 tpa for the ATRF was completed using the EA's H1 software. This assessment is summarised in Table 9 below.

Table 9. Annual Energy Consumption

Energy Source	Delivered Mwh	Primary Mwh	Specific Energy Consumption (Mwh/Te Waste)	Emissions Co_2 Te/Yr
Electricity (Public Supply)	1,165	2,796	0.01864	464.14
Gas Oil	180	180	0.003	45

8.2.4 Specific Energy Consumption

There is no specific industry benchmark set within the 'Biological Waste Treatment: Appropriate Measures' Guidance regarding the SEC for biological treatment processes. However, the 'Waste Treatment BREF' document states that "*the average energy consumption is around 64 kWh per tonne of waste treated for outdoor aerobic treatment, with a range of 0–330 kWh/t*".

The specific energy consumption for the OWC site has been calculated to be around 9.53 KWh/Te.

The specific energy consumption for the ATRF site including crusher has been calculated to be around 33.72 KWh/Te.

Appendix A Drainage Plan

N

134800mN

134700mN

134600mN

Tank

Tank

Tank

Tank

Engines

TP

SURFACE WATER STORAGE TANKS

EXISTING WELFARE UNITS

EXISTING WATERCOURSE, BOLDINGS BROOK.

ACCESS WALKWAY FROM WELFARE FACILITIES

EXISTING CULVERT C. CROSSES UNDERNEATH RAILWAY AND DISCHARGES TO BOLDINGS BROOK TO THE WEST.

V CHANNEL DRAIN AND CONCRETE UPSTAND

PROPOSED NORTH BASIN
1:3 SIDE SLOPES
355 m³ CAPACITY
2.2m DEPTH

NORTH BASIN

PROPOSED BUILDING HAS SEPARATE DRAINAGE SYSTEM. RAINFALL TO BE CAPTURED AND RE-USED FOR WINDROWS

PROPOSED SURFACE DISH DRAINS CAPTURES SURFACE WATER FROM EACH GROUP OF WINDROWS.
350mm NOM. DEPTH.
DRAINS TRANSFER SURFACE WATER INTO PROPOSED OPEN CHANNEL THROUGH OUTLET HOLES IN RC RETAINING WALL.

SCREENING AND SEPARATION PLANT

ROOF WATER STORAGE TANK

GREEN BAYS

BELOW GROUND PIPEWORK WITH GULLYS. TRANSFERS SURFACE WATER TO NORTH BASIN STORAGE. GULLY SPACING/DETAIL TBC.

PROPOSED OPEN CHANNEL. FORMED AS A SERIES OF CASCADING CHANNELS. 1V:110H CHANNEL GRADIENT 1:1 SIDE SLOPES 1.5m WIDE BASE 1.0m HIGH

CATTLE GRID

WOOD RECEPTION BAYS

GREEN RECEPTION BAY

PROPOSED SOUTH BASIN
1:3 SIDE SLOPES
610 m³ CAPACITY
3.1m DEPTH

SOUTH BASIN

STORAGE & SETTLEMENT PONDS

PROPOSED CONNECTION INTO EXISTING SURFACE WATER SYSTEM. EXISTING SURFACE WATER SYSTEM CARRIES SURFACE WATER SOUTH-EAST TO EXISTING MBT LAGOON ON SITE.

SUB STATION

EAST - WEST ACCESS ROAD

FUEL TANK

MESH SECURITY FENCE

2No WEIGHBRIDGES

WEIGHBRIDGE OFFICE & PARKING SPACE

MH

MH

Tank

Signal Post

517100mE

517200mE

0 10 20 30 40 50 100m

KEY

- CONCRETE SURFACE / ROAD
- STOCKPILE & NUMBER (65m LONG x 8m WIDE x 4m HIGH)
- PERMIT BOUNDARY
- PROPOSED CHAIN LINK FENCE LINE
- PROPOSED R.C. UPSTAND
- PROPOSED R.C. RETAINING WALL
- 50.000 SPOT LEVEL (EXISTING)
- 50.000 SPOT LEVEL (PROPOSED)
- SOUTH BASIN DRAINAGE CATCHMENT AREA (TREATED AS GREY WATER TO BE TAKEN AWAY)
- SOUTH BASIN DRAINAGE CATCHMENT AREA FLOW PATH
- NORTH BASIN DRAINAGE CATCHMENT AREA (TREATED AS GREY WATER TO BE TAKEN AWAY)
- NORTH BASIN DRAINAGE CATCHMENT AREA FLOW PATH
- EAST-WEST ACCESS ROAD DRAINAGE CATCHMENT AREA (TREATED AS STORM WATER)
- EAST-WEST ACCESS ROAD DRAINAGE CATCHMENT AREA FLOW PATH
- SCREENING AND SEPARATION PLANT DRAINAGE CATCHMENT AREA (TREATED AS GREY WATER TO BE TAKEN AWAY)
- MAIN ACCESS ROAD DRAINAGE FLOW PATH (GOES TO MAIN SITE LAGOON)
- PROPOSED SURFACE WATER DRAINAGE ROUTE
- PROPOSED OPEN CHANNEL
- PROPOSED MANHOLE
- PROPOSED GULLY

