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Applicant details	Sharpsmart Limited 9 Longport Enterprise Centre Scott Lidgett Road Stoke on Trent ST6 4NQ
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1 Introduction

1.1 General

Sharpsmart Ltd (the 'applicant') has requested that Reva Environmental Ltd (the 'agent') prepares an Environmental Permit (EP) variation application, for its Spennymoor Clinical Waste Treatment Facility at Unit 1 Enterprise City, Meadowfield Avenue, Spennymoor, County Durham, DL16 6JF.

The applicant current supplies re-usable sharps containers to the healthcare sector and provides a collection service to its customers whereby the used containers are taken to one of the applicant transfer facilities, emptied and cleaned and sent back to the customer. The contents are transferred to an appropriately permitted facility for recovery or disposal.

The site currently operates as a clinical waste transfer facility where repackaging of incoming waste is permitted as a Waste Operation, prior to submission to any disposal operation (D1 to D13). The facility is currently authorised by EP ref. EPR/EB3804LV which was originally granted (as EAWML 64037) in January 2002 and most recently varied (V005) in 2021.

The objective of this application is to obtain a varied EP which allows the following:

- Increase of the waste input limit from 3,500 tonnes to 30,000 tonnes per year to reflect the processing ability of the site with the proposed treatment activities. The existing repackaging activity is already permitted as a Waste Operation but the proposals will increase the throughput and add waste codes. The repackaging activity will continue to be supported through the operation of the existing Washsmart wash plant which enables the operator to service its contract customers by way of a large scale sharps bin exchange service, emptying and washing the bins before returning them to the customer.

  The proposed increased repackaging activity replaces the existing waste operation and adds a new listed activity to the EP for the hazardous waste component, under 5.3 Part A(1)(a)(iv) – Repackaging prior to any of the other activities listed in Section 5.3 or 5.1, with a capacity exceeding 10 tonnes per day. It is proposed that this comprises D14 prior to D1 to D13 or R12 prior to R1 to R11 and that this is Activity AR1. It shall not exceed 50 tonnes/day.

- The waste stream being autoclaved would be first subject to pre-treatment shredding to break the waste down for better treatment.

  The shredding of waste adds a new listed activity to the EP, under 5.3 Part A(1)(a)(ii) – Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving physico-chemical treatment (D9 and R12). It is proposed that this is Activity AR2 and will not exceed 50 tonnes/day.

  Installation and operation of an autoclave plant. This would treat waste from the repackaging activity (AR1) and waste received directly from the producer. The waste stream being autoclaved would be subject to subsequent compaction. Treatment would be of bagged waste but the proposed waste types also include single use metal instruments (18 01 03*) facilitating the recovery of the metal. This waste stream would not be subject to pre-treatment shredding or compaction but will allow the direct recovery of these wastes that would otherwise not be recovered.

  The treatment of hazardous waste in an autoclave plant adds a new listed activity to the EP, under 5.3 Part A(1)(a)(ii) – Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving physico-chemical treatment (D9 and R3). It is proposed that this is Activity AR3 and will not exceed 50 tonnes/day.

- Storage of hazardous waste prior to repackaging or treatment on site. The storage capacity is to be limited to less than 70 tonnes at any one time for all wastes, of which hazardous will make up less than 50 tonnes.

  The storage of hazardous waste < 50 tonnes adds a new Waste Operation to the EP. It is proposed that this is Activity AR4.

- Operation of a (mains supplied) natural gas fired steam-raising boiler. Whilst the input capacity of the proposed boiler is below the threshold for a Listed Activity the applicant does recognise that as the input capacity will exceed 1 MWth the Medium Combustion Plant Directive (MCPD) is applicable and that emission limits will be imposed on this exhaust via permit conditions.

  The operation of a gas-fired boiler is a DAA to the autoclave activity, AR3. It is proposed that this is Activity AR5.

