Project details	Environmental Permit Variation Application – EPR XP3493VP Sharpsmart Limited – Clinical Waste Facility Stoke on Trent
Applicant details	Sharpsmart Limited 9 Longport Enterprise Centre Scott Lidgett Road Stoke on Trent ST6 4NQ
Report details	**EP Variation Application – Appendix K: Odour Management Plan** **Document reference: SHSMT_2018.01/08**
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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 clinical waste facility at 9 Longport Enterprise Centre, Scott Lidgett Road, Stoke on Trent, ST6 4NQ.

The applicant supplies re-usable sharps containers to the healthcare sector and provides a collection service to its customers whereby the used containers are taken to an applicant transfer facility, emptied and cleaned and sent back to the customer. The contents are transferred to an appropriately permitted facility for treatment. In addition to the sharps containers, a proportion of the incoming waste is bagged and in bulk containers. This waste stream is simply stored pending transfer to another treatment or disposal facility.

The facility is currently authorised by EP ref. EPR/XP3493VP which was originally granted in November 2011 and most recently varied (V005) 2018.

The objective of the application is to obtain a varied EP which enables the applicant to carry out a waste treatment activity at the Stoke facility, as a supporting activity to the existing transfer operations.

The proposed treatment plant is an autoclave which will have the capacity to process more than 10 tonnes per day; it is therefore a 'listed activity' and the EP will be an Installation EP as a result of its inclusion. The plant also includes a standalone shredder unit pre-treatment, and a standalone compaction unit post-treatment. The listed activity that covers all 3 parts of the treatment plant is as follows:

- Section 5.3 Part A(1)(a)(ii) – Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day, by physico-chemical treatment.

Activities directly associated with the above include:

- Operation of steam-raising boiler (natural gas-fired) to supply the autoclave; and
- Storage of hazardous waste pending treatment.

This Odour Management Plan (OMP) forms part of the Environmental Management System and, in the same way as other procedures are, it will be reviewed on a regular basis in accordance with the EP and also updated as required following any substantiated complaints, changes to process, or to reflect changes in legislation or best practice. It seeks to outline the procedures that are in place to ensure that odour is managed at the Site and that odour nuisance does not arise as a result of the operations.

This OMP has been written in accordance with EA Horizontal Guidance H4 Odour Management – How to Comply with your Environmental Permit, dated March 2011. H4 states that emissions from the activities shall be free from odour at levels likely to cause pollution outside the Site.

1.2 Site Setting

The facility is located in the Longport Enterprise Centre which is a business park extending to approximately 1.7 ha located in a wider industrial area to the east of Scott Lidgett Road and west of the Trent and Mersey Canal. It comprises 15 industrial and warehouse units, some of which have been subdivided. The units, apart from Units 7-10, are located around the perimeter of the Business Centre creating a central enclosed vehicle circulation and parking area which so ensure that activities on the business park are visual and acoustically relatively self-contained and do not significantly impact on

the nearby residential area to the west. There is undeveloped green area with some trees and scrub grassland adjoining the north west side of the business park which partly screens it from Scott Lidgett Road. The Site setting is summarised in Table 1.

Table 1: Site Setting

Direction	Local Setting
Northern Boundary	The Trent and Mersey canal runs adjacent to the enterprise centre, to the north/northeast, at 45 m. There is undeveloped green open land (trees and scrub grassland) to the north west side, providing screening from Scott Lidgett Road which lies beyond it. The Steelite International plant takes up most of the industrial area to the north.
Eastern Boundary	The Steelite International plant takes up most of the industrial area to the east, beyond the Trent and Mersey Canal which lies at 45 m from the site (at an elevated position). Residential properties on Port Vale Street lie 130 m to the east.
Southern Boundary	Residential properties on Harper Street lie some 130 m to the southeast. The A500 lies approximately 300 m to the southwest.
Western Boundary	Residential properties on Scott Lidgett Road lie 70 m to the west. Longport Railway Station (Grade II Listed) lies 295 m to the west.

1.3 Sensitive Receptors

Key sensitive receptors are considered to be those within 1 km of the Site; the potential dispersion of odours to these depends on the weather conditions. The odour concentrations at receptors located down-wind are likely to be more than at those located cross or up-wind. Some receptors are more sensitive than others, for example a residential area is likely to be more sensitive than an industrial estate. Though not usually considered as sensitive receptors, the adjacent industrial premises have been included in the OMP.