NOTE

ATRF SITE DRAINAGE IS SEPARATE FROM THE COMPOST SITE

- ATRF SITE
- ATRF SITE CLEAN SURFACE WATER
- ATRF SITE CLEAN SURFACE WATER DIRECTION OF FLOW
- ATRF SITE SURFACE WATER SEPARATOR DISCHARGES TO BOLDINGS BROOK TO THE WEST
- ATRF SITE SURFACE WATER GULLY
- ATRF SITE DIRTY SURFACE WATER
- ATRF SITE DIRTY SURFACE WATER DIRECTION OF FLOW
- ATRF SITE DIRTY SURFACE WATER RUN-OFF STORAGE TANK USED IN ATRF PROCESS
- ATRF SITE DIRTY SURFACE WATER GULLY

REV.	DATE	DRAWN	DESCRIPTION
1	05/11/24	AO	EXISTING ATRF DRAINAGE DETAIL ADDED

Biffa Waste Services Ltd
Redhill Landfill Site
Cormongers Lane,
Nutfield, Redhill
RH1 4ER
Tel. 01737 765042
Mob: 07921 386021

E-mail phil.mumford@biffa.co.uk

PROJECT	PROPOSED OPEN WINDROW COMPOSTING FACILITY
LOCATION	BROOKHURSTWOOD LANDFILL SITE
DRAWING TITLE	PROPOSED SURFACE WATER DRAINAGE LAYOUT
DRAWING No.	BA0313401
COMPUTER REF.	
DRAWN	AO
DATE	05/11/2024
SCALE(S)	1:500 @ A1

Appendix B Updated Waste List For ATRF Including for Crushing

Waste Code	Description
01	WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING, AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS
01 01	Wastes from mineral excavation
01 01 01	wastes from mineral metalliferous excavation
01 01 02	wastes from mineral non-metalliferous excavation
01 04	wastes from physical and chemical processing of non-metalliferous minerals
01 04 08	waste gravel and crushed rocks other than those mentioned in 01 04 07
01 04 09	waste sand and clays
01 04 13	wastes from stone cutting and sawing other than those mentioned in 01 04 07
02	WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING
02 01	wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing
02 01 01	sludges from washing and cleaning
02 03	wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing;
02 03 01	sludges from washing, cleaning, peeling, centrifuging and separation
02 04	wastes from sugar processing
02 04 01	soil from cleaning and washing beet
10	WASTES FROM THERMAL PROCESSES
10 02	wastes from the iron and steel industry
10 02 01	wastes from the processing of slag
10 09	wastes from casting of ferrous pieces
10 09 06	casting cores and moulds which have not undergone pouring other than those mentioned in 10 09 05
10 09 08	casting cores and moulds which have undergone pouring other than those mentioned in 10 09 07
10 11	*wastes from manufacture of glass and glass products*
10 11 12	waste glass other than those mentioned in 10 11 11
10 12	*wastes from manufacture of ceramic goods, bricks, tiles and construction products*
10 12 06	discarded moulds
10 12 08	waste ceramics, bricks, tiles and construction products (after thermal processing)
15	*WASTE PACKAGING: ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED*
15 01	packaging (including separately collected municipal packaging waste)
15 01 07	glass packaging
16	WASTES NOT OTHERWISE SPECIFIED IN THE LIST
16 11	*waste linings and refractories*
16 11 04	other linings and refractories from metallurgical processes other than those mentioned in 16 11 03
16 11 06	linings and refractories from non-metallurgical processes others than those mentioned in 16 11 05
17	*CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)*
17 01	*concrete, bricks, tiles and ceramics*
17 01 01	concrete
17 01 02	bricks
17 01 03	tiles and ceramics
17 01 07	mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06
17 02	wood, glass, and plastic
17 02 02	glass
17 03	*bituminous mixtures, coal tar and tarred products*
17 03 02	bituminous mixtures other than those mentioned in 17 03 01
17 05	*soil (including excavated soil from contaminated sites), stones and dredging spoil*