- Storage (externally) of compacted floc (treated waste) pending transfer off site for recovery. There is an outlet for the floc resulting from the treatment process. This would be stored in enclosed/sealed skip containers located in the external yard area, in a dedicated area just outside the building, on the other side of the wall to the internal compactors. The EP application seeks to allow the storage of up to 20 tonnes of this floc pending transfer off site for use as an RDF. It is proposed that this is achieved through the addition of this as a storage limit against the storage of non-hazardous waste.

  The storage of floc is a DAA to the autoclave activity, AR3. It is proposed that this is Activity AR6.

- Storage of hazardous waste prior to transfer off site for disposal or recovery (D15 / R13). This relates to waste that will not be subject to treatment on site. This is already included in the EP as a waste operation and will be limited to below 50 tonnes at any one time.

  It is proposed that this is Activity AR7.

- Storage of non-hazardous waste prior to transfer off site for disposal or recovery (D15 / R13). This relates to waste that will not be subject to treatment on site. This is already included in the EP as a waste operation and will be limited to below 50 tonnes at any one time.

  It is proposed that this is Activity AR8.

- Repackaging of non-hazardous waste prior to transfer off site for disposal or recovery (D15 / R13). This relates to non-hazardous waste that will not be subject to treatment on site. This is already included in the EP as a waste operation and will be limited to below 50 tonnes at any one time.

  It is proposed that this is Activity AR9.

- Compaction of non-hazardous waste (offensive) waste. This waste stream would not be subject to shredding or autoclaving but would be subject to compaction in a dedicated separate compactor to that used for the compacted autoclaved waste. It is proposed that this is achieved through the addition of a new Waste Operation for D9/R12 (<10 tonnes per day).

  The compaction of offensive waste adds a new Waste Operation to the EP. It is proposed that this is Activity AR10.

The applicant can confirm that the storage limit for waste is defined by the building size and allows for safe and appropriate storage techniques; this defines it as 70 tonnes. The maximum storage period for any load of waste within the building is 2 weeks; this provides allowance for the operational contingency plan to be implemented.

The quantity of waste that will be stored at the facility, pending transfer or treatment, is constrained by the floor space in the existing building. It is limited to 70 tonnes, of which no more than 50 tonnes will be hazardous; it is therefore below the threshold for a listed activity under Section 5.6 of the EP Regulations; instead the temporary storage of hazardous waste is a directly associated activity (DAA) to the treatment activity.

The steam required for the autoclave process will be delivered by a new natural gas-fired steam raising boiler. The input capacity of the boiler is below the threshold for a listed activity under Section 1.1 of the EP Regulations and will therefore be a second DAA to the treatment activity. The applicant does recognise that as the input capacity exceeds 1 MWth the Medium Combustion Plant Directive (MCPD) is applicable and that emission limits will be imposed on this exhaust via permit conditions.

The facility will provide the ability to treat metal instruments that are classified under the EWC codes above. This waste stream will not require (or suit) pre-shredding so would be loaded directly into the autoclave unit. This will allow the direct recovery of these wastes that would otherwise not be recovered.

1.2 Assessment of BAT

As required by Question 6 in Appendix 4 of EA Application Form Part C3 a description of the treatment activities must also be provided which covers the standards set out in the relevant best available techniques (BAT) document.

The variation does not inherently change the existing repackaging and transfer activities; this assessment is therefore limited to the key changes which are demonstrating that the shredding, autoclaving and compaction of bagged waste is BAT and that the storage of treated waste (floc) outside in the yard is BAT.

The new activities have been assessed against indicative BAT, in accordance with the following EA guidance:

- Sector Guidance Note EPR S5.06 “Recovery and disposal of hazardous and non-hazardous waste”, version 5 dated May 2013; and
- EA guidance on healthcare waste appropriate measures for permitted sites.

The BAT assessment has been written on the basis of information provided to the agent by the applicant.

