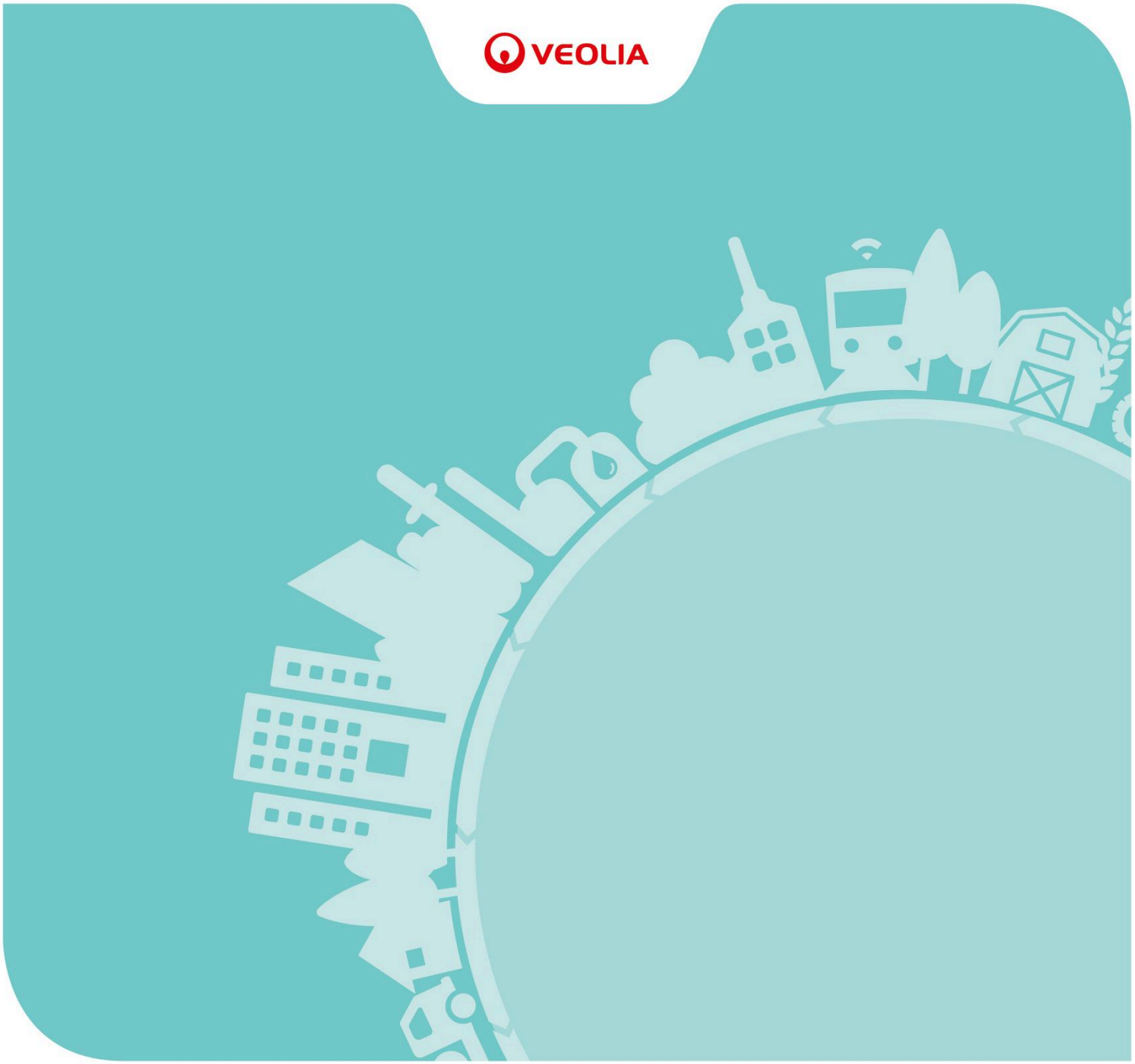


Odour Management Plan
Shropshire IVC

Fenn's Bank, Whitchurch, SY13 3PA (NGR: SJ 50631 39117)
Permit Reference: TBC

Date: May 2025
Version: 1

Document control

Version	Revision date	Reason for revision
V1	May 2025	Permit application

Table of Contents

1. Overview

1.1. Background

Shropshire IVC 'the IVC facility' will be operated by Veolia ES (UK) Limited 'Veolia' and will accept 50,000 tonnes per year of primarily municipal green and food waste. The facility is located in Fenn's Bank which is just under 3km south west of Whitchurch and just under 13km from Bangor-on-Dee. The input green and food waste will be recycled by the IVC facility to produce a PAS100 compliant compost material which will be used as either an agricultural or horticultural soil improver. Treatment capacity may also be available from time to time for merchant waste inputs from a wider range of sources including business, commercial or trade premises, but these will be secondary to the municipal waste inputs. All municipal and merchant wastes will be classified as non-hazardous.

The process includes input storage of green and food waste, shredding, sanitisation concrete vessels / tunnels and stabilisation / maturation within windrows. Input storage and shredding including offloading is carried out within an enclosed building under negative pressure. The concrete sanitisation vessels are enclosed with waste gasses extracted directly to an abatement plant. The vessels are within a building which is maintained under negative pressure with the air surrounding the tunnels extracted to an abatement plant. Stabilisation and maturation are carried out in windrows on an eternal pad with a forced aeration system. Leachate and condensate produced within the buildings and from the external pad are collected and either recirculated or stored pending removal from site by road tanker.

The abatement plant includes an acid scrubber which removes ammonia from the gas stream and a biofilter which controls release of odourous substances.

1.2. Synopsis

1.3. Document layout and format

1.4. Maintaining this document

Training / review aspect	Details
Post holder responsible for FPP related training	Site manager
Review interval criteria	Annually unless there have been no changes.
	Following an incident which resulted in actual or potential fire.
	A change to activities on site.
	Following instruction by National Resources Wales under the relevant condition of the environmental permit.
Training overview	The Veolia Management System 'VMS' includes a procedure that defines the process and responsibilities of personnel involved in the identification and evaluation of learning and development needs as well as the subsequent implementation of essential training to enable all employees to perform effectively and proficiently in their individual jobs. Site personnel are aware of the parts of the permit relevant to their role and a copy of the permit is available.

	A training matrix for all site personnel is in place and updated with all personnel trained according to the requirements of their role, including refreshers Monitoring is in place to demonstrate competency. Staff will be trained in the use of portable fire fighting equipment.
Training interval	Management will maintain a statement of training requirements for each operational post and keep a record of the training received by each person whose actions may have an impact on the environment.

1.5. Relevant sector guidance

Reference documents

Guidance title	Source	Publication date / date accessed
H4 Odour Management	https://www.gov.uk/government/publications/environmental-permitting-h4-odour-management	March 2011
How to comply with your environmental permit	https://cdn.cyfoethnaturiol.cymru/media/2110/how-to-comply-with-your-environmental-permit.pdf?mode=pad&rnd=131467604540000000	October 2014

2. Site description

2.1. Site setting and location

The Fenn's Bank IVC is located at just under 3km south west of Whitchurch and just under 13km from Bangor-on-Dee. The site sits within a principally agricultural setting less than 500m from the border between Wales and England. The closest residential receptor is 115m to the south east near Mereside Industrial Park. There are several other isolated or small clusters of residential dwellings within 1km of the site. The site has been in industrial use since 1998 as a salt slag reprocessing facility principally producing aluminium oxide operating under a modern permit since 2005 (VP3030BX). The adjacent site (Mereside industrial park) was formally an aluminium works since the 1940s.

To the east are a mixture of farms and residential properties including converted farm dwellings. To the south is the Meresite Industrial Park which is a small collection of light industrial and non retail commercial premises. To the north is agricultural land with the nearest dwellings approximately 340m away. West of the site is predominantly agricultural with a few farm dwellings the closest of which is approximately 700m away. The table below lists relevant receptors which are also shown on the following plan.

There are several ecological receptors surrounding the site including the Fenn's, Whixall, Bettisfield, Wem and Cadney Mosses which are designated a RAMSAR site, Special Area of Conservation 'SAC' and a Site of Special Scientific Interest 'SSSI'. There are also several other Sites of Importance for Nature Conservation 'SINCs' surrounding the proposed IVC facility.

The full address for the site is detailed below:

Veolia ES Shropshire Limited
Fenn's Bank
Fenn's Bank Road
Whitchurch
SY13 3PA

2.2. Operating hours

The site operations are typically 07:00 to 18:00 Mondays to Saturday, but are subject to opening Sunday morning for deliveries.

2.3. Storage and transfer activities

Food and green waste material arrives at the site either from direct collection in RCV or in walking floor vehicles from transfer stations. Stored materials are summarised as follows:

- Input material including green and food waste, stored within a building under negative pressure
- Shredded / blended material, stored within a building under negative pressure
- Residual materials are stored 'in process' for short periods by the refining plant including extracted plastics, metals and woody oversized material

2.4. Treatment activities

Shredded / blended green and food waste is transferred into the sanitisation phase of the composting process and then on to stabilisation. Treatment activities are summarised as follows

- Blending and shredding of green and food waste to produce a feedstock for the composting process, which takes place internally within a building under negative pressure
- Sanitisation of the shredded material using an in-vessel process with waste gas extraction to abatement plant
- Stabilisation of sanitised material in windrows under forced aeration

3. Process description

Delivery

Green and food waste material is delivered to the site by bulk tipper / RCV and deposited into a bank of four concrete reception bays situated within a building with roller shutter doors.

Input storage

Storage of principally green and food waste and input material in concrete bays of a maximum capacity of 450m3. These may be co-mingled or source segregated and may be directly delivered or come via intermediate bulking facilities (i.e. transfer stations).

Shredding / blending

Green and food waste is transferred from storage bays and blended and shredded together to form a uniform mixture which is suitable for composting. Experienced operators ensure the correct mix of green / food material to achieve a suitable ratio of carbon to nitrogen content. The shredded material is then stored temporarily in a concrete bay with a maximum capacity of 450m3. The shredding process increases the surface area of material available to the microbes which carry out the composting process, speeds up composting and creates a more uniform end product.

In-vessel composting (sanitisation)

Shredded material is moved through a doorway between the input and processing halls and deposited into one of seven 32 x 5.5 x 5.5m concrete tunnels / vessels with a special door equipped with a rubber sealing. The concrete floor of the tunnels houses a series of parallel PVC pipes with tapered plastic nozzles called spigots which distribute the air evenly across the waste to maintain aerobic conditions. Each tunnel has its own centrifugal fan that blows a mixture of fresh air and recirculated process air via the spigot pipes to the composting material. Temperature, oxygen content, pressure, moisture levels and air flow are constantly monitored during the composting process. The sanitisation process destroyed any pathogens present in the material conforming to all requirements under the Animal By Product Regulations.