Table 2: Sensitive Receptors within 1 km

Receptor	Distance at closest point	Direction	Receptor Type	Relative Risk of Odour Impact
Trent & Mersey Canal	45 m (at an elevated position)	North, Northeast	Public area – transient use by members of public	Low
Scott Lidgett Road, Port Vale Street, Harper Street	70 m	Southeast	Residential properties – potential all-day presence	Moderate
Workers in the local Enterprise Centre	Immediately adjacent	All directions	Commercial/industrial workplace	Low
Longport Railway Station	295 m	West	Public transport route – transient use	Low
Allotment Gardens	150 m	South	Green, open area – potential all-day presence	Moderate

1.4 Complaint History

To date, the operator has not received any complaints from members of the public or from neighbours in the industrial estate with regards to odour. Details of the process in the event of receipt of an odour complaint are provided in section 5.4 of this OMP.

2 Odour Sources and Pathways

2.1 Raw Materials

Raw material use for the treatment plant is minimal, and limited to:

Disinfectant – This is used to clean the shredder plant. It is delivered to the Site when stock checks identify the need for more, and is in small proprietary containers. It is stored within the building in a dedicated area. When it is needed, it is carried to the plant area where it is sprayed in as required.

Due to the nature of the raw material and the storage and handling arrangements, the risk of odour release is considered to be very low.

2.2 Waste Receipt, Handling, and Storage

Clinical waste arrives at the facility in two forms:

Bagged waste – This waste is always contained within a yellow lidded 770 litre waste bin. It is delivered to the Site in an appropriate waste delivery vehicle and unloaded using the tail lift on the vehicle. The vehicle reverses right up to the doors into the process building. Bins are wheeled into the dedicated bin store area for waste pending treatment. The access doors are open only during the delivery process.

Sharps waste – This arrives contained in the applicant's own re-useable sharps containers. These are thick plastic, lidded and securely closed. It is also delivered to the Site in an appropriate waste delivery vehicle and unloaded using the tail lift on the vehicles. The vehicle reverses right up to the doors into the process building. The bins are placed into enclosed trolley units designed specifically for the safe movement and handling of this type of waste and the trolleys are placed in a dedicated area pending emptying.

The maximum storage period for any load of waste is 2 weeks.

The nature of the waste (predominantly plastics and metals) and the storage and handling arrangements mean that the risk of odour release is low.

2.3 Waste Shredding

The treatment process begins with the shredding of a batch of clinical waste to break it up to a form that enables efficient heat treatment (autoclaving) to be applied. Waste is loaded into a bin tipper mechanism that loads the batch into the shredder unit. The shredder has an air extract system (hood) which vents air from the shredder to the atmosphere via a HEPA air filter and a carbon filter system, providing odour control. Once shredded, the waste falls into an autoclave cart which is immediately placed into the autoclave.

The waste is potentially odorous however, given that it is processed on a batch system and there is LEV with filters on the shredder, this part of the treatment plant is considered to present a low-medium risk of odour release.

2.4 Waste Treatment (Autoclave)

The autoclave is a horizontally orientated cylindrical vessel that is subject to high vacuum and high pressure. The waste is placed into the vessel in its autoclave cart and the door is closed. There is air extraction from around the autoclave door, to capture any remnant steam release when the doors are open. This vents to atmosphere via a HEPA air filter and a carbon filter system, providing odour control.

During the waste treatment cycle, 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 waste is potentially odorous however given that it is processed on a batch system within an enclosed pressurised unit, there is LEV with filters on the extract from around the door when loading, and the venting of the treatment vessel during operation is via a condenser unit, this part of the treatment plant is considered to present a low-medium risk of odour release.

2.5 Waste Compaction

The sterilised waste floc exits the autoclave at the end of the batch process and the autoclave cart is placed onto a bin lifter which tips the waste into a compacter. The compacted floc is placed into compactor skips or retained in the portable compactor and stored temporarily at the facility pending transfer off-Site.

The waste has been fully treated at this stage so is not odorous. This part of the treatment process is therefore considered to have a very low risk of odour release.

2.6 Residue Management

In addition to the floc the process generates a condensate from the autoclave, and a potentially contaminated effluent which is generated when the shredder is cleaned. The two liquid effluent streams are managed in one of two ways, depending on the composition, as follows:

- If the effluent generated relates to the autoclaving of waste that could be considered potentially pharmaceutically contaminated then it is not discharged to sewer. Instead it is collected in an engineered sump and pumped into IBCs for transfer to a permitted energy from waste facility for disposal (and heat recovery). The same applies if the effluent contains wash water from cleaning the shredder.
- If the effluent generated relates to the autoclaving of a batch of solely orange classified waste, then 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.