Waste Code	Description
17 05 04	soil and stones other than those mentioned in 17 05 03
17 05 06	dredging spoil other than those mentioned in 17 05 05
17 05 08	track ballast other than those mentioned in 17 05 07
17 09	*other construction and demolition wastes*
17 09 04	mixed construction and demolition waste other than those mentioned in 17 09 01, 17 09 02 and 17 09 03
19	*WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTEWATER TREATMENT PLANTS AND PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION/INDUSTRIAL USE*
19 08	Wastes from wastewater treatment plants not otherwise specified
19 08 01	screenings
19 08 02	wastes from desanding
19 10	Wastes from shredding of metal-containing wastes
19 10 06	other fractions other than those mentioned in 19 10 05
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not
19 12 05	glass
19 12 09	minerals (for example sand, stones)
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11 (and only including waste types listed in this table that contain a high proportion of recoverable aggregate)
19 13	*wastes from soil and groundwater remediation*
19 13 02	solid wastes from soil remediation other than those mentioned in 19 13 01
19 13 04	sludges from soil remediation other than those mentioned in 19 13 03
20	*MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS*
20 01	separately collected fractions (except 15 01)
20 01 02	glass
20 02	garden and park wastes (including cemetery waste)
20 02 02	) soil and stones
20 03	other municipal wastes
20 03 03	street-cleaning residues

Appendix C Permitted Wastes for Open Windrow Composting

Waste Code	Description	Compost Quality Protocol Restrictions
02	*WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING*	
02 01	wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing	
02 01 03	plant-tissue waste	Includes straw, other crop residues, riverine vegetation and spent growing media based on plant tissues such as compost derived from source-segregated biodegradable waste, peat, and bark. No Japanese Knotweed
02 01 06	animal faeces, urine, and manure (including spoiled straw) only	Includes straw, other crop residues, riverine vegetation and spent growing media based on plant tissues such as compost derived from source-segregated biodegradable waste, peat, and bark.
02 01 07	wastes from forestry (biodegradable only)	Green waste and plant tissue only.
02 03	wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve production; yeast and yeast extract production, molasses preparation and fermentation	
02 03 04	materials unsuitable for consumption or processing (biodegradable only)	Allowed only if no chemical additives or toxin residues present.
02 07	wastes from the production of alcoholic and non-alcoholic beverages (except coffee, tea, and cocoa)	
02 07 01	wastes from washing, cleaning, and mechanical reduction of raw materials (biodegradable only)	Only allowed: • Malt husks, sprouts or dust. • Hops and spent grains. • Sludge from production process • Yest and yeast-like residues Waste types allowed if biodegradable only. Any chemical additives or contaminants must comply with EU regulations (e.g., EC 1881/2 006 which sets max levels for some contaminants in foodstuffs.
02 07 02	wastes from spirits distillation (biodegradable only)	
02 07 04	material unsuitable for consumption or processing (biodegradable only)	
02 07 99	wastes not otherwise specified (malt husks, malt sprouts, yeast, and yeast-like residues only)	
03	*WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER, AND CARDBOARD*	
03 03	wastes from pulp, paper and cardboard production and processing	
03 03 01	waste bark and wood	
03 03 10	fibre rejects only	Only allowed if not mixed with, or does not contain, de-inking sludge
04	*WASTES FROM THE LEATHER, FUR AND TEXTILE INDUSTRIES*	
04 02	waste from the textile industry	
04 02 10	organic matter from natural products (un-dyed and untreated only)	Only allowed if biodegradable material only.
07	*WASTES FROM ORGANIC CHEMICAL PROCESSES*	
07 02	wastes from the MFSU of plastics, man-made rubber, and synthetic fibres	