Stabilisation

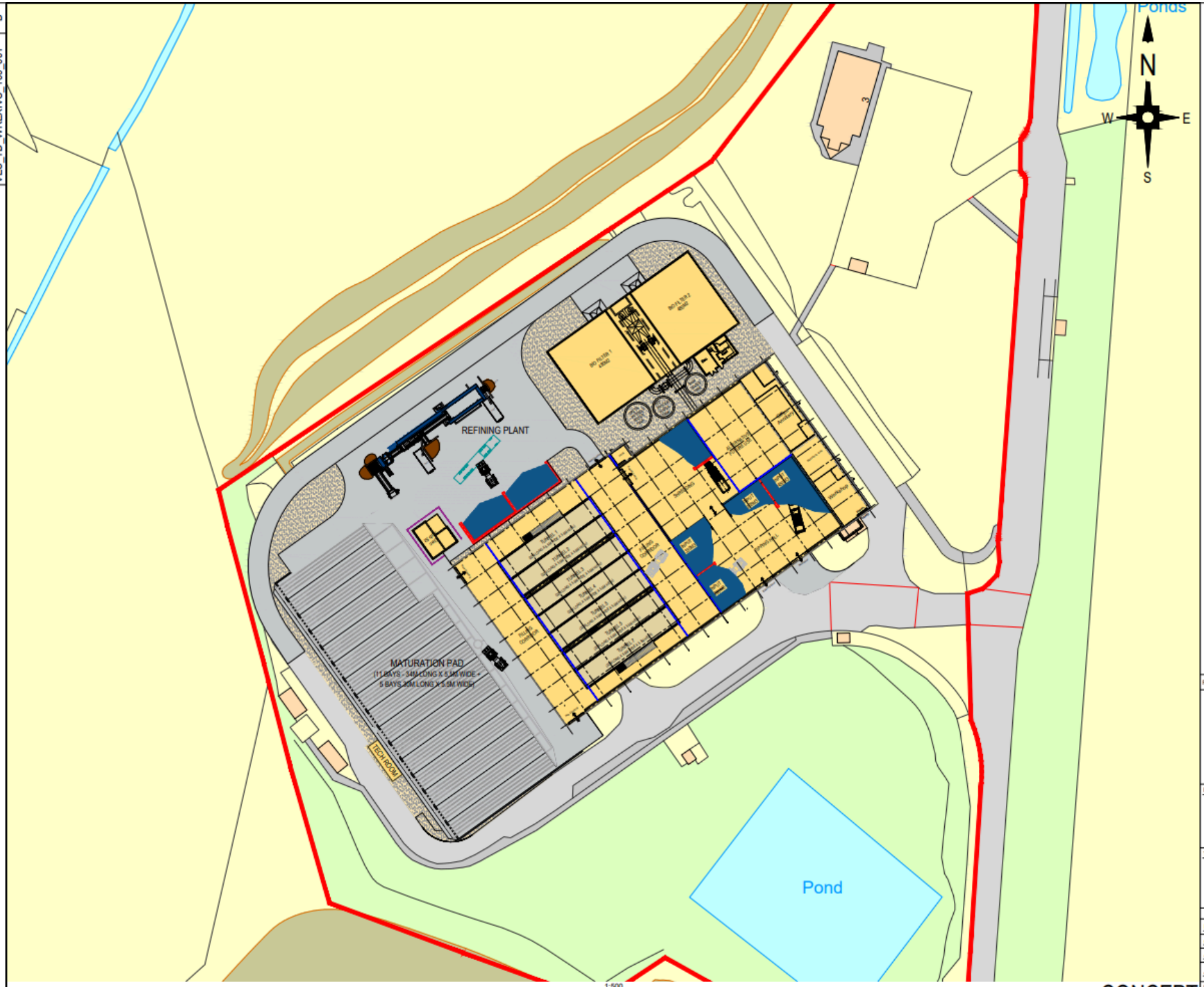
Once the material is sanitised having undergone a computer controlled programme ensuring all required thresholds and set points are met, it is transferred to an external stabilisation / maturation pad. The pad consists of 11 bays of 35(l) x 5.5(w) metres and 5 bays of 30(l) x 5.5(w) metres. The pad has a forced aeration system supplying the air required to support the biological activity needed to complete the composting process, delivered by a series of fans and an underground network of pipework and spigots. Use of a forced air system means there is no requirement for tuning of the piles. During the stabilisation period stage temperature is monitored by a probe array as well as air flow. Moisture and structure are monitored manually.

Refinement

Once the active composting process is completed the material is passed through a refining plant. The refining plant removes oversized material which is undesirable in the finished product. Refining plant includes a star screen, wind sifters, overband magnet and a trommel. Output includes plastics, metals, oversized material and graded compost material (10mm and 20mm product grade).

Product storage

Once refinement is complete, the product is stored in one of two Legioblock bays awaiting transport off site for final use as agricultural or horticultural soil improver.



Revision B

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SITE BOUNDARY

FULL HEIGHT PARTITION WALL

Rev	Description of revision	Drawn	Chkd	App	Date

VEOLIA

Technical Direction,
8th Floor, 210 Pentonville Road, London. N1 9JY
Tel: 0207 812 5185

Project

MERSEYSIDE INDUSTRIAL ESTATE
FENNS BANK
WHITCHURCH

Title

SHROPSHIRE IVC
PROPOSED SITE LAYOUT

	Initials	Date	Scale	Sheet size
Drawn	RB	12.06.24	1:500 @A1	A1
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Approved				

Job No. WREXIVC

Drawing No. VES_TD_WREXIVC_100_001

Revision B

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CONCEPT

Fenn's Bank IVC Facility - Process Flow diagram

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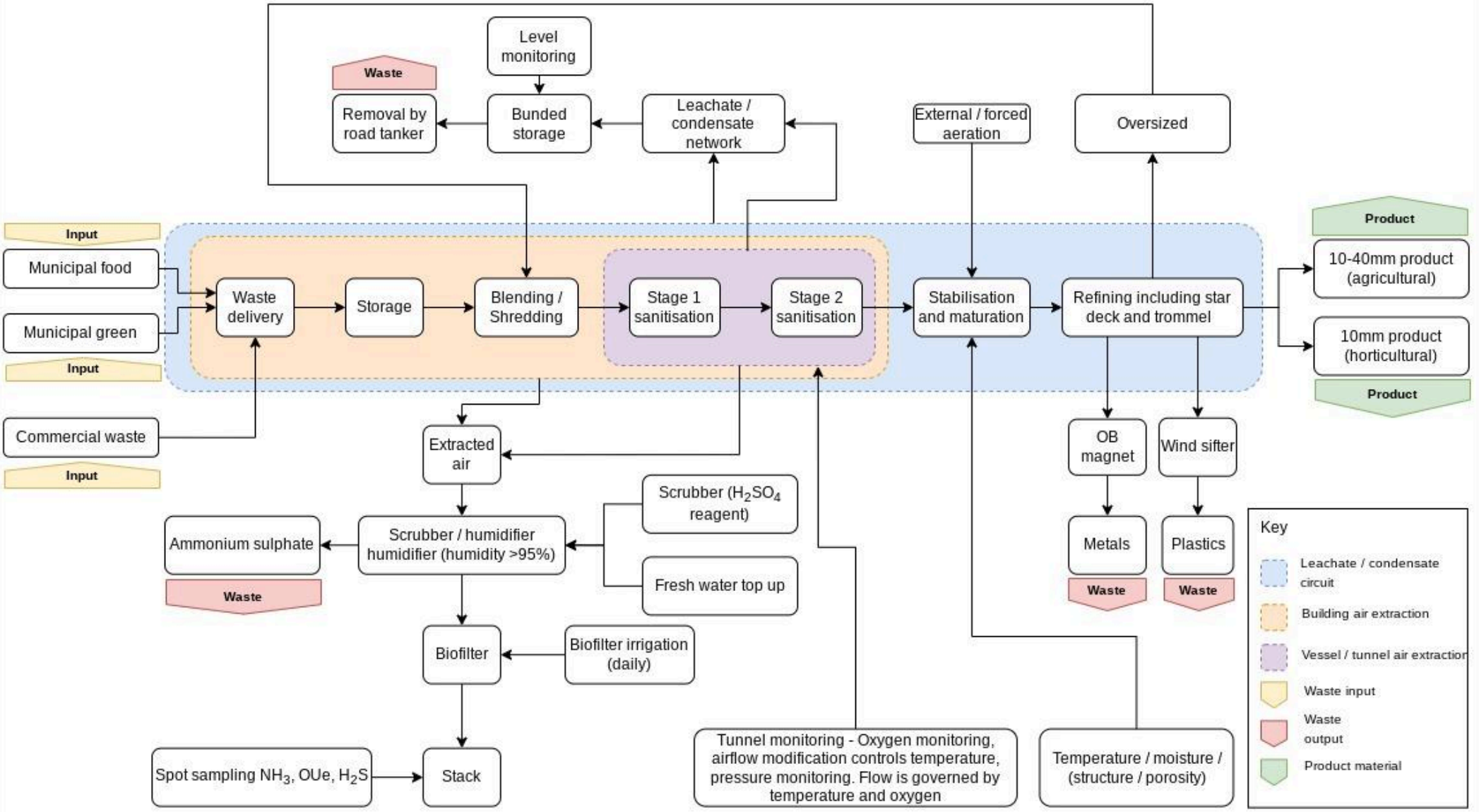
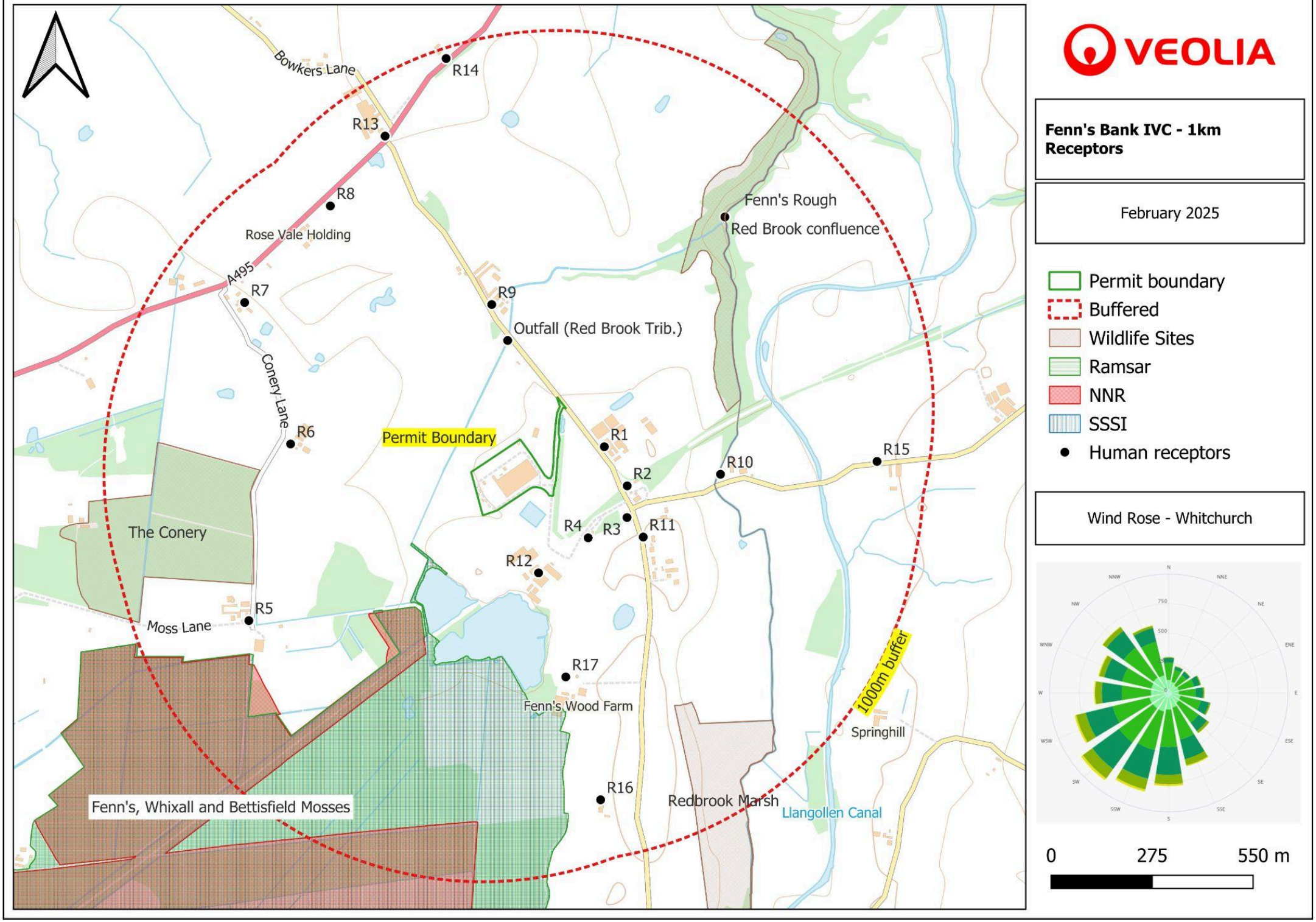
March 2025