2 Managing the Activities

2.1 General Management

The applicant recognises that an effective management system is a key technique for ensuring that pollution prevention and control techniques are implemented and support compliance with BAT. Sector guidance EPR S5.06 recommends certification to a recognised standard such as ISO 14001 or EMAS.

The healthcare waste guidance requires appropriate measures to be in place and implemented, in relation to management of shutdown as a result of maintenance, incidents and non-conformances. A malfunction or shutdown can lead to permit conditions being breached.

2.1.1 Procedures

The applicant operates the current facility in accordance with a certified environmental management system (EMS). The EMS is certified by The British Assessment Bureau and was last audited in 2017

against the requirements of ISO 14001: 2015. The applicant will integrate the operation of the treatment plant into its existing management system for the facility.

The EMS includes a process of internal auditing, raising of non-conformances, reporting and investigation of incidents, maintenance and routine servicing. It also includes an Accident Management Plan which covers existing waste transfer and repackaging operations at the site. This has been updated to reflect additional measures or considerations that are pertinent to the proposed activities. A copy of the Accident Management Plan (AMP) is provided in **Appendix I**.

2.1.2 Plant Design

This section is written in the context of the autoclave plant being used to treat permitted soft waste. For this application, this also includes the treatment (autoclave only) of single use metal instruments.

The design of the treatment plant is such that the three parts (shredding, autoclaving, and compaction) can each operate in isolation. This enables the operator to carry out maintenance or repair works on any one part of the plant whilst the other parts can continue to operate. For example, if there is a breakdown of the shredder this can be repaired whilst a treatment cycle is underway. This system reduces the impact of failure or shutdown on the overall plant operation.

The proposed treatment plant and ancillary equipment is in wide use within the UK, including by the applicant at its other sites. As a result the availability of spare parts is good. The operator has received technical advice from the plant manufacturer regarding the ongoing maintenance and repair of the equipment and, on this basis, will retain a stock of key spare parts at the facility. An inventory of these spare parts will be maintained, and stock replaced upon use to ensure that a sufficient level of parts is always available at the facility. Scheduled maintenance and service will be carried out by the manufacturer (or manufacturer's contracted provider); the tools and expertise required for this is therefore assured.

At the time of this variation application, the applicant is in the process of finalising the technology design. As such no HAZOP or risk assessments have yet been completed for the operation of the plant. Once finalised, a HAZOP will be carried out and will seek to identify any known or predictable malfunctions in order to risk assess these and put in place appropriate measures to react to them. At that point, the applicant will also generate a procedure that will sit within the existing certified EMS and will assist the identification of items of plant that should be prioritised for planned preventative maintenance (PPM).

Part of the procedure will include the production of an inventory of equipment whose failure could directly or indirectly lead to an impact on the environment. It is expected that this will include (but not be limited to) the IBCs (effluent storage), pipework (effluent to sewer), waste containers, the shredder, and the LEV systems.

2.1.3 Contingency

When the treatment plant is not available, as a result of planned shutdown or unplanned failure, the contingency plan will be activated. The contingency plan also addresses the need to manage materials if the third party recovery facilities are unavailable due to their own planned shutdown or unplanned failure. The contingency plan addresses the need to manage the following streams:

- Incoming waste; and
- Floc.

In the event of unavailability of the autoclave treatment plant, the incoming waste will continue to be accepted via the permitted transfer activity at the facility as is currently the case. Processed waste is transferred off-site for treatment at a third party permitted plant with which the applicant has a contractual relationship. This will ensure that waste storage and throughput limits set by the EP will not be exceeded. If required, the operator would cease accepting orange bagged waste into the

facility and transport this directly to alternative treatment from its customer sites. There are 15 alternative treatment facilities that are able to accept this waste in the UK.

The floc will be classified as 19 02 10 (non-hazardous) and will be transferred to a waste to energy plant with R1 status. Should the primary contracted recovery facility for the floc be unavailable, there are three other R1 rated energy from waste plants in the UK that are able to take the waste as well as a number of R1 status energy from waste plants in Europe.