Waste Code	Description	Compost Quality Protocol Restrictions
07 02 13	waste plastic (compostable plastic only, unused, and uncontaminated excess production only)	Unused and uncontaminated excess production only. Plastic must be certified as compostable/biodegradable.
15	*WASTE PACKAGING: ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED*	
15 01	packaging (including separately collected municipal packaging waste)	
15 01 01	paper and cardboard packaging (excluding veneers, plastic coatings, or laminates)	Not allowed if any non-biodegradable coating or preserving substance present.
15 01 02	plastic packaging (compostable plastics only)	Plastic must be certified as compostable / biodegradable
15 01 03	wooden packaging	Not allowed if any non-biodegradable coating or preserving substance is present. Untreated wood only.
15 01 05	composite packaging (only biodegradable organic packaging)	Allowed only if all components comply with requirements of the chosen standard. Plastic must be certified as compostable / biodegradable
15 01 09	textile packaging (made entirely from biodegradable fibres only)	Allowed only if entirely natural fibres.
16	*WASTES NOT OTHERWISE SPECIFIED IN THE LIST*	
16 10	aqueous liquid wastes destined for off-site.	
16 10 02	Untreated wash waters from cleaning fruit and vegetables on farm only	Allowed only if digestate or liquor from an aerobic digestion process that accepts only the waste input types allowed by this Quality Protocol
17	*CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)*	
17 02	wood, glass, and plastic	
17 02 01	Wood	Not allowed if treated, for example contains veneers, other coatings or preserving substances. Waste types in this section allowed if biodegradable material only, with no chemical additives or preservative, and no persistent organics present. Untreated wood only.
17 05	soils (excluding excavated soils from contaminated sites), stones and dredging spoil	
17 05 06	dredging spoil other than those mentioned in 17 07 05 (from inland waters only)	Only riverine vegetation allowed (and not associated dredged mineral material). Only dredged vegetation is permitted. EWC 17 05 06 dredging spoil allowed only if Hazard Analysis and Critical Control Point (HACCP) assessment considers pollutants that may be present and adequate risk control is decided feasible.
19	*WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTEWATER TREATMENT PLANTS AND PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION/INDUSTRIAL USE*	
19 02	wastes from physic/chemical treatments of waste (including dechromatation, decyanidation, neutralisation	
19 02 03	premixed wastes composed only of non-hazardous wastes (waste types listed within these standard rules only)	Acceptable only if derived solely from input types allowed by this Quality Protocol and remains segregated from, and uncontaminated by, any other waste type.

Waste Code	Description	Compost Quality Protocol Restrictions
19 02 06	Sludges from physico/chemical treatment other than those mentioned on 19 02 05 (sewage sludge which has been previously pasteurised and stabilised only)	Acceptable only if derived solely from physical treatment and/or pH adjustment of input types allowed by this Quality Protocol and remains segregated from, & uncontaminated by, any other waste type
19 05	wastes from the aerobic treatment of solid wastes	
19 05 03	off-specification compost (from a composting process that accepts waste input types listed in these standard rules only)	Allowed only if the compost is derived from input types allowed by this Quality Protocol. This includes oversize material resulting from screening such compost.
19 06	wastes from anaerobic treatment of waste	
19 06 04	Digestate from anaerobic treatment of municipal waste, separated fibre from a process that accepts waste types as listed in these standard rules or anaerobic digestion standard rules only, made up of previously pasteurised and stabilised batches only and in compliance with Animal and Plant Health Agency authorisation	Waste types in this section are allowed only if derived from input types allowed by the Anaerobic Digestate Quality Protocol and are derived from a facility independently certified as complying with BSI PAS 110. (e.g., the waste must not contain wastes derived from mechanical biological treatment (MBT) facilities or any compost-like outputs (CLO).
19 06 06	Digestate from anaerobic treatment of animal and vegetable waste, separated fibre from a process that accepts waste types as listed in these standard rules or anaerobic digestion standard rules only, made up of previously pasteurised and stabilised batches only and in compliance with Animal and Plant Health Agency authorisation	
19 06 06	Digestate from anaerobic treatment of animal and vegetable waste (previously digestate sewage sludge only)	
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11 (and only including waste types listed in this table)	Acceptable only if derived solely from input types allowed by this Quality Protocol and remains segregated from, and uncontaminated by, any other waste type.
20	*MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS*	
20 01	separately collected fractions (except 15 01)	
20 01 01	paper and cardboard (excluding veneers, plastic coatings, or laminates)	Not allowed if any non-biodegradable coating or preserving substance present.
20 01 38	wood other than that mentioned in 20 01 37	20 01 37 is described as 'wood containing dangerous substances. Non treated wood waste. Not allowed if any non-biodegradable coating or preserving substance present. No chemical additives or preservative, and no persistent organics present.
20 01 39	plastics (compostable plastics only)	Plastic must be certified as compostable / biodegradable
20 02	garden and park wastes (including cemetery waste)	
20 02 01	biodegradable waste (plant matter only)	Waste types in this section allowed if biodegradable material only, with no chemical additives and no toxin residues present. Excludes road sweepings and gully waste.