4. Receptors

The recovery of organic waste has the potential to generate malodours from site operations. This odour management plan assesses likely sources of odour generation and sets out the good site practice and mitigation that is employed to minimise where reasonably practicable any odour emitted from site.
The likelihood and frequency of exposure to odour arising from the facility is determined by a combination of the magnitude of release, the prevailing meteorological conditions, and the distance and direction of receptors in relation to the facility. Each of these factors are discussed in the following sections.

Land use e.g. house, school, hospital, commercial	No.	Land use e.g. house, school, hospital, commercial	Direction from site (North, South, East, West)	Approximate distance to site boundary excluding access road (m)
Residential	R1	Park Farm Cottages, Fenn's Bank Road	East	190
Residential	R2	Fenn's Bank Road 2	East	220
Residential	R3	Fenn's Bank Road 3	South East	240
Residential	R4	Residence near Mereside Industrial Park	South East	308
Residential	R5	The Conery, Conery Lane	South West	680
Residential	R6	Woodlands Farm, Conery Lane	West	470
Residential	R7	Conery Lane Farm, Conery Lane	North West	770
Residential	R8	Pinfold Cottage, Long Lane	North West	840
Residential	R9	The View, Fenn's Bank Road	North West	390
Residential	R10	Waterworks Lane 1	East	480
Residential	R11	Fenn's Bank Road 4	South East	310
Industrial	R12	Mereside Industrial Park	South	180
Residential	R13	Bowkers Lane	North	960
Residential	R14	Ellesmere Road	North	1060
Residential	R15	Waterworks Lane 2	East	930
Residential	R16	Fenn's Cottage	South	860
Residential	R17	Fenn's Wood Farm	South	580



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Fenn's Bank IVC - 1km Receptors

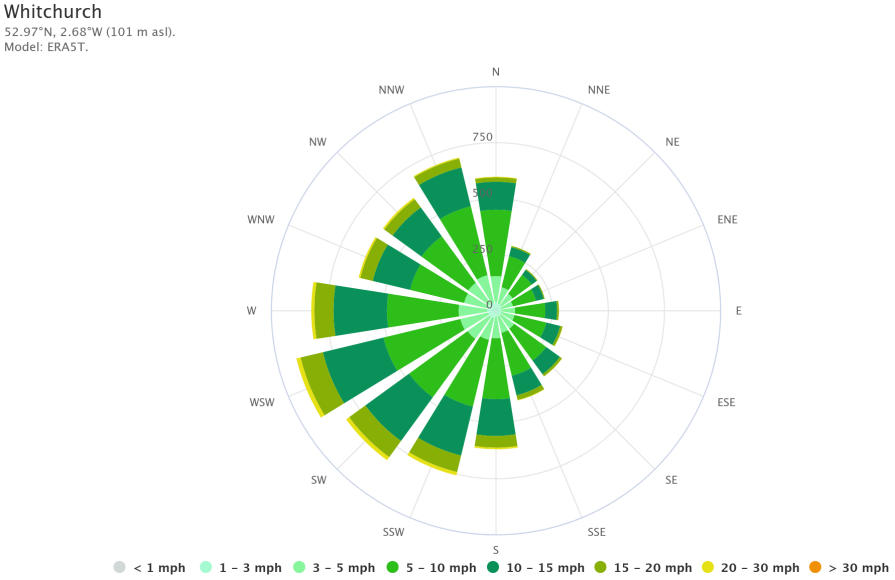
February 2025

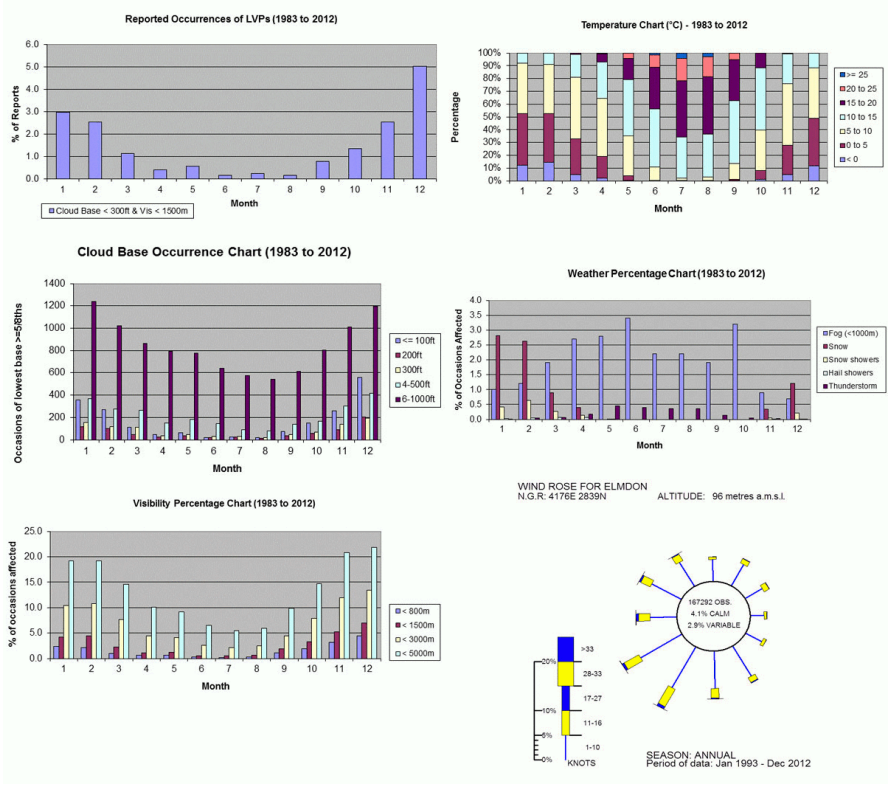
- Permit boundary
- Buffered
- Wildlife Sites
- Ramsar
- NNR
- SSSI
- Human receptors

Wind Rose - Whitchurch

0 275 550 m

4.1. Wind Direction





Source: Meteoblue (simulated historical climate and weather data for Whitchurch)
https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/whitchurch_united-kingdom_2634124

Source: Met office (Birmingham Airport)
https://www.metoffice.gov.uk/services/transport/aviation/regulated/national-aviation/uk-services/airfield-climate-data#Birmingham

5. Sources of odour

5.1. Inventory of odours materials

Material type	Source	Description	Intrinsic odour potential
Inputs			
Green waste	Municipal collections (kerbside or via transfer stations or civic amenity sites)	Normal: Grass and woody plant material from domestic gardens. The material is likely to have been stored in wheelie bins for up to two weeks on arrival to the site if it is received directly and slightly over two weeks if received via a bulking facility and therefore may be in the early stages of aerobic decomposition.	High
Food waste	Municipal collections (kerbside or via transfer stations)	Normal: Waste food from domestic properties. The material is likely to have been stored in small domestic food bins for up to a week before arrival to site and slightly over two weeks if received from a bulking facility and therefore may be in the early stages of aerobic decomposition.	High
Comingled green and food waste	Municipal collections (kerbside or via transfer stations)	Normal: A mixture of grass and woody plant material from domestic gardens and food waste from domestic properties. The ratio of green to food is likely to be around 95:5 in the winter rising to 95:5 during the spring / summer and autumn.	High
Processing stages			
Shredded / blended food green waste	Input material and residual oversized material	Normal: A mixture of green waste and food waste derived from the waste inputs. Softer waste with higher nitrogen content is mixed with more woody waste with a higher carbon content and structural material to create a blend to promote an ideal aerobic composting media. The shredded material has a higher surface area to volume ratio which increases the rate of biological activity due to the higher exposure of the waste mass to oxygen in the air.	High
Material in sanitisation	Shredded / blended material	Normal: Shredded material which has been loaded into the vessels and is undergoing the sanitisation phase of the composting process. The material is in the tunnels for approximately 2 weeks, using a two barrier system. This phase has a high oxygen demand and creates high levels of waste gas from microbial metabolism.	High
Material in stabilisation	Sanitised material	Normal: Material which has been sanitised by the in-vessel stage of the process which is still undergoing active composting. Soluble carbon is usually not fully used and material is still considered to be in treatment.	High
Outputs			
Plastics	Stabilised material	Normal: Plastics that are separated by the refining plant by wind sifters. These plastics will comprise both compostable and non-compostible fractions and will be contaminated with organic material.	Low
Oversized material	Stabilised material	Normal: Predominantly woody material with a high carbon to nitrogen and low surface area to volume ratio which is slow therefore slow to compost. Biological activity in this material is low.	Low
Metals	Stabilised material	Normal: Metals that are separated by the refining plant by over-band magnets which are contaminated with organic material.	Low