The contracted, and contingency, plants themselves carry out planned shutdowns; details of these are provided to the applicant so that the contingency plan reflects actual availability. Waste producers/customers are also provided with information regarding the applicant's contingency plan.

The applicant will seek to honour its waste collection contracts and will not cease accepting waste from its customers if there is a viable outlet for treatment that would enable continued operation of the facility within the EP storage limits. This is irrespective of the location of the contingency facility and cost of recovery/disposal.

2.2 Energy Efficiency

The addition of the shredder, the autoclave plant, the compactors and the boiler, will have an impact on the overall energy use at the facility. Additional energy use will be attributed to:

- Mains supplied electricity use - for the bin tipper, shredder, compactor, LEV systems, and building infrastructure (lighting, fire detection, CCTV etc.)
- Natural gas use – for the new steam raising boiler that will be installed in the treatment facility portion of the building.

Energy is monitored at the facility at a single meter on the mains supply into the building. In the absence of specific data for this site, Sharpsmart has identified likely energy consumption based on its Normanton facility which has a similar set up. Data for that facility indicates that usage will be in the region of 69,580 kWh per month.

The quantity of natural gas will depend on the boiler that is chosen to be installed. As part of the EMS, efficiency measures are reviewed and implemented as appropriate. When purchasing new equipment, its energy needs are assessed as part of the technology selection process. The gas supply will be limited to the operation of the boiler so the energy consumption of this combustion activity can be identified.

The proportion of waste that will be diverted to the treatment plant would currently be transferred off site for incineration (with no energy recovery). Upon commencement of operation of the treatment plant on site, the floc and effluent generated from this waste stream will be going to an R1 rated energy from waste facility. The generation of energy from that plant therefore serves to offset some of the energy used by the treatment plant.

2.3 Efficient Use of Raw Materials and Water

Following variation, a new style EP will be in place and, in accordance with the standard requirements in that EP, a review of raw material use will be carried out at least every four years. This will seek to identify if there are suitable alternative materials that could reduce the environmental impact, or identify opportunities to improve the efficiency of the raw material and water use.

The condenser on the autoclave unit will be an air to air type (a heat exchanger with a blast cooler – a closed loop system) which will minimise water use for the new activity.

2.3.1 Chemicals & Reagents

The current operations at the facility use a disinfecting chemical ('Solid Hero') to clean the incoming waste containers. This is a detergent that contains 35 to <50% sodium hydroxide. Following the

variation application and the installation of the new shredder/autoclave plant, an additional disinfecting chemical will be required (sodium hypochlorite) for the cleaning of the shredder prior to maintenance or service. It is anticipated that the quantities required to clean the shredder will be small (it will be sprayed in), however the usage cannot be quantified until the throughput increases once the EP is varied.

There will be extraction of air from around the shredder unit. This will be passed via a HEPA filter and carbon filter system. The differential pressure reading over the filter will determine when it is no longer providing appropriate levels of filtration and needs replacing (HEPA) or replenishing (carbon). The quantity of filter material required over an operating year is unlikely to be large however the usage cannot be quantified until the EP is varied and the plant is operational.

The quantity of chemicals, filters and reagents used at the facility will be recorded and tracked during the lifetime of the EP and assessed at regular intervals.

2.3.2 Water

Water is currently used at the facility for the purposes of cleaning the incoming waste containers, for general cleaning of the building area, and for welfare facilities (kitchen, toilets, sinks etc.). Additional water will be required to supply the new wash plant which will be the primary user. Estimated water usage is 5,000 litres per day and this is based on the wash plant initially processing up to 150 containers per hour, for 10 hours per day, and 5 days a week. At full capacity the plant would be operating for 20 hours per day and 7 days per week.

Additional water will be required to supply the new boiler to generate the steam required for the autoclave plant. Estimated water usage data has been taken from the applicant's Normanton facility; this is 174 litres per autoclave cycle (524,000 litres per year).