Waste Code	Description	Compost Quality Protocol Restrictions
20 03	other municipal wastes	
20 03 01	Municipal household waste − separately collected garden waste only	Allowed only if separately collected biodegradable wastes otherwise allowed by this Quality Protocol.
20 03 02	waste from markets (biodegradable only)	Allowed only if biodegradable fractions. (e.g., plant material, fruit, and vegetables.) Packaging waste from a market source is allowed only if it complies with the restriction for EWC 07 and EWC07 above and certified as biodegradable.

Exclusions

Wastes having any of the following characteristics shall not be accepted:

- Biodegradable waste significantly contaminated with non-compostable contaminants, litter and plastic.
- Consisting solely or mainly of dusts (except sawdust), powders or loose fibres;
- Catering waste and other wastes containing animal by-products covered by the Animal By- Products Regulations (except waste code 02 01 06 below).;
- Wastes that are in a form which is liquid;
- Hazardous wastes;
- Wastes containing treated wood;
- Wastes containing wood-preserving agents or other biocides;
- Wastes containing persistent organic pollutants;
- Wastes containing Japanese Knotweed or other invasive plants species.
- Manures, slurries and spoiled bedding and straw from farms where animals have notifiable diseases as stipulated in the Animal By-Products (Enforcement) (England) Regulations 2011
- Pest infested waste

Appendix D Waste Wood Accepted for Treatment

Waste Code	Description
02	*WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING*
02 01	wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing
02 01 07	wastes from forestry (biodegradable only)
03	*WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER, AND CARDBOARD*
03 01	wastes from wood processing and the production of panels and furniture
03 01 01	waste bark and cork
03 01 05	sawdust, shavings, cuttings, wood, and particle board other than those in 03 01 04 only
03 03	wastes from pulp, paper and cardboard production and processing
03 03 01	waste bark and wood
03 03 10	fibre rejects only
15	*WASTE PACKAGING: ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED*
15 01	packaging (including separately collected municipal packaging waste)
15 01 03	wooden packaging
17	*CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)*
17 02	wood, glass, and plastic
17 02 01	Wood
19	*WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTEWATER TREATMENT PLANTS AND PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION/INDUSTRIAL USE*
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise
19 12 07	wood other than that mentioned in 19 12 06
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11 (and only including waste types listed in this table))
20	*MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS*
20 01	separately collected fractions (except 15 01)
20 01 38	wood other than that mentioned in 20 01 37
20 02	garden and park wastes (including cemetery waste)
20 02 01	biodegradable waste (plant matter only)
20 03	other municipal wastes
20 03 01	Municipal household waste − separately collected garden waste only

Exclusions
Wastes having any of the following characteristics shall not be accepted:

- Wastes containing treated wood.
- Wastes containing wood-preserving agents or other biocides.

Appendix E PAS 100 Product Criteria

Parameter	Validation	After Validation	Method	Upper Limits
Pathogens	1 sample from 3 different batches of compost grade	1 sample representative of a batch within every 5,000 m^3 or 2,500 tonnes of compost grade produced. OR If < 5,000 m^3 or < 2,500 tonnes is produced per 12 months, then 1 representative sample per batch.	*E. Coli* – BS ISO 16649-2	1000 CFU/g fresh mass
			Salmonella Spp – Schedule 2 Pt II, BS EN ISO 6579	Absent in 25g fresh mass
Toxic Elements			Cd – BS EN 13650	1.5 mg/kg
			Cr – BS EN 13650	100 mg/kg
			Cu – BS EN 13650	200 mg/kg
			Pb – BS EN 13650	200 mg/kg
			Hg – BS ISO 16772	1.0 mg/kg
			Ni – BS EN 13650	50 mg/kg
			Zn – BS EN 13650	400 mg/kg
Stability/ maturity (microbial respiration rate)			ORG 0020	16 mg CO_2 /g organic matter/day
Physical contaminants and stones			Total glass, metal, plastic and other non-stone fragments > 2mm – use REAL MT PC&S	0.25 % mass/mass of air dry sample
			Plastic – use REAL MT PC&S	0.12 % mass/mass of air dry sample
			Stone >4mm in grades other than 'mulch' – use REAL MT PC&S	8 % mass/mass of air dry sample
			Stones >4mm in 'mulch' grade – use REAL MT PC&S	10% mass/mass of air dry sample
Weed seeds and propagules			Germinating weed or propagule regrowth – REAL MT PRT	0 mean number / litre of compost
Plant response			Tomato plant germination – REAL MT PRT	80 germinated plants in peat – compost test mix trays as % of germinated plants in peat control trays
			Tomato plant growth – REAL MT PRT	80 average plant mass in peat – compost test mix trays as % of average plant mass in peat control trays
			Tomato Plant Abnormalities – REAL MT PRT	0 abnormalities recorded in plants grown in peat-compost test mix