Material type	Source	Description	Intrinsic odour potential
Ammonium sulphate	Acid scrubber	Normal: Produced from the reaction between ammonia in the waste gas from the composting process and sulphuric acid.	High
Leachate	Inputs, shredded material, sanitisation and stabilisation	Normal: Leachate generated from tunnels, within buildings and from OW composting.	High
Finished compost	Stabilised material	Normal: Finished compost material that has been sanitised, stabilised and refined and is compliant with BSI PAS 100. The degree of processing and biodegradation at which the rate of biological activity has slowed to an acceptably low and consistent level and will not significantly increase under favourable, altered conditions.	Low

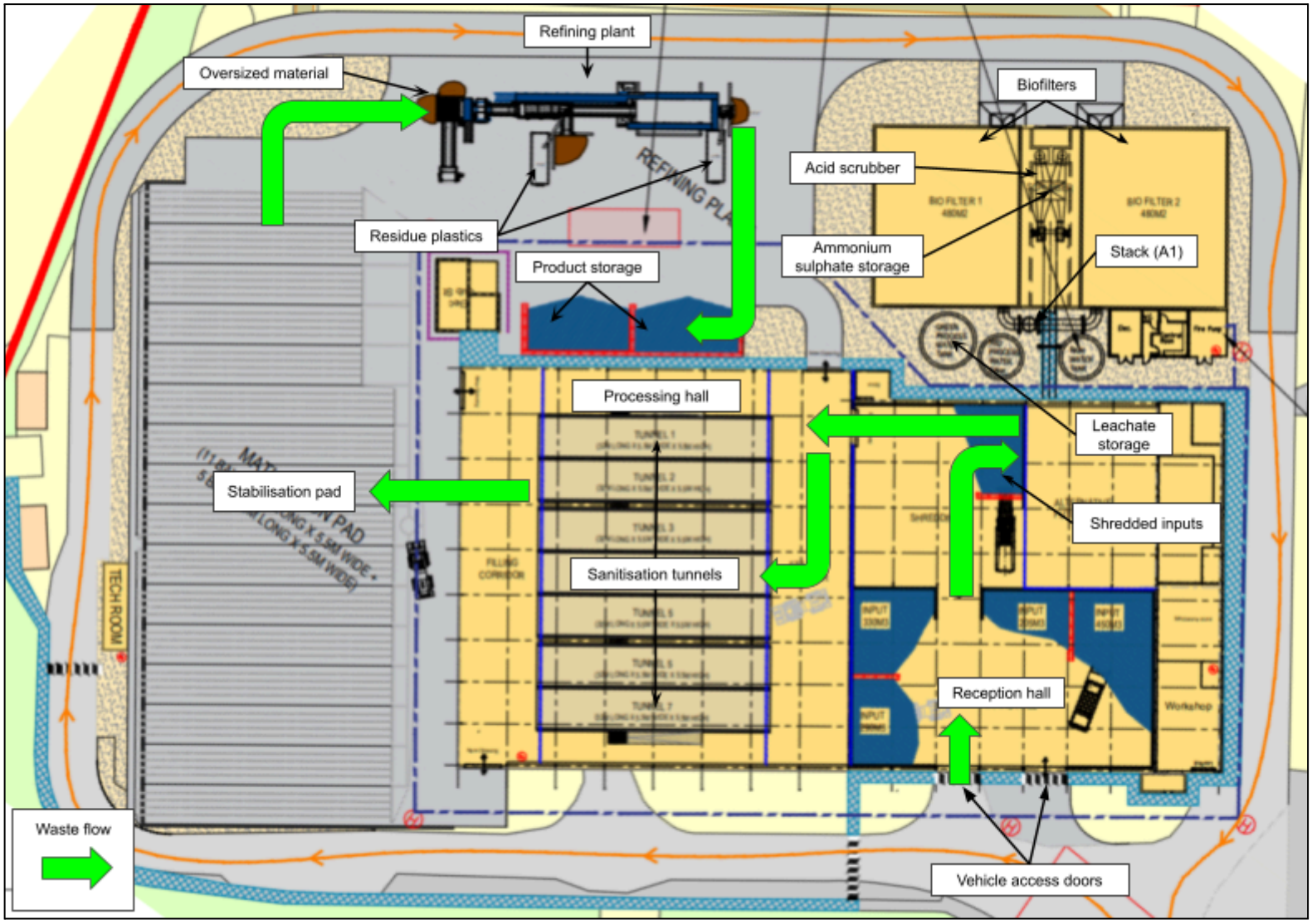
5.2. Inventory of processing techniques

Material type	Source	Description	Intrinsic odour potential
Arrival and tipping of waste from delivery vehicle	Municipal collections (kerbside or via transfer stations or civic amenity sites)	Odour release can be higher during tipping of material.	Medium
Shredding of input material	Input material and residual oversized material	Odour release can be higher during shredding activity due to agitation and increasing the surface area available for moisture evaporation.	High
Internal waste movements	Inputs, shredded material, sanitised waste	Disturbing the waste material can generate odour.	Low
In-vessel composting	Shredded material	Odour is released from the active composting sanitisation phase.	High
Windrow composting	Sanitised material	Odour is released from the active composting stabilisation phase.	High
Refining	Stabilised material	The refining process disturbs the waste during the screening and conveying activities and as the material is dropped onto different conveyors.	Medium
External waste movements	Sanitised material, finished compost	Disturbing the waste material can generate odour.	Low

5.3. Specific odour release points

Release point	Source	Description	Intrinsic odour potential
Main stack	Input storage, shredding, sanitisation and building air	Collected non condensable gasses from the sanitisation process and air from the building envelope surrounding the tunnels and from the reception hall.	High
Vehicle access doors	Input storage and shredding	Release of organic products of biodegradation during opening of doors to the reception hall	Medium
Leachate storage	Inputs, shredded material, sanitisation and stabilisation	Release of organic products from the evaporation of leachate collected from the sanitisation tunnels, building envelope and OW composting pad	Medium

5.4. Site diagram (storage, release points and waste flow)



6. Control measures and process monitoring

6.1. Odorous materials entering and leaving site

6.1.1. Character of inputs and outputs

Green and food waste will be delivered either from household collections or via transfer stations by collection vehicles of various types including Roadside Collection Vehicles 'RCVs' and articulated bulk vehicles. All input material received at the site will be for composting to produce a PAS100 compliant horticultural / agricultural soil improver.

Input material will be of a consistent character being principally household derived green food waste or commercial material of a similar nature.

Vehicles bringing waste into the Facility will be enclosed or covered which will reduce fugitive emissions during transport. Vehicles removing waste from the Facility will be enclosed or covered.

6.2. Maintaining control of inputs

6.2.1. Contractual control

A major factor affecting the potential for odour emissions at the waste delivery and reception stage is the content and nature of the material. Veolia's policy with its waste suppliers - specifying the inputs that are unacceptable and the frequency of deliveries - is the main control measure. Veolia will exercise rigorous control of delivered waste. In any contractual agreement there will be a clause which covers the delivery of malodorous content material. It will be within the site supervisor's power to reject any material (e.g. contaminated or odorous wastes that have been stored too long) that will jeopardise the ability to manage the site and prevent the emission of unacceptable odours.

6.2.2. Waste Acceptance Procedures

On-site operatives will be trained as to the acceptability criteria for incoming loads. Waste will only be accepted if:

- It conforms to the type and maximum quantity that is specified in the Environmental Permit; and
- It conforms to the description in the documentation supplied by the producer and holder.

A waste acceptance procedure is followed to ensure that only suitable waste is accepted into the facility in accordance with the Environmental Permit.

6.2.3. Arrival of non conforming waste

Procedures are in place so that incoming waste considered to be malodorous will either be processed immediately or rejected from the site. If it is deemed necessary, inputs can be refused or diverted to alternative treatment facilities if odour pollution is considered likely.

Vehicles will be directed to tip within a specific waste bay, as directed by the site staff. Once tipped, if the load is found to be malodorous and / or not conforming to pre acceptance criteria the site supervisor will make the decision to either process the load immediately or reject the waste from site.

For waste acceptance in general all business contracts establish collection schedules and storage arrangements that are suitable for the waste types and business size i.e. sealed bins that are emptied on an agreed frequency.

Any rejected inputs will be re-loaded on the delivery vehicle immediately and the manager will contact the site of origin / council to inform them of the rejection from the site and to remind them of the quality of input material deemed acceptable.