Whilst the current intention is to process only in-house waste, from contracted customers, the capacity of the treatment plant will allow the acceptance of third party waste too if appropriate. In the event that this is the case, there will be a need for the installation of a bin washer unit to enable third party waste exchange. This will use water, however for this plant, the operator would seek to reuse the waste several times before discharging to sewer instead of using mains water for each cycle.

Consideration has been taken of the potential to re-use condensate from the autoclave process however this has been determined to be inappropriate due to the likely composition of the condensate. The boiler will be sensitive to the quality of the feed water and the use of condensate rather than mains water would lead to scale and sedimentation, and potentially corrosion, of the unit. The reuse of the condensate would therefore not represent BAT.

2.4 Avoidance, Recovery and Disposal of Wastes

The inherent purpose of the proposed autoclaving activity is to render the incoming hazardous waste (hazardous by virtue of its infectious nature) non-hazardous, and to treat it to produce residues from which energy can be recovered. There are a number of reasons that highlight the benefit of autoclaving the proposed waste streams, including the following:

- The use of the autoclave to sterilise single use metal instruments (which have been segregated at source into reusable containers) will enable the recovery of metals that would otherwise be disposed of. This accords with ISO 23907 which historically only related to single use instruments but was augmented to cover reusable sharps in 2019.

With respect to waste generation, the autoclave plant will result in just two primary residues:

- Floc – the shredded and treated clinical waste which will be compacted (post autoclave) and placed into 770 litre bins (200 kg per bin); and

- Liquid effluent – the condensed steam from the autoclave plant and the wash water from cleaning the shredder plant. The condensed steam enters a sealed tank. It is then pumped to drain for discharge.

The floc is classified as 19 02 10 and will be transferred to a national outlet where the waste is further processed and blended to produce a fossil fuel replacement pellet fuel for use in power plants, energy from waste and cement kilns. The shredding of the waste prior to autoclaving enables the recovery of the floc as it meets the requirement of the R1 status for RDF which is that the waste cannot be recognisable as healthcare waste.

Liquid effluent is managed via the discharge to sewer already in place. It is considered that there is no pharmaceutical contamination and the effluent is no different to that produced by the transfer facility and can therefore be discharged to sewer under the existing consent.

The treatment activity will also generate the following, ancillary residues/wastes:

- Spent HEPA filters; and
- Spent carbon from the carbon filter.

The HEPA filters can become blinded with particulate over time, increasing the resistance to air flow through them, reducing the flow and potentially resulting in a reduction in air quality. Filters usually last anything from 1 – 5 years depending on the loading. When they require replacement, the spent filters are disposed of at an appropriate facility, suitable for the waste type.

The carbon filters can become saturated and their absorptive capacity reduces over time. When they require replacement, the spent filters are disposed of at an appropriate facility, suitable for the waste type.

3 Operations

3.1 Permitted Wastes

3.1.1 Sharps – Repackaging, Shredding, Autoclaving and Compaction

The variation application only seeks to add one new waste stream that is not already included in the EP; this is 15 01 04 metallic packaging. This will only be subject to repackaging and storage activities.

Sector guidance sets out the wastes that are considered suitable for alternative treatment and that it limits this to infectious waste, suggesting that wastes that contain other chemical, pharmaceutical or anatomical characteristics may not be suitable for alternative treatment. The current EP waste list includes non-infectious waste but it is not proposed that all currently permitted waste types will be treated in the autoclave as the treatment plant will operate alongside the existing transfer activity. The proposed treatment plant will process just the following existing waste streams:

- 18 01 03* – wastes whose collection and disposal is subject to special requirements in order to prevent infection (from human source);
- 18 02 02* – wastes whose collection and disposal is subject to special requirements in order to prevent infection (from animal source).

To confirm, Sharpsmart will not be treating any other wastes in the autoclaves; all other wastes are collected separately and will be subject to repackaging and/or transfer only.