Appendix F Waste Analysis for 19 12 12

Biffa Limited
Ford MRF, Ford Road
Nr Arundel
West Sussex
BN18 0FL

Waste Assess Classification No:
BIF/AMRF/128179/01

Date 06/12/2023

Dear Tony,

Waste Assess Ltd has been commissioned by Biffa Limited to undertake classification of 2 water samples, prepared from MRF outputs described as Glass Waste (Fines). This is a mixed waste steam physically consisting on average of:

- 80% glass
- 9% paper
- 6% mixed paper
- Remainder mix of other plastic, Ali cans, steel, ceramics, wood and other.

The material was unsuitable for standard laboratory analytical chemical techniques because there is no soil fraction and the glass content is too high for a whole sample grind.
Most of the constituent elements are absolute non-hazardous by nature so the main concern is contamination on the surfaces. A leachate was prepared from the raw material. A sub sample of raw sample for asbestos and the leachate were then analysed to allow classification of the material. A comparison of the results has also been made against surface water GAC to give context to the results.

Both results are confidently classified as Non-Hazardous. The waste stream should be classified as

19 12 12 – Mixed wastes from mechanical treatment without hazardous properties.

The leachate shows elevated nickel, selenium, zinc likely relating to metal plating on the tin cans. BOD and COD were expected to be elevated due to paper in the waste stream breaking down.

The Extracted petroleum hydrocarbons is the most elevated compound. BF/0611/01 shows 15546 ug/l. This is 15.55 ppm or 0.0015%.

The classification of unknown hydrocarbons is laid out on page 29 of Waste Classification: Guidance on the classification and assessment of waste (1st Edition v1.2.GB) quoted below.

info@waste-assess.co.uk
07774 151332
www.waste-assess.co.uk
Waste Assess Limited, Bridge House, The Ash, Little Hadham, Ware, SG11 2DG
Registered in England No. 13298541

The assessment of the waste is based on the presence of oil. It considers each of these properties in turn using the Total Petroleum Hydrocarbons (TPH) (C_6 to C_{40}) concentration. The bullets below compare the concentration of TPH to the concentration limit concentrations set out in Appendix C for each hazardous property:

(i) If the concentration of TPH is ≥ 10% the waste will be HP 5* Specific Target Organ Toxicity (STOT)/Aspiration Toxicity

(ii) If the concentration of TPH is ≥ 3% the waste will be HP 10 toxic for reproduction.

(iii) If the concentration of TPH is ≥ 2.5% the waste will be HP 14* Ecotoxic.

(iv) If the concentration of TPH is ≥ 0.1% the waste will be HP 7 Carcinogenic **and** HP 11 Mutagenic unless the concentration of benzo-a-pyrene is <0.01% of the concentration of the TPH (this is explained in the following section)

Note '*': HP 5 Specific Target Organ Toxicity (STOT)/Aspiration Toxicity and HP 14 Ecotoxic are additive properties. Where other hazardous substances, with hazard statement codes associated with those properties, are present the additive procedures in Appendices C5 and C14 must be followed.

Benzo-a-pyrene was below limit of detection in both samples so indent (iii) is the appropriate classification. The worst-case compound encountered was 0.0015% which is 3 orders of magnitude lower than the hazardous threshold.

Even if we assume worst case and assess against indent (iiii) the waste is still 2 orders of magnitude below the hazardous threshold.

No asbestos was detected during sample preparation or by the laboratory analysis.

Table 1: Results

Determinant	Result (ug/l)	Standard	Exceedance
	BF/0611/01		
Arsenic (dissolved)	0.78	50	No
Barium (dissolved)	69.5	130	No
Cadmium (dissolved)	<0.1	0.25	No
Chromium (dissolved)	4.8	32	No
Copper (dissolved)	26.1	28	No
Lead (dissolved)	1.6	7.2	No
Mercury (dissolved)	<0.05	0.07	No
Nickel (dissolved)	27.2	20	Yes
Selenium (dissolved)	7.29	2.1	Yes
Zinc (dissolved)	991	125	Yes
pH	6.2	5.2 – 9.0	No
Biological Oxygen Demand	42	5	Yes
Chemical Oxygen Demand (total)	2530	30	Yes
PAH (total of ESEPA 16)	< 1.6	All below LOD	No
EPH (>C10-C40)	15546	50 to 200	Yes
Benzene	8	10	No