6.3. Seasonal variation

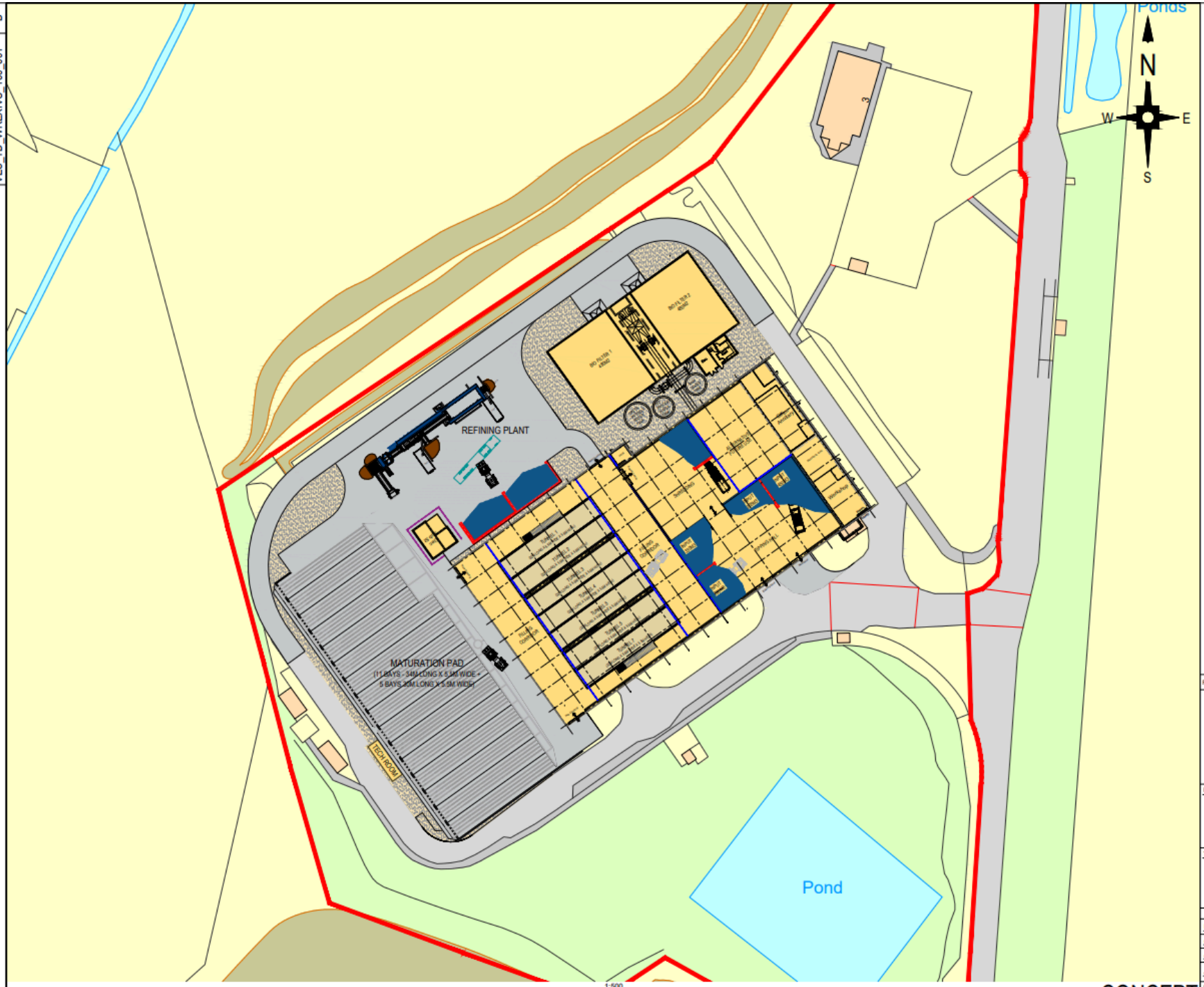
It is recognised that seasonal variations in the percent of green waste accepted at the site would have the potential to affect odorous emissions on the site. It is anticipated that the tonnages during the winter will fall to around 70t per day but within this mix the food content is not expected to rise above 30% by total weight. Inputs will be visually monitored by the operative and supervisor for bulk density, moisture content and the food/green split and the stock of oversize material will be added accordingly to correctly condition the input for composting.

Excessive Influx of Waste

The contractual nature of the input streams means that excessive influx of waste is unlikely as this has been aligned to plant design. If there is an excessive influx of waste into the facility, further loads will be diverted to another biowaste waste facility. Records will be maintained of all waste accepted onto the site.

6.4. Residence time

Odorous and potentially odorous material (any solid, liquid or gas)	**Odour potential**	**Maximum quantity on site at any given day** (m^3 unless otherwise stated)	**Residence time in days (typical - max)**	**Location of odorous materials on site**
Green waste	High	1725	1 - 3	Reception hall
Food waste	High		1 - 3	Reception hall
Comingled green and food waste	High		1 - 3	Reception hall
Shredded / blended food green waste	High	450	1 - 3	Reception hall
Material in sanitisation (1st or 2nd barrier)	High	3500	14	Treatment hall / tunnels
Material in stabilisation	Medium	7000	28	External pad
Plastics	Low	30	14	RORO
Oversized material	Low	50	1 - 2	Concrete bay adj. refining plant
Metals	Low	30	30	RORO
Leachate	High	TBC	TBC	Fixed tank
Ammonium sulphate	High	TBC	TBC	Fixed tank
Finished compost	Low	1000	1 - 7	Concrete bay



Revision B

Drawing No. VES_TD_WREXIVC_100_001

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SITE BOUNDARY

FULL HEIGHT PARTITION WALL

Rev	Description of revision	Drawn	Chkd	App	Date

VEOLIA

Technical Direction,
8th Floor, 210 Pentonville Road, London. N1 9JY
Tel: 0207 812 5185

Project

MERSEYSIDE INDUSTRIAL ESTATE
FENNS BANK
WHITCHURCH

Title

SHROPSHIRE IVC
PROPOSED SITE LAYOUT

	Initials	Date	Scale	Sheet size
Drawn	RB	12.06.24	1:500 @A1	A1
Checked				
Approved				

Job No. WREXIVC

Drawing No. VES_TD_WREXIVC_100_001

Revision B

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CONCEPT

6.5. Appropriate measures

Odorous and potentially odorous process / material	Control measures | Monitoring frequency | Monitoring procedure and optimum process parameters | Trigger level | Action taken if outside optimum process parameters
Waste delivery and reception	• Pre-acceptance criteria are in place. • Where a contractual arrangement is made with a waste supplier, it shall include criteria for acceptance / rejection of loads delivered for composting. It will be within the site supervisor's power to reject any material (e.g. contaminated or odorous wastes that have been stored too long) that will jeopardise the ability to manage the site and prevent the emission of unacceptable odours. • Acceptance criteria are in place including visual assessment of every incoming load. • Every load tipped has visual inspection with clearly defined acceptance criteria. Loader drivers are trained in waste acceptance. Processes are in place to safely manage contamination and non-conforming waste. • First in first out 'FIFO' system in place. • If reception storage is reaching capacity, waste deliveries will be reduced or ceased until the process is back under control. • Inspection checks are completed on roller shutter doors, Operational checks are in place and included in the PPM schedule, Doors operate within full range, closing to ground level. • Maximum waste quantities defined by storage bays limits static storage amount. • A copy of the European Waste Catalogue (EWC) codes as specified by the permit along with a simplified description of acceptable waste is available. • Only waste on this list can be accepted and a procedure for dealing with non-conforming waste is in place. • All vehicles entering the site are sheeted. • Agreed delivery schedules are in place. Weighbridge operative monitors vehicles waiting to enter the Facility. • Unloading and loading of waste is carried out within the reception hall which is an enclosed building under negative pressure. • Visual inspection of incoming waste is completed with clear and communicated acceptance criteria. • Non conforming loads are assessed on a case by case basis and either prioritised for processing if they can be treated without compromising odour controls or rejected. • A quarantine area is available, demarcated and with signage where loads require decanting for assessment. • Feedback is provided to the waste producer / haulier, discontinuation of contract if necessary. • Wash down / disinfection facilities are available in the reception area. • Daily housekeeping checks are in place, with cleaning carried out daily if required.
Green waste / food waste / comingled green and food waste / oversized material / other commercial inputs	• Input wastes have a low residence time reducing degradation occurring outside the actively managed stages (sanitisation and stabilisation). • The activity is carried out within the reception hall which is an enclosed building. • The reception hall is maintained under slight negative pressure minimising leakage of air beyond the building envelope. • Building air in the reception hall is treated through an abatement plant including acid scrubber and biofilters. • Vehicle and personnel doors remain closed apart from access egress. • The fabric of the building is visually inspected for damage and damage / wear likely to reduce odour control efficiency are repaired without delay. • The air flows within extraction ducts in the building will be measured once per annum to ensure negative pressure is maintained, and the actual extraction and flow rates will be re-balanced as necessary. • Daily housekeeping checks are in place, with cleaning carried out daily if required.
Shredded / blended food green waste	• Residence time of shredded material is low, reducing the amount of time biological degradation occurs outside of an actively managed process (sanitisation and stabilisation). • Daily housekeeping checks are in place, with cleaning carried out daily if required.
Odour from the sanitisation process	• Sanitisation takes place in a closed system within concrete tunnels with sealed doors at each end.

Odorous and potentially odorous process / material	Control measures | Monitoring frequency | Monitoring procedure and optimum process parameters | Trigger level | Action taken if outside optimum process parameters
	• Once a tunnel is fully loaded, its doors will be closed to seal the composting environment from the rest of the facility. • Gasses generated from the sanitisation process are collected and treated within an abatement plant. • The processing hall building envelope surrounding the tunnels is maintained under slight negative pressure. Any odours escaping from the tunnels (e.g. when the doors are opened at the end of the active composting phase) are contained within the building which is then ducted to the air abatement system. • Within each tunnel air temperature, pressure, volume and oxygen content are monitored and a computer system controls air flow, temperature and tunnel water supply on a fully automated basis with connection to the plant SCADA system.
Odour from the stabilisation process	• Stabilised material is formed into open windrows under forced aeration preventing the formation of anaerobic conditions. • The forced aeration system means no turning of waste is required minimising the disturbance of waste until stabilisation is complete. • Temperature is monitored continuously allowing modification of moisture and oxygen to prevent the formation of anaerobic conditions. • Moisture levels in each windrow are monitored daily. • Target oxygen levels within the windrows are above 10% throughout the process. • The forced aeration system will be fully automated by connection to the plant SCADA system and controlled by monitoring the temperature via 2m long probes. The critical temperature for the stabilization phase of the compost is 35 and 65 °C. • Handheld ammonia monitors are also used to check optimum conditions are being achieved. • pH sampling sticks are available for diagnostics if required. • Each windrow is independently controlled to reflect the stage of the stabilisation process – as the decomposition process continues, the demand for oxygen and moisture generally reduces as the compost becomes less biologically active. • In order to assure a good air distribution, the floor aeration system is inspected and cleaned on a regular basis.
Shredding of input material	• The shredding activity is carried out within the reception hall which is an enclosed building. • The reception hall is maintained under slight negative pressure minimising leakage of air beyond the building envelope. • The shredding activity is carried using a slow speed shredder so physical agitation of the waste is kept as low as practicable. • Drop height of the shredder is reduced to as low as practicable minimising physical agitation of the waste.
Leachate storage	• The leachate drains from under the tunnels to a sealed storage tank. • The storage tank is vented and the air extracted and sent to the air treatment system. • Any leachate that cannot be re-circulated into the composting process will be collected and tankered away. • The composition of the leachate is analysed on a weekly basis to ensure the water body does not become anoxic or anaerobic and if necessary corrective actions such as the addition of peroxide can be implemented as required.
Internal waste movements	• Process flow is optimised by site design minimising the number of movements required to move waste material through the composting stages. • Training of vehicle drivers ensures awareness of odor control requirements and waste is handled sympathetically.