The resultant non-hazardous floc generated by the treatment process is classified as 19 02 10 and will be transferred to a national outlet where the waste is further processed and blended to produce a fossil fuel replacement pellet fuel for use in power plants, energy from waste and cement kilns. The

shredding of the waste prior to autoclaving enables the recovery of the floc as it meets the requirement of the R1 status for RDF which is that the waste cannot be recognisable as healthcare waste. Sharpsmart has an agreement in place with the national outlet.

Whilst a final recovery point has not been defined for the floc from Spennymoor, it is likely that will be transferred, following further processing and blending, to an R1 recovery status waste to energy facility which will address the potential contamination as it will be subject to sufficient incineration temperatures for the destruction of pharmaceutical content. Any facility receiving the floc will have a specification which will need to be met to enable it to be accepted. An example is given below, which has been provided by the facility receiving the RDF from the applicant's Stoke facility.

Table BAT2: RDF Specification

	As received basis		
Parameter	**Minimum Limit**	**Maximum Limit**	**Unit**
Net Calorific Value	9	12.5	MJ/kg
Moisture Content	10	40	% w/w
Ash Content	N/A	24	% w/w
Sulphur Content	N/A	0.7	% w/w
Chloride Content	N/A	1	% w/w
Sizing	N/A	300	mm
Metals	N/A	1	% w/w

With respect to air emissions, there is an emergency vent (emission point F2) from the autoclave but that will only release to atmosphere under abnormal operating conditions so is not an active release to air. Instead, during normal operations, venting is performed through a condenser unit to produce a small volume of liquid effluent, approximately 200 litres per cycle. The post-vacuum cycle removes residual steam from the autoclave and flashes residual liquids, drying the waste. This also controls odour.

The condenser uses atmospheric air as the cooling energy so does not require any cooling water to be used. In essence it is a heat exchanger through which the autoclave process steam will travel, whilst a set of fans force atmospheric air across it. The condensate is collected in a sump under the autoclave; there is no direct connection of the effluent system to the point of discharge to sewer.

In addition to the condensate there is a potentially contaminated effluent generated when the shredder is cleaned. The two liquid effluent streams are managed together; it is considered that there is no pharmaceutical contamination and the effluent is no different to that produced by the transfer facility and can be discharged to sewer under the existing consent.

3.1.2 Offensive Waste – Compaction

It is proposed that a new Waste Operation (AR10) is included for D9/R12 compaction of non-hazardous wastes (<10 tonnes per day), and that a new Permitted Waste Table (wastes accepted for treatment by compaction only) is added to allow the following:

- 18 01 04 (proposed addition) – wastes whose collection and disposal is not subject to special requirements in order to prevent infection; this is limited to non-clinical human offensive/hygiene waste and autoclaved waste from laboratories only.

With respect to air emissions, there will be an emission point (F3) from the shredder LEV system. This LEV has a carbon filter and a HEPA filter (for VOCs and particulates control respectively). This represents an appropriate level of emissions control for the shredding of offensive waste in the shredder.

3.2 Waste Acceptance

Waste acceptance is split into two stages, pre-acceptance and acceptance. For sites accepting waste, the requirements for containment engineering are set out in EPR 5.06 and the healthcare waste appropriate measures guidance. The site has already been set up to conform to this, and has been assessed by the EA in order to obtain the current waste permit.

The existing EMS does not include a pre-acceptance procedure; this is because this is not a requirement for a facility only carrying out a transfer activity. The applicant has already carried out an initial gap analysis and identified the need for a waste pre-acceptance procedure for the treatment activity and this will be in place prior to the operation of the treatment plant. The applicant has already started the process of requesting pre-acceptance audits from the waste producers. BAT requirements, as set out in Section 2.1.1 of EPR 5.06 will be fully implemented via this procedure.