	BF/0611/02		
Arsenic (dissolved)	0.90	50	No
Barium (dissolved)	64.9	130	No
Cadmium (dissolved)	<0.1	0.25	No
Chromium (dissolved)	2.8	32	No
Copper (dissolved)	66.5	28	No
Lead (dissolved)	<0.6	7.2	No
Mercury (dissolved)	<0.05	0.07	No
Nickel (dissolved)	13.5	20	Yes
Selenium (dissolved)	5.09	2.1	Yes
Zinc (dissolved)	948	125	Yes
pH	6.4	5.2 – 9.0	No
Biological Oxygen Demand	46	5	Yes
Chemical Oxygen Demand (total)	1940	30	Yes
PAH (total of ESEPA 16)	< 1.6	All below LOD	No
EPH (>C10-C40)	8025	50 to 200	Yes
Benzene	3	10	No

Any site that may be chosen to receive the material represented by the above samples should also be provided with the chemical analysis reports.

Yours sincerely,

Tom Harris
Technical Director
Waste Assess Limited

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ANALYTICAL TEST REPORT

Contract no: 128179

Contract name: Biffa - Arudel MRF

Client reference: 738/T81970/1

Clients name: Waste Assess

Clients address: Bridge House, The Ash
Little Hadham
Ware
SG11 2DG

Samples received: 08 November 2023

Analysis started: 08 November 2023

Analysis completed: 17 November 2023

Report issued: 17 November 2023

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing
NAD	No Asbestos Detected

Approved by: E. McCulloch

Ellis McCulloch
Senior Reporting Administrator

Chemtech Environmental Limited

GROUNDWATERS

Lab number			128179-1	128179-2
Sample id			BF/0611/A1	BF/0611/A2
Depth (m)			-	-
Date sampled			06/11/2023	06/11/2023
Time sampled			12:30	12:30
Test	**Method**	**Units**		
Arsenic (dissolved)	CE265[U]	µg/l As	0.78	0.90
Barium (dissolved)	CE265[U]	µg/l Ba	69.5	64.9
Cadmium (dissolved)	CE265[U]	µg/l Cd	<0.1	<0.1
Chromium (dissolved)	CE265[U]	µg/l Cr	4.8	2.8
Copper (dissolved)	CE265[U]	µg/l Cu	26.1	66.5
Lead (dissolved)	CE265[U]	µg/l Pb	1.6	<0.6
Mercury (dissolved)	CE265	µg/l Hg	<0.05	<0.05
Nickel (dissolved)	CE265[U]	µg/l Ni	27.2	13.5
Selenium (dissolved)	CE265[U]	µg/l Se	7.29	5.09
Zinc (dissolved)	CE265[U]	µg/l Zn	991	948
pH	CE213 [U]	units	6.2	6.4
Biological Oxygen Demand	CE036	mg/l O_2	42	46
Chemical Oxygen Demand (total)	CE037	mg/l O_2	2530	1940
PAH				
Naphthalene	CE051	µg/l	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6
BTEX & TPH				
MTBE	CE057	µg/l	<2	<2
Benzene	CE057	µg/l	8	3
Toluene	CE057	µg/l	<1	<1
Ethylbenzene	CE057	µg/l	<1	<1
m & p-Xylene	CE057	µg/l	2	<2
o-Xylene	CE057	µg/l	<1	<1
EPH (>C10-C40)	CE052	µg/l	15546	8025
PCB				

Chemtech Environmental Limited

GROUNDWATERS

Lab number			128179-1	128179-2
Sample id			BF/0611/A1	BF/0611/A2
Depth (m)			-	-
Date sampled			06/11/2023	06/11/2023
Time sampled			12:30	12:30
Test	**Method**	**Units**		
PCB Congener 28	CE070	µg/l	<0.1	<0.1
PCB Congener 52	CE070	µg/l	<0.1	<0.1
PCB Congener 101	CE070	µg/l	<0.1	<0.1
PCB Congener 118	CE070	µg/l	<0.1	<0.1
PCB Congener 138	CE070	µg/l	<0.1	<0.1
PCB Congener 153	CE070	µg/l	<0.1	<0.1
PCB Congener 180	CE070	µg/l	<0.1	<0.1
PCB (total of ICES 7)	CE070	µg/l	<0.7	<0.7