The liquid effluent, that is not discharged to sewer at the Site, is stored in IBCs within the process building, until there is sufficient to make up a full load for transfer off-Site for recovery. The IBCs are enclosed and within the building so it is considered that this poses a low risk of odour release.

2.7 Odour Source Assessment

The potentially significant odour sources (materials and processes) are set out in Table 3.

Table 3: Odour Sources

Source	Odorous material	Containment / Release Point	Odour Description	Pattern of Release	Abatement Techniques
Raw materials	Disinfecting chemicals	Fugitive emission from storage and use of the chemical. Localised odour in process area, dilution in ambient air before release via doors	Cleaning chemical	Intermittent – only during cleaning activities	Within building, doors shut as standard
Waste delivery and storage	Clinical waste	Fugitive emissions from the access doors used for delivery and from the waste storage areas, in the process areas within the building, dilution in ambient air before release via doors	Clinical waste, ammonia	Continuous during operation	None
Shredder emissions	Exhaust air from shredding of clinical waste	Emission from the shredder during loading, closed process vessel during shredding of incoming waste, filtered extract via A2	Clinical waste	Intermittent as shredder is part of a batch process, but continuous during operation of the shredder	Active extraction with HEPA and carbon filter
Autoclave emissions	Exhaust air, hot process air from treatment of clinical waste	Closed process vessel exhaust via stack A3, fugitive emission from the door to the autoclave during loading of carts of shredded waste	Clinical waste	Intermittent as autoclave is part of a batch process, but continuous during operation of the autoclave	Active extraction with HEPA and carbon filter
Compactor emissions	Clinical waste	Closed vessel, fugitive emission from the door of the compactor during loading of treated waste	Clinical waste	Intermittent as compactor is part of a batch process, but continuous during operation of the compactor	Fully enclosed compactor skip, within building – doors shut as standard
Liquid effluent storage	Effluent from treating of clinical waste	Fugitive emission from storage of liquid effluent in IBCs		Continuous during operation	Containment within IBCs, within the building
Treatment areas – general	Clinical waste or raw material spillage	Fugitive emission from spillages on the floor, localised odour in process area, dilution in ambient air before release via doors	Clinical waste, cleaning chemical	Occasional, cleaning activities occur regularly	Housekeeping, within building – doors shut as standard

2.8 Odour Release Points and Pathways

Release of odours from the Site would be via a release to air from any of the sources details above, and transfer through the air via dispersion. Odour releases can be either from a point source (a physical intentional, forced emission point) or fugitive (an unintentional or passive release). These are as follows:

- Point Source A2 – Shredder LEV – filtered emissions from the shredding process
- Point Source A3 – Autoclave LEV – filtered emissions from around the door of the autoclave
- Fugitive Source 1 – Incoming waste storage area
- Fugitive Source 2 – Delivery doors on the southern side of the building

3 Odour Risk Assessment

The applicant has carried out a qualitative risk assessment for the proposed new treatment plant. This identifies the sources, their pathways to causing nuisance to the defined receptors, the likelihood of odour release, the control measures in place, and actions required based on the findings. This is presented in Table 4.

Table 4: Risk Assessment

Odour Source	Material	Pathway	Main Receptor	Likelihood	Controls	Residual Likelihood	Action Required?
Raw materials	Disinfecting chemicals	Fugitive via open doors, windows – air transportation then inhalation	Any of the identified receptors in Table 2, depending on prevailing wind direction	Low	Small quantities held, proprietary container, stored within building	Very Low	No
Waste delivery and storage	Clinical waste			Medium	Intermittent – only during delivery, all waste in closed containers, doors closed at all times outside of delivery, no waste stored outside, waste processed quickly	Low	No
Shredder emissions	Exhaust air from shredding of clinical waste	A2 shredder LEV stack – air transportation then inhalation		Medium	Active air extraction whilst in operation, HEPA and carbon filter - maintained and serviced in accordance with PPM	Low	No
Autoclave emissions	Exhaust air, hot process air from treatment of clinical waste	A3 autoclave LEV stack – air transportation then inhalation		Medium	Active air extraction whilst loading the waste into the unit, HEPA and carbon filter - maintained and serviced in accordance with PPM	Low	No
Compactor emissions	Fugitive emission from compacted waste	Fugitive via open doors, windows – air transportation then inhalation		Low	Waste has been heat treated, compactor is fully enclosed, located within a building, doors and windows kept closed	Very Low	No
Liquid effluent storage	Effluent from treating of clinical waste			Medium	Effluent unlikely to be odorous, stored in IBCs, within a building, doors and windows closed other than during delivery/transfer of waste	Low	No
Treatment areas – general	Clinical waste or raw material spillage			Low	Regular inspection and cleaning, housekeeping controls, all incoming waste is contained	Very Low	No