The existing certified EMS includes a waste acceptance procedure and this remains unchanged and unaffected as a result of the installation of the treatment plant because the incoming waste will still be arriving at the facility in the same way. The bulked waste (bagged and in 770 litre skip bins) will be accepted into the transfer facility and subject to the existing weighing and labelling system before being moved to the storage area for waste pending treatment, and the sharps containers will still be repackaged in the existing permitted transfer facility before being moved to the storage area for waste pending transfer. There will be an opportunity to carry out a visual inspection of the waste when it is tipped into the shredder as there is a camera providing a live feed from within the unit.

The existing rejection procedure also remains applicable. The current version of the Sharpsmart rejection procedure is applicable and will be implemented in full.

3.3 Validation of Treatment

The EA healthcare waste appropriate measures guidance sets out the mandatory standards and measures for clinical waste treatment activities. It confirms that the applicant must demonstrate that the treatment process is able to render the waste safe, by way of efficacy testing. It is understood that the varied EP will include a pre-operational condition requiring the applicant to submit a written site commissioning validation report to the EA for approval.

Autoclaving is a proven technology in the UK with a number of facilities operating successfully in relation to the treatment of healthcare waste.

The floc from the treatment will be sent as RDF as the applicant has an agreement in place with a UK waste disposal company to send this to its energy from waste plants; the applicant is also putting in place contingencies to send the RDF to an exporter with contracts in Europe.

4 Emissions and Monitoring

4.1 Waste storage, handling and dispatch

In relation to waste handling, this is carried out in accordance with the facility waste acceptance procedure and remains relevant and applicable to the facility with the inclusion of the treatment plant. The waste will continue to arrive at the facility in its current form, in proprietary and appropriate containment. Details regarding the tracking processes for the incoming waste and the reusable containers are provided in the Supporting Statement.

Manual handling is minimised at the treatment plant by way of the use of an automated bin tipper to raise up and empty the contents of a bin into the shredder unit. Shredded waste is automatically fed into the autoclave cart which is moved into the autoclave by forklift truck. The feeding of the treated waste from the autoclave cart into the compactor is also by means of forklift which will move the cart

to the bin tipper on the compactor. The area of the building in which the treatment plant, and associated storage activities, benefits from an impermeable flooring with a sealed drainage system. This is commensurate with the existing transfer activity.

Waste pending treatment will be stored in a dedicated area and segregated from other types of waste. There is a clearly defined route for the movement of waste depending on its journey (transfer or treatment). This aids the implementation of good waste segregation. As for the existing transfer facility, areas will be marked up on the floor to identify their use (red is for waste pending treatment, grey is for treated waste pending transfer off site for recovery, green is for clean empty containers). All waste storage is within the confines of the building; no untreated waste is stored outside.

Existing measures in place to ensure that containers are cleaned, inspected and repaired or replaced will be applied to the treatment activity. The existing procedures also ensure that waste is processed quickly such that no problems with odour, litter, vermin or pests occur. The contingency plan has been implemented to ensure that storage of waste pending transfer or treatment does not exceed 2 weeks. After 2 weeks, the waste will be transferred off site for incineration or alternative treatment elsewhere.

Dispatch of waste from the facility is covered by existing procedures, in relation to the bulk and repackaged waste currently managed with the transfer activity. Whilst the installation of the treatment plant will introduce a new type of waste (the floc), the procedures relating to its packaging, loading onto vehicles, tracking and documentation remain the same and will be applied immediately.

There is no fixed designated quarantine area at the site currently. Under normal operations, receipt of non-conforming waste or that which would require quarantining is rare as waste is collected from serviced customers, in the applicants own (sealed) containers. As the site operates as (and will continue to operate as) a waste transfer facility, should waste arrive that can't be processed, this would be transferred immediately to a treatment facility.

All waste storage infrastructure is subject to regular inspection and any issues recorded and actioned. If damage, deterioration or leakage is found then waste will be removed from the area until repairs are completed.

4.2 Emissions Monitoring

EPR S5.06 recognises that the level of detail relating to fugitive emissions e.g. odour and noise should be in keeping with the risk of causing annoyance at sensitive receptors.