Odour from extracted tunnel / building air	• Air extracted from the sanitisation process and the reception and processing hall building envelopes is treated via an abatement plan which includes an acid scrubber to reduce ammonia content, humidifier to condition the air and a biofilter to reduce odour emissions.
	• The biofilter material is sprinkled regularly with clean water to wash out any ammonia that could poison the filter, especially in warm weather. If ammonia emissions are noted as being too high, that section of the biofilter's air supply is reduced and the section is sprinkled with water.
	• The biofilter media is inspected and changed typically on a 2-3 yearly cycle guided by measurements including:
	  ▪ biofilter backpressure;
	  ▪ the concentration of odour in residual emissions (measured by dynamic dilution olfactometry 'DDO')
	• A biofilter checklist is in place covering the following aspects:
	  ○ Weekly checks

Odorous and potentially odorous process / material	Control measures | Monitoring frequency | Monitoring procedure and optimum process parameters | Trigger level | Action taken if outside optimum process parameters
	■ The pressure before the biofilter will be checked to ensure compliance with the maintenance schedule. ■ The medium is visually inspected to ensure it is uniformly placed and that there are no obvious preferential airflows, shown by vapour being dispersed in a concentrated manner. ■ The moisture content of the substrate is maintained by using a humidifier, may have to be regularly sprinkled with water, to maintain humidity levels between 50 and 70%. ■ The temperature of the biofilter will be tested manually by inserting temperature probes into the substrate. Any necessary process adjustments required to maintain the operational temperature range between 30 oC an 40 oC will be done using the visualisation computer. ■ The air humidifier pump and sprinkler will be visually inspected, and pump pressure maintained between 1.5 and 2.5 bars. ■ The pressure differential across the humidifier will be checked for pressure drop. ■ Ammonia will be measured weekly at the biofilter discharge point if the levels are elevated (if not this is measured monthly). If the value exceeds 5 ppm (light odour) the biofilter will be sprinkled with water. ■ Ammonia will also be measured at the inlet to the biofilter, if this becomes too high (>20ppm) then this air can be diluted with fresh air to reduce its ammonia concentration. ■ The pH will be tested to ensure the media is healthy and within the range of 6-7.5. ■ The walls are visually checked for cracks and leaks ○ Quarterly checks ■ The biofilter bed will be visually inspected and if necessary, the level will be topped up with fresh material. ■ The base of the air humidifier will be visually inspected. ● To maintain a healthy microbial population, before entering the biofilter, untreated process air will pass through a humidifier to maintain substrate humidity levels of between 50 and 70%. ● The air from all parts of the building is mixed prior to passing through a humidifier; the washed air mixture then feeds both biofilters at the same rate ensuring the same air composition passes through both. ● An air grid system will allow for the even distribution of untreated air through the biofilter substrate to optimise odour destruction. ● The media is continuously saturated with water using the wet untreated air and also a sprinkler system within the biofilter system. The media is kept wet to ensure the bacterial community can thrive. ● The pressure drop across the biofilter and humidifier is measured and controlled. ● The following aspects are monitored - Temperature before and after scrubber, Pressure before and after scrubber, Water level scrubber, Water pH scrubber and biofilter, Water EC scrubber, Pressure exhaust duct. ● The following aspects are controlled - Fans Capacity, Biofilter inlet Air temperature, Fresh water supply valve scrubber / humidifier, Drainage valve scrubber / humidifier, Acid dosing pump. ● The biofilters are enclosed with abated air released via a 20m stack which disperses residual emissions to ensure impacts to surrounding receptors is not significant. ● The scrubber reagent is dosed by a dosing pump driven by pH signal. ● Emission limit values for ammonia have been set and implemented by abatement equipment design to ensure protection of the local environment including human and ecological receptors, compliance monitoring is carried out 6 monthly. ● Planned Preventative Maintenance Schedules are carried out regularly on extraction systems (e.g. fan greasing, cleaning and vibration tests). ● Fenn's Bank IVC is capable of handling up to 120,000 m^3 of air per hour. The air system is fully automated and self -adjustable. If one biofilter is down for less than 24 hours (because of routine maintenance) the renewal rates will be reduced in the plant. The system will then automatically adjust to 60,000m^3 of air and in some instances this may mean that the tunnel logistics has to be adjusted (longer cycles in the tunnels for example) which will impact on the weekly throughput. This is always planned in advance by the plant manager.
Odour from the refining process	● Material entering the process has been sanitised and stabilised and the material is much less biologically active by this stage due to reduced carbon availability, so the resulting material has a lower odour potential.

Odorous and potentially odorous process / material	Control measures | Monitoring frequency | Monitoring procedure and optimum process parameters | Trigger level | Action taken if outside optimum process parameters
	• Movements from open windrow stabilisation to the refining plant are optimised with good process flow. • Daily housekeeping checks are in place, with cleaning carried out daily if required.
Ammonium sulphate	• Spent scrubber liquids are stored in a tank.
Storage of oversized material	• The residence time of stored oversized material is low.
Storage of plastics	• The residence time of stored plastic material is low.
Storage of metals	• The residence time of stored metal material is low.

Abnormal operations

Identify the release point(s) and areas	Identify possible abnormal operation or failure that would lead to an odour event	What are the consequences of such an abnormal situation or failure	What measures should be in place to prevent or reduce the abnormal situation or failure	What actions are should be taken and who will be responsible
Access route at facility and outside reception area.	Delivery of a large volume of feedstock over a short period of time.	Fugitive release of feedstock odours from delivery vehicles unable to discharge their loads – vehicles left standing at the site entrance. The acceptance of feedstock when the facility is operating at full capacity, leading to operational problems at every stage of the process – with knock on effect of increased potential for odour generation, especially in the waste reception hall due to prolonged holding times.	Veolia will apply the following policy with waste suppliers: (1) Define maximum tonnages that can be accepted on a day-to-day basis. (2) Agreed delivery schedules, paying particular attention to public holidays. (3) Entitlement that wastes can be rejected if the facility is over supplied. Recording of the amount of feedstock accepted onto the facility on a daily basis. Contingency plan to manage over supply of feedstock, including possible diversion to other biowaste facilities to accept rejected loads and options to return to supplier	Management team responsible for negotiating Veolia supplier policy and a contingency plan. Weighbridge operator to record feedstock weights and call competent person if the maximum acceptance criteria is exceeded. Competent Person to decide if waste should be rejected and if so whether it should be returned to the supplier or sent to another licensed biowaste plant or for disposal.
	Gradual accumulation of split feedstock and leachate from delivery vehicles.	Uncontrolled release of odours from open area source.	Cleaning procedure and schedule for site entrance, weighbridge, fuel and outside reception areas.	Competent Person to carry out regular inspections of all areas to detect spills. If spills detected required, spilt materials and debris will be transferred to the reception hall and hardstanding hosed down.
	Accident involving delivery vehicle causing major spillage of feedstock.	Uncontrolled release of odours from open area source – potential to lead to odour	Response plan to deal with accidents.	Competent Person to initiate accident response plan – delivery vehicle made safe. If drivable, remaining material discharged in to reception hall or vehicle removed off site.

Identify the release point(s) and areas	Identify possible abnormal operation or failure that would lead to an odour event	What are the consequences of such an abnormal situation or failure	What measures should be in place to prevent or reduce the abnormal situation or failure	What actions are should be taken and who will be responsible
		annoyance at the sensitive receptor.		Spilt materials and debris are immediately collected and transferred into the reception hall. Spill area is then cleaned and hosed down.
Reception hall / Shredder zone and biofilter exhaust	Delivery of particularly malodorous feedstock or putracides	Fugitive releases of highly odorous emissions through open doors – potential to lead to odour annoyance at the sensitive receptor. If a biofilter is accustomed to coping with moderate loading on a continuous basis, in the event of a sudden loading occurring it will not be able to respond quickly enough to this dramatic change in condition.	Prevention of shock loadings by ensuring proper blending and management of feedstock input. Training covering the acceptability / rejection criteria for incoming feedstock – formal procedure implemented Training covering the blending/mixing principles for incoming feedstock – formal procedure implemented. The Weighbridge Operator will identify malodorous feedstock at site entrance / weighbridge and call the Competent Person. The Competent Person shall either: (1) Reject the load (return to the supplier sent to another licensed biowaste plant or licensed landfill). (2) Accept the load and inform the Shovel Loader who will immediately isolate feedstock once it is discharged in the reception hall. The Shovel Driver will then 'improve' the load, following the blending / mixing procedures and load it into one of the tunnels (after shredding) for composting.	Veolia operatives will receive hands-on training on managing malodorous feedstock from the process supplier and through Veolia's web-based training package. If highly odorous material is tipped in the waste reception area and the operator identifies it as being malodorous it will be isolated from other incoming material and then either reloaded into the original delivery vehicle or loaded into a container where it will be taken to landfill as soon as possible. If malodorous feedstock is discharged in the reception hall not having been identified at the weighbridge, the Shovel Driver will immediately inform the Competent Person. The Competent Person shall either: (1) Reject the waste and inform the shovel driver to reload it into the delivery vehicle (return to the supplier or sent to another licensed biowaste plant or licensed landfill). (2) Inform the Shovel Loader to accept the load and isolate it. The Shovel Loader will then 'improve' the load, following the blending / mixing procedures and load it into one of the tunnels (after shredding) for composting.
	Delivery of bagged green waste feedstock	Bagged material may be anaerobic and odorous.	As above	Corrective action - The bags require splitting open as soon as possible and the contents mixing with amendment material in order that structure and oxygen are readmitted.
	Delivery of wet and compacted odorous feedstock comprising mainly grass collections.	Potential for anaerobic conditions to develop within feedstock material leading to the releases of inherently odorous volatile by-products - may cause odour to be detected at nearby sensitive receptors.	As above	As soon as material is discharged from the refuse collection vehicle, it will be isolated from the other feedstocks. Amendment material such as wood chips or oversize compost should then be mixed thoroughly to open up and add structure. On completion, the blended material can be covered with wood chip or screened compost (preferably moistened) which will aid in reducing any odorous emissions.
Reception and final product storage	Rapid roller doors malfunction and doors remain open	Potential for fugitive odorous emissions from open doors	Doors will be able to be operated by remote control or manually. A routine maintenance	Nearest person to immediately close the doors either remotely or manually and inform the Competent Person.