4 Management Responsibilities

The Site is operated in accordance with the defined business management system (current version 1.6, dated 30 January 2019). This is led by the management team which ensures that the system is implemented, understood, and complied with at all levels of the organisation. The National Operations Manager, Midlands Plant Manager, and Plant Supervisor all have responsibility for odour management at the Site, as follows:

- National Operations Manager – responsible for overall control of operations for the company and providing the resources required to support the work of the responsible persons in reducing the risk of odour impact from the Site;
- Midlands Plant Manager – responsible for (or delegates authorised alternative to be responsible for) maintaining compliance with legal and regulatory requirements, liaising with neighbours (local receptors), implementing the OMP, providing odour training to Site personnel, and implementing the odour monitoring regime;
- Plant Supervisor – responsible for day to day management and operation of the Site, including provision of operating procedures and training as required.

All employees have a stake in odour control at the Site and training is therefore provided to all staff.

5 Odour Control and Response

Further detail is provided in this section of the control measures listed in Table 4 above.

5.1 Limiting the Odour Source

The Site undertakes the treatment of clinical waste and as such has the potential to generate odour from both the storage of clinical waste pending treatment, and the treatment process itself. Measures are taken to limit the potential for odour, as follows:

- All waste is delivered in sealed containers – the bagged waste is always contained within a yellow lidded 770 litre waste bin whilst sharps waste is received in re-useable sharps containers which are thick plastic, lidded and securely closed. The waste stream itself is primarily metals and plastics and unlikely to be an odour source;
- Storage of waste is within the building – no waste is stored outside;
- Doors to the building are kept closed other than when there is a delivery or collection taking place;
- Procedures ensure that waste is processed quickly. This is usually a matter of up to a few days, however the contingency plan limits it to 2 weeks after which the waste is transferred off Site;
- The three parts of the treatment process are enclosed when in operation and the first two (shredder and autoclave) have air extraction which is filtered via HEPA and carbon systems;
- General cleaning of process plant is carried out on a regular basis, including disinfection of the shredder plant.

5.2 Maintenance and Monitoring

The operator follows a planned preventative maintenance programme to ensure that the plant works efficiently and the likelihood of failure is minimised. This has a direct reduction in the likelihood of odour release resulting from abnormal operations.

The following are included in the PPM:

- Maintenance of HEPA and carbon filters in the LEV systems, in accordance with the manufacturer's guidelines to ensure normal removal efficiency is retained. Pressure differentials are measured across the filters to identify when exchange is required; and
- Maintenance of the component parts – shredder (and bin tipper), autoclave (and autoclave carts), compactor in accordance with manufacturer specification.

The design of the plant is such that the three component parts can each operate in isolation, enabling the operator to carry out maintenance or repair works on any one part whilst the parts can continue to operate. This reduces the impact of failure or shutdown on the overall plant operation.

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.

The operator will carry out regular olfactory monitoring in accordance with the EA's guidance in H4, using a checklist based on the one provided in H4, a copy of which is attached as Annex OMP1. During the first month of operations this will be undertaken on weekly basis. Following that period, it will be carried out monthly and/or following any odour complaints from receptors or identification of odour issues within the building by the operational team. The frequency may also need to be increased in the event of extreme weather conditions such as long periods of hot weather.

The monitoring will be undertaken at several fixed points around the Site boundary, as well as a point down-wind at the time of the monitoring (a moveable point). These are shown on Figure 1.