With regards to odour, it is noted that the proposed variation does not significantly alter the types of waste that will be accepted at the site from those which already are and have been under the existing EP. Of the three stages of the proposed treatment activity, the latter two are fully enclosed when in operation (the autoclave and the compactor). There is therefore very low potential for the release of odours. The first stage, the shredder, is fully enclosed and the air extracted from it and filtered via HEPA and carbon filters. There is also air extraction around the autoclave unit and this is filtered in the same way. The pathway to receptors is through building openings only as no untreated waste is stored outside it nor is any waste treated outside, and all doors are kept closed when there is no delivery or collection taking place.

EA guidance does specifically require the implementation of an odour management plan (OMP) for applications relating to clinical waste. A copy of the OMP for the site is provided in **Appendix G** of this variation application.

With regards to noise, the potential noise sources, the pathway for propagation, and the sensitivity of the receptors have been considered in the qualitative risk assessment and deemed not to warrant a full noise assessment or management plan. The information provided in the qualitative environmental risk assessment is considered sufficient.

The EA healthcare waste appropriate measures guidance identifies the key potential emission **sources** from clinical waste sites as being: pathogenic micro-organisms; chemicals and pharmaceuticals; and bodily fluids. The proposed additional activities do not inherently change the types of waste that are permitted to be accepted at the site, albeit two of them (18 01 03* and 18 02 02*) are proposed to be subject to processes that they are not currently permitted for. As such, no new odour emission **sources** are introduced as a result of the variation application.

Potential **pathways** leading to an emission include a breach of packaging during manual handling, treatment processes in particular the shredding of untreated waste, and cleaning and disinfection of mobile rigid containers.

Throughout this BAT document, details have been provided for control measures that are to be put in place for the proposed treatment plant. These are confirmed as follows:

- Waste is never manually handled directly. Bulked waste is moved to the treatment plant in lidded skip containers for safe handling. The containers are subject to regular checks to ensure their integrity and fitness for use.
- Waste is tipped into the shredder using an automated bin lifter. The shredder is fully enclosed to prevent waste spillage from this activity; it will not operate with the doors open. The shredder also has active air extraction which draws air away from the hopper entrance and which is served by both a HEPA filter and a carbon filter. Both filters are subject to maintenance in accordance with the manufacturer's guidelines to ensure removal efficiency is retained, and pressure differentials measured across the filter to identify when exchange is required. The HEPA filter will prevent bioaerosol emissions from the shredder.
- Cleaning of the shredder is only when required, for example prior to access to carry out maintenance, repair or service. Effluent generated through the cleaning process is collected in the sump and can be discharged to sewer under the existing consent.
- The floc will be transferred to an intermediate facility that will further treat it and blend it so that it can be sent for recovery at an R1 status energy from waste plant, or use as a fuel in power plants or cement kilns, ensuring that any scant pharmaceutical contamination is destroyed by the combustion process.
- Discharge to sewer (which will include from the area of the treatment activity) is regulated under the existing discharge consent which sets a number of limits.
- Monitoring will be undertaken of emissions of bio-aerosols from the treatment process, specifically around the shredder plant where the waste will be physically treated prior to sterilisation.
- Waste classified as pharmaceutical waste is not processed in the treatment plant. Pre-acceptance processes will identify if there is the potential for significant pharmaceutical contamination in any of the permitted waste streams for treatment and will enable the operator to divert this from the treatment plant.

5 Conclusion

On the basis of the assessment above, which addresses compliance with sector guidance as well as considering the chosen technology against the other available options, it is deemed that the proposed activities appropriately fulfil the definition of BAT.

In relation to the autoclaving of waste, the autoclaving process offers the requisite level of sterilisation, utilises a waste feed system that presents a very low health and safety risk for

maintenance, is in use across the UK for healthcare waste so is proven and parts are available, and the resultant solid residues can be used to generate energy in waste to energy facilities.