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METHOD DETAILS

METHOD	GROUNDWATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE265	Arsenic (dissolved)	Analysis by ICPMS	U	0.1	µg/l As
CE265	Barium (dissolved)	Analysis by ICPMS	U	0.9	µg/l Ba
CE265	Cadmium (dissolved)	Analysis by ICPMS	U	0.1	µg/l Cd
CE265	Chromium (dissolved)	Analysis by ICPMS	U	0.5	µg/l Cr
CE265	Copper (dissolved)	Analysis by ICPMS	U	0.6	µg/l Cu
CE265	Lead (dissolved)	Analysis by ICPMS	U	0.6	µg/l Pb
CE265	Mercury (dissolved)	Analysis by ICPMS		0.05	µg/l Hg
CE265	Nickel (dissolved)	Analysis by ICPMS	U	0.4	µg/l Ni
CE265	Selenium (dissolved)	Analysis by ICPMS	U	1.1	µg/l Se
CE265	Zinc (dissolved)	Analysis by ICPMS	U	3	µg/l Zn
CE213	pH	Based on BS 1377, pH Meter	U	-	units
CE036	Biological Oxygen Demand	5 day ATU, DO Meter		1	mg/l O_2
CE037	Chemical Oxygen Demand (total)	Colorimetry		10	mg/l O_2
CE051	Naphthalene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluorene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Phenanthrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Chrysene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(b)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(k)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Indeno(123cd)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Dibenz(ah)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(ghi)perylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	PAH (total of USEPA 16)	Solvent extraction, GC-MS		1.6	µg/l
CE057	MTBE	Headspace GC-FID		2	µg/l
CE057	Benzene	Headspace GC-FID		1	µg/l
CE057	Toluene	Headspace GC-FID		1	µg/l
CE057	Ethylbenzene	Headspace GC-FID		1	µg/l
CE057	m & p-Xylene	Headspace GC-FID		2	µg/l
CE057	o-Xylene	Headspace GC-FID		1	µg/l
CE052	EPH (>C10-C40)	Solvent extraction, GC-FID		10	µg/l
CE070	PCB Congener 28	Solvent extraction, GC-MS		0.1	µg/l
CE070	PCB Congener 52	Solvent extraction, GC-MS		0.1	µg/l
CE070	PCB Congener 101	Solvent extraction, GC-MS		0.1	µg/l
CE070	PCB Congener 118	Solvent extraction, GC-MS		0.1	µg/l
CE070	PCB Congener 138	Solvent extraction, GC-MS		0.1	µg/l
CE070	PCB Congener 153	Solvent extraction, GC-MS		0.1	µg/l
CE070	PCB Congener 180	Solvent extraction, GC-MS		0.1	µg/l

Chemtech Environmental Limited

METHOD DETAILS

METHOD	GROUNDWATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE070	PCB (total of ICES 7)	Solvent extraction, GC-MS		0.7	µg/l

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
128179-1	BF/0611/A1	-	N	
128179-2	BF/0611/A2	-	N	

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Soil/Solid samples will be disposed of 4 weeks from initial receipt unless otherwise agreed.

Waters and leachate samples will be disposed of 2 weeks from report issue unless otherwise agreed.

DEFRA Licence for the introduction and movement within England of prohibited soil for chemical and physical analysis Licence No: 132693/469907-0

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

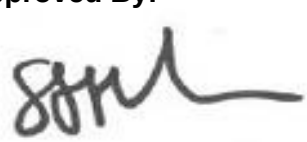
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-37954-1
Initial Date of Issue:	17-Nov-2023
Re-Issue Details:	
Client	Waste Assess Limited
Client Address:	The Mill House Albury Road Little Hadham Hertfordshire SG11 2DQ
Contact(s):	Ian Bailey Joline Forshaw Tom Harris
Project	Biffa MRF Arundel

Quotation No.:		**Date Received:**	15-Nov-2023
Order No.:		**Date Instructed:**	15-Nov-2023
No. of Samples:	1		
Turnaround (Wkdays):	5	**Results Due:**	21-Nov-2023
Date Approved:	17-Nov-2023		

Approved By:



Details: Stuart Henderson, Technical Manager

Results - Soil

Project: Biffa MRF Arundel

Client: Waste Assess Limited			**Chemtest Job No.:**		23-37954
Quotation No.:			**Chemtest Sample ID.:**		1731258
Order No.:			Client Sample Ref.:		BF/0611/01
			Sample Type:		SOIL
			Date Sampled:		06-Nov-2023
			Time Sampled:		10:00
			Asbestos Lab:		DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected

Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com