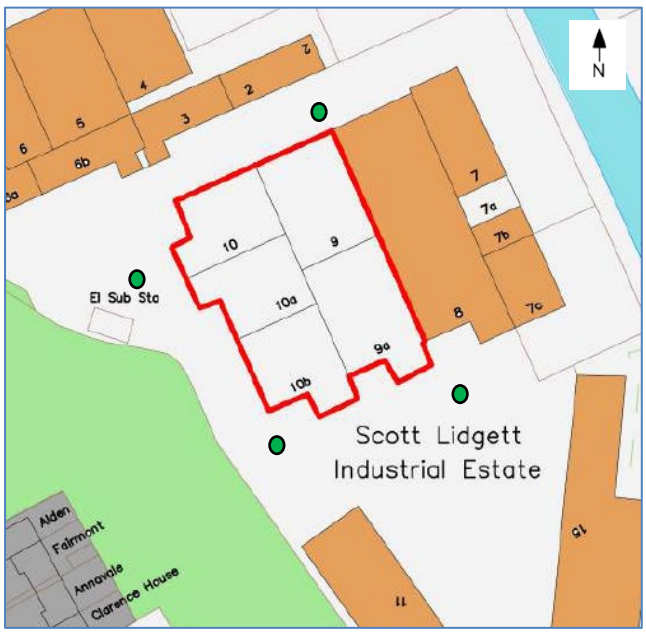

Figure 1: Olfactory Monitoring Locations

5.3 Odour Incident Response

In the event that there is an issue with odour, within the building, resulting from the treatment plant or associated activities, the incident will be investigated to identify the cause:

- **If the odour source is found to be the treatment process**. The treatment process will be stopped (one or more of the 3 distinct components) to allow assessment of the equipment. Once shutdown the plant will be cleaned thoroughly to remove any residual odour source. If the source is deemed to be abnormal operation of the LEV filter systems these will be checked and filters replaced if required. Olfactory monitoring will be carried out (internal and external to the building) and if odour is no longer being generated, treatment can recommence.
- **If the odour source is found to be a fugitive source (e.g. waste storage, spillage).** The source of the odour will be identified and removed, the area will be cleaned thoroughly to remove any residual odour source.
- **If the odour source is found to be in an external area.** The source of the odour will be identified and removed/repaired – this may require the services of a third party contractor. The area will be cleaned thoroughly if required.

5.4 Odour Complaint Response

If an odour complaint is received, this may be directly to the Site from a member of public, or via the EA. The complaint will be investigated immediately if it received during normal operating hours, or first thing on the next working day if received outside of normal operating hours.

Following receipt of a complaint, the operator will determine:

- Is the process under control? (i.e. has the site received exceptionally odorous wastes or have wastes been left standing for too long before processing?)
- Have odour containment measures failed? (i.e. has a door been left open, have odorous materials been stored outside a containment area, have adverse conditions, such as weather, overwhelmed containment structures?)
- Have treatment measures failed? (i.e. has a carbon scrubber become saturated, does the LEV system need servicing?)
- If the odour is associated with the treatment of hazardous materials, is there any possibility of health risk to the local community?

As noted in Section 5.2 above, the operator will carry out additional olfactory monitoring in accordance with the EA's guidance in H4, following any odour complaints from receptors. Records will be kept of any investigations that are carried out following an odour complaint. This will include details of any measures taken to rectify the issue where the complaint is substantiated.

Sharpsmart recognises the need to identify and understand the needs of interested parties; this includes neighbours (e.g. householders) and neighbouring businesses within the managed business park (Enterprise City). Engagement with these parties is encouraged and will be undertaken as required.

5.5 Odour Records

Records of olfactory monitoring are maintained in hard copy at the Site. These records can be made available to the EA if requested.

This OMP is a live document and will be reviewed on a regular basis. Circumstances that would initiate an extraordinary review of the OMP includes a significant change to the treatment process or ancillary processes, introduction of any new control measures, introduction of a new odour source, a change to the Site layout, or changes to the sensitive receptors.

Annex OMP1

Odour report form				Date	
Time of test					
Location of test e.g. street name etc					
Weather conditions (dry, rain, fog, snow etc):					
Temperature (very warm, warm, mild, cold, or degrees if known)					
Wind strength (none, light, steady, strong, gusting) Use Beaufort scale if known					
Wind direction (e.g. from NE)					
Intensity (see below)					
Duration (of test)					
Constant or intermittent in this period or persistence					
What does it smell like?					
Receptor sensitivity (see below)					
Is the source evident?					
Any other comments or observations					

Sketch a plan of where the tests were taken, the potential source(s).

Intensity		**Receptor sensitivity**
0 No odour	4 Strong odour	Low (e.g footpath, road)
1 Very faint odour	5 Very strong odour	Medium (e.g. industrial or commercial workplaces)
2 Faint odour	6 Extremely strong odour	High (e.g. housing, pub/hotel etc)
3 Distinct odour	Ref: German Standard VDI 3882, Part 14	