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		(particularly from the waste reception hall) – may cause odour to be detected at nearby sensitive receptors.	plan and schedule will be incorporated into any existing maintenance programme.	Competent Person to ensure doors are repaired as quickly as possible. Until repairs are completed, Competent Person to ensure doors remain open for the shortest time possible. The reason for failure will be investigated (in association with supplier / contractor if required) and maintenance plan revised if required.
Personnel access doors on the outside fabric of the building	Doors/openings accidentally or deliberately left open	Potential for fugitive odorous emissions from open doors (particularly the waste reception hall) – may cause odour to be detected at nearby sensitive receptors.	A closed door policy to ensure building containment is not compromised	Clear and conspicuous signs will be pinned on all outside doors (inside and out). After entering or exiting the building, it will be the responsibility of all staff / visitors to ensure doors are closed behind themselves (inc. openings).
Feedstock shredder	Mechanical / electrical breakdown of the shredder	Material ready for composting will not have a uniform porosity, leading to an increase in the required composting time and increased potential for odour generation. This may affect the biofilter's ability to treat the tunnel air and will have a knock-on effect on downstream processes.	The Shredder will be covered by a maintenance plan from the supplier or other contractor. A routine maintenance plan and schedule will be incorporated into any existing maintenance programme.	Competent Person will call supplier / contractor of the breakdown cover at the earliest opportunity. The process downstream of the shredder will continue to operate normally. Competent Person to ensure non-shredded feedstock will not be loaded into tunnels until shredder is repaired. Depending on how quickly the shredder can be repaired, the Competent Person will decide if it is necessary to redirect delivery vehicles already on the facility (not having discharged their loads) and incoming vehicles to other licensed biowaste facilities. If required, waste suppliers will be contacted at the earliest opportunity and the situation explained – temporary redirection of delivery vehicles to other biowaste facilities might be required. The reason for failure will be investigated (in association with supplier / contractor) and maintenance plan revised if necessary.
Composting tunnels	Malfunction of valves, water sprinkler systems or parameter sensors (O_2 , temperature, pressure etc.) and O_2 air distribution of the tunnel spigot floor.	Optimum composting conditions cannot be maintained – anaerobic conditions may develop during the two active treatment phases, leading to an increase in the required composting time and releases of inherently odorous volatile by-products. This may affect the biofilter's	Routine maintenance plans and schedules for tunnel doors, fans, sprinkler system and sensors. Spares kept. Major equipment failure will be as appropriate, covered by a maintenance plan from the supplier or other contractor. Spares parts will be stored at the facility for repairs by Veolia staff. Tunnel test sheet to be filled in prior to filling of the tunnel.	Competent Person to ensure the maintenance plan and schedule are followed and details of what has been checked and any findings are recorded. Competent Person to ensure simple repairs are carried out as quickly as possible. For major breakdowns, Competent Person will call as appropriate the supplier / contractor at the earliest opportunity. Composting material should be taken out of the tunnel and be filled in another tunnel in order to get away from the anaerobic conditions and malfunctions of the composting process. Depending on the severity of the

Identify the release point(s) and areas	Identify possible abnormal operation or failure that would lead to an odour event	What are the consequences of such an abnormal situation or failure	What measures should be in place to prevent or reduce the abnormal situation or failure	What actions are should be taken and who will be responsible
		ability to treat the tunnel air and will have a knock-on effect on the downstream processes		malfunction and how quickly it can be rectified, the Competent Person will make the following assessments: (1) whether the facility should continue to process untreated waste or whether that waste should be transferred to another licensed biowaste facility. (2) whether delivery vehicles already on the facility (not having discharged their loads) and incoming vehicles should be redirected to other licensed biowaste facilities. Reason for failure will be investigated (in association with supplier/contractor if called) and maintenance plan revised if required.
	Computer control system failure / malfunction	Optimum composting conditions cannot be maintained. Anaerobic conditions may develop during the two active treatment phases, leading to an increase in the required composting time and releases of inherently odorous volatile by-products. This may affect the biofilter's ability to treat the tunnel air and will have a knock-on effect on the downstream processes	Visualisation system in place for easy identification of system software problems. Manual operations override possible. Modem link for software troubleshooting	Automated system to be continuously monitored by the Competent Person through the visualisation interface. Should problems develop with the system software, switch to manual operation to control tunnel conditions. Software support will be sought from the supplier via a modem link to rectify the problem as quickly as possible.
Biofilter Exhaust	Biofilter's odour destruction efficiency reduced	Exceedance of the permitted Emission Limit Value (ELV) has the potential to lead to annoyance at the sensitive receptor	Biofilter crisis procedure Biofilter maintenance plan and schedule (see Section 12). Method for biofilter efficiency testing (see Section 10). Method to assess off-site odours (see Section 7). Weather station and wind sock to be installed for wind speed and direction. Humidifier / scrubber to be maintained on a regular basis. Daily control of the pressures and temperatures prior to the biofilter. Senior member of staff who can liaise with all stakeholders (regulators, community representatives, immediate neighbours etc.).	Competent Person to ensure the maintenance plan and schedule are followed and details of what has been checked and any findings are recorded. If biofilter is suspected to be operating with reduced performance, Competent Person to decide which of the following actions if any should be carried out: (1) Competent Person to organise olfactometry testing (or surrogate) to determine the biofilter's destruction efficiency and to quantify the residual odours to atmosphere. (2) Competent Person to walk around the perimeter of the facility and carry out sniff testing according to implemented protocol. If odour detected, review weather station data and conduct testing at appropriate sensitive receptor. (3) If complaints expected, nominated staff member to be reactive and contact regulator, community group representatives etc. to offer explanation about the odour event and provide an action

Identify the release point(s) and areas	Identify possible abnormal operation or failure that would lead to an odour event	What are the consequences of such an abnormal situation or failure	What measures should be in place to prevent or reduce the abnormal situation or failure	What actions are should be taken and who will be responsible
				plan (4) Review of maintenance plan and schedule by Competent Person and revise if required. Reason(s) for reduced performance investigated (with help from manufacturer if required) and problem rectified. Follow-up efficiency testing carried out if required.
Biofilter fans	Mechanical / electrical breakdown of biofilter fans	Tunnel and building air will not be extracted through the biofilter, leading to fugitive emissions of untreated air - potential to lead to odour annoyance at the sensitive receptor. Potential for the collapse of the microbial population of the biofilter substrate – control of temperature, humidity and feedstock cannot be controlled, leading to subsequent treatment issues once fans are operational again.	Routine maintenance plans and schedules for biofilter and all building extraction fans. Spares parts will be stored at the facility for repairs as appropriate. Major repairs will be sub contracted to specialist contractors.	Competent Person to ensure the maintenance plan and schedule are followed and details of what has been checked and any findings are recorded. Until the fans are repaired, Competent Person should ensure that: (1) No reception hall feedstock is shredded or and loaded into the composting tunnels. (2) All external doors to the facility are kept closed. (3) Delivery vehicles already on the facility (not having discharged their loads) and incoming vehicles should be redirected to other licensed biowaste facilities – agreements having previously been setup. (4) The facility perimeter is regularly walked and sniff testing is carried out according to implemented protocol. If odour detected, review weather station data and conduct testing at appropriate sensitive receptor. (5) Nominated staff member to be proactive and contact regulator, community group representatives etc. to inform them of the general situation including the results of any odour assessments. Competent Person to ensure simple repairs are carried out as quickly as possible. For major breakdowns, Competent Person will call supplier/contractor of the breakdown cover at the earliest opportunity. Reason for breakdown will be investigated (in association with supplier / contractor if called) and maintenance plan revised if required.
Extraction fans	Mechanical / electrical breakdown building general extraction fans	Building air will not be extracted through the biofilter, leading to fugitive emissions of untreated air - potential to lead to odour annoyance at the sensitive receptor	Routine maintenance plans and schedules for biofilter and all building extraction fans. Spares parts will be stored at the facility for repairs as appropriate. Major repairs will be sub contracted to specialist contractor.	Competent Person to ensure the maintenance plan and schedule are followed and details of what has been checked and any findings are recorded. Competent Person to ensure simple repairs are carried out as quickly as possible. For major breakdowns, Competent Person will call supplier/contractor at the earliest opportunity. Depending on how many fans are malfunctioning, the Competent Person will make the following assessments: (1) Whether the facility should continue to process untreated waste or whether that waste should be transferred to another licensed biowaste facility. (2) Whether delivery vehicles

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				already on the facility (not having discharged their loads) and incoming vehicles should be redirected to other licensed biowaste facilities – agreements having previously been setup. Reason for failure will be investigated (in association with supplier/contractor if called) and maintenance plan revised if required.
Biofilter Exhaust, doors and openings throughout the building	Mechanical / electrical breakdown of forced aeration fans – composting tunnels and windrows in maturation hall	Exceedance of the permitted Emission Limit Value (ELV) has the potential to cause annoyance at the sensitive receptor	Routine maintenance plans and schedules for all forced aeration fans. Spares parts will be stored at the facility for repairs as appropriate. Major repairs will be sub contracted to specialist contractor.	Competent Person to ensure the maintenance plan and schedule are followed and details of what has been checked and any findings are recorded. Competent Person to ensure simple repairs are carried out as quickly as possible. For major breakdowns, Competent Person will call supplier / contractor at the earliest opportunity. Composting material to remain in the affected tunnels and doors kept closed as long as possible to maintain tunnel conditions. Depending on the severity of the malfunction and how quickly it can be rectified, the Competent Person should consider the following: (1) Whether partly composted material from the sanitisation / stabilisation phases) can be moved to neighbouring tunnels / windrow piles (2) Whether the facility should continue to process untreated waste or whether that waste should be transferred to another permitted biowaste facility. (3) Whether delivery vehicles already on the facility (not having discharged their loads) and incoming vehicles should be redirected to other permitted sites. (4) Whether the frequency of windrow pile turning should be increased in the maturation hall. Reason for breakdown will be investigated (in association with supplier/contractor if called) and maintenance plan revised if required.
Biofilter Exhaust	Mechanical breakdown of humidifier	Drying out of biofilter substrate with subsequent loss of odour destruction efficiency. Poisoning of biofilter (NH_3) microbial populations with subsequent loss of odour destruction efficiency.	Routine maintenance plans and schedules for all forced aeration fans. Spares parts will be stored at the facility for repairs as appropriate. Major repairs will be sub contracted to specialist contractor.	Competent Person to ensure the maintenance plan and schedule are followed and details of what has been checked and any findings are recorded. Competent Person to ensure simple repairs are carried out as quickly as possible. For major breakdowns, Competent Person will call supplier / contractor at the earliest opportunity. Until the humidifier / scrubber is repaired, Competent Person should ensure that: (1) The biofilter substrate is kept moist by manual watering and humidity levels are regularly monitored. (2) NH_3 concentrations are regularly monitored

Identify the release point(s) and areas	Identify possible abnormal operation or failure that would lead to an odour event	What are the consequences of such an abnormal situation or failure	What measures should be in place to prevent or reduce the abnormal situation or failure	What actions are should be taken and who will be responsible
				pre and post biofilter. If NH_3 concentrations begin to rise, the Competent Person should ensure that the production in the composting tunnels is controlled and extraction tunnel air through the biofilter is reduced. Depending on the severity of the malfunction and how quickly it can be rectified, the Competent Person should consider the following: (3) Whether the facility should continue to process untreated waste or whether that waste should be transferred to another permitted biowaste facility. (4) Whether delivery vehicles already on the facility (not having discharged their loads) and incoming vehicles should be redirected to other permitted biowaste facilities. Reason for breakdown will be investigated (in association with supplier/contractor if called) and maintenance plan revised if required.
Main leachate pit and drainage system	Mechanical breakdown of aeration pump	Reduced availability of oxygen may lead to septicty problems in stored leachate – leading to the fugitive release of highly odorous volatile compounds from the open drainage channels. This may affect the biofilter's ability to treat the building space air and will have a knock-on effect on downstream processes.	Routine maintenance plans and schedules for aeration fans. Spares parts will be stored at the facility for repairs as appropriate. Major repairs will be sub contracted to specialist contractor.	Competent Person to ensure leachate and sludge is pumped to an enclosed vessel for temporary storage before tankering away as soon as possible. Competent Person to ensure that fugitive odours are minimised after access to the main pit. Competent Person to ensure simple repairs are carried out as quickly as possible. For major breakdowns, Competent Person will call supplier/contractor at the earliest opportunity. Reason for breakdown will be investigated (in association with supplier/contractor if called) and maintenance plan revised if required.
Biofilter Exhausts	Reduced efflux velocity caused by blockage increased back pressure in the biofilter substrate.	Poor dispersion of residual biofilter odours, leading potentially to odour annoyance at the sensitive receptor	Routine maintenance plans and schedules for biofilter.	Competent Person to ensure the maintenance plan and schedule are followed and details of what has been checked and any findings are recorded. Competent Person to ensure operators respond to information / alarms on the visualisation software interface before loss of buoyancy is experienced post biofilter. If system detects sudden increase in back pressure across the biofilter, Competent person to ensure the cause is investigated and the problem rectified as soon as possible – revised maintenance schedule if required.
Biofilter Exhausts	Unusual weather conditions at the facility such as extreme	Poor dispersion of residual biofilter odours, leading	Daily meteorological information/forecasts received from the Met. Office.	Competent Person to ensure meteorological information / forecast is reviewed daily. Should information / forecast

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	atmospheric temperature inversions or extreme wind turbulence etc	potentially to odour annoyance at the sensitive receptor		indicate potential poor dispersion, Competent Person to walk the facility perimeter and sniff testing is carried out according to implemented protocol. If odour detected, review weather station data and conduct sniff testing at appropriate sensitive receptors. Avoid so far is practicable any non-essential odorous activities upwind of sensitive receptors. Nominated staff member to be proactive and contact regulator, community group representatives etc. to inform them of the general situation including the results of any odour assessments.

7. Odour reporting

7.1. Complaints reporting

All feedback including complaints and non-conformances are recorded and reviewed with corrective and preventive actions put in place in accordance with Complaints and Non-Conformance Reporting procedures.

The management of complaints is controlled by the Veolia Management System 'VMS'. Managers shall ensure that all complaints have been investigated, adequately handled and that any measures necessary to prevent a recurrence have been put in place.

Complaint recording

The recommended minimum level of detail that needs to be collected when an odour potentially linked to on site activities is reported is as follows:

- the time and date when the offensive odour was observed;
- the location (within approx. 100 m) where the offensive odour was observed, e.g. postal address, grid reference)
- the sensitivity of the location;
- a description of odour including a subjective all factors necessary to make an assessment of the impact, including intensity, character (preferably on the basis of a choice from standardised descriptors given in Environment Agency (England) Technical Guidance Note H4), offensiveness, frequency and duration;
- the identity and address of the reporter, if provided / consented, in order to understand the spread of complaints and the number of individuals impacted;
- any other information the reporter can offer on activities at the alleged odour source

It is also necessary to collect (by observation or further investigation) the following additional information to allow subsequent analysis and collation of complaints:

- wind direction and speed, and atmospheric stability class at the time of complaint; and
- any process incidents at the time of complaint.

Complaints are recorded on the standard AVA complaint form. This should then be recorded on AVA as an attachment to the AVA complaint entry.

7.2. Investigation of Odour Complaints

The aim of the investigative actions will be to establish:

- the source of the odour complaint; and
- the impact of the odour
- appropriate measures / actions required to prevent pollution if required

Complaint screening

The object of the initial screening is to quickly identify those odour complaints that are unlikely to be due to the facility.

Initial screening should consider the following:

- knowledge of potential sources on the facility (timing of the report cross referenced with work activities in progress, any plant problems, etc);
- knowledge of other potential sources in the locality other than the facility;
- wind direction at the time of the alleged odour episode relative to the location of the facility and the reporter;
- distance of the reporter from site; and
- concurrent odour monitoring data where available

VES will liaise with local stakeholders (including the complainant) and inform them on the outcome of the screening assessment of the complaint and whether or not any action is to be taken.

Further investigation / substantiation

If the initial screening does not discount the facility as a potential source of the odour reported further investigation will be carried out using:

- on and off-site odour monitoring techniques (sniff testing), using the 'Odour report form' included with this document.
- a review of activities being carried out on site using the inventory of odorous emissions to ensure a systematic, risk based review of potential emission sources
- records about process conditions, observations or inspections at the time of report

Note that on and off site odour monitoring is not appropriate where reports are made retrospectively but records can still be reviewed.

Where the odour is substantiated, VES will carry out a root cause analysis to identify the conditions which are leading to unacceptable odour emissions from the Facility and review containment and control measures as appropriate.

Multiple Complaints

Where multiple complaints are received during the same time period i.e. during a single working day. The site manager will instigate investigation on site including a review of all current operations taking place with particular note to the storage or movement of material within the odorous inventory, sniff testing at the key monitoring points and direct engagement with the complainants and NRW. If the source of odour can be located the operation will adapt i.e. use of odour units, damping, removal of waste for onward disposal.

Reporting systems for the business are laid out in the following two documents -

- SYS/2/007 - Complaints and Non Conformance Reporting
- SYS/2/037 - Event Reporting and Notification

7.3. Community engagement

Communicating with Natural Resources Wales

In the event a report of odour is received from a member of the public the local Natural Resources Wales officer / team will be informed by telephone or email and a 'Notification of Abnormal Emissions' form will be submitted if the report is substantiated.

Communicating with complainants

In the case of answerphone messages a return call will be made as soon as possible and within 48 hours. In the case of complaints submitted by email or by letter, a written response will be made within 15 working days of submission of the complaint for complaints made by members of the public, or 5 working days for complaints made by an MP or Councillor.

In the case of further investigations, VES will communicate to the complainant the course of actions likely to be taken so as to ensure that there is transparency and also to establish at the outset clear targets and goals for determining the success of any control measures.

The level of annoyance associated with odours can often be reduced if affected individuals are provided with information about what they are smelling, the process that generates the odours, any factors affecting dispersion, what health impacts might be associated with the odour, what efforts are being undertaken to control odours and what is being done in response to their complaint. These actions can help affected individuals to moderate their own emotions of powerlessness and fear which may be exacerbated by odour. Liaison with the local community, offering credible reassurance and taking complaints seriously are often effective means of mitigating odour nuisance. To put this into practice, VES will aim to communicate the following message:

- The reason for the odour;
- The likely duration of the odour
- What plan is in place to end the odour episode
- What preventative plan will be implemented to prevent a re-occurrence
- What grievance procedure the aggrieved party can take
- Who is the responsible person on site to contact

Members of the public are able to contact VES directly with any odour complaints about the Facility. Methods of contacting VES will be displayed at the site, shown on the company website and communicated through meetings, press releases, bulletins and other forms of advertisement in connection with the operation of the Facility.

Monthly site reviews are in place reviewing all aspects of site performance including performance against objectives, site improvement plan, customer feedback (Customer Feedback Procedure) and site actions.

Quarterly reviews with General Managers are in place. Reviews include objectives, customer feedback, site improvement plan, review of actions and performance (Management Review).

7.4. Pro-active odour monitoring

Veolia will dynamically monitor emissions at their source (i.e. on site) to minimise the likelihood of odour nuisance at sensitive receptors. This monitoring will consist of inspection of feedstock, process, buildings and equipment to check that emissions are being contained and controlled in accordance with the measures identified in this document.

Routine pro-active off site odour monitoring will be carried out as part of the site daily checks.

7.5. Reactive odour monitoring

Given the pre-acceptance controls in place and the short residence time the potential for unacceptable odour emissions off site is considered to be low. Veolia will therefore undertake sniff testing dynamically based on the following criteria:

- Observation by trained staff that odour pollution is or may be occurring
- Receipt of waste which is deemed to be borderline malodorous and has triggered a decision to reject the vehicle / load
- Receipt of waste which is deemed to be malodorous but a decision is made that offsite impact could be avoided or minimised by prioritising this material for processing
- Any abnormal operation where there is considered to be a risk of odour pollution
- If notified a complaint is received externally
- If instructed to undertake an off site check by NRW

Ensuring staff are trained to undertake sniff testing in this manner ensures that the reasons for making a decision to carry out monitoring are well understood.

7.6. On site and off site monitoring

The sensory field odour ("sniff test") assessments will be carried out based on Natural Resources Wales Sniff Test protocol in H4 guidance using the 'Odour report form' included in this document. The person carrying out the sniff test will be rotated on a regular basis to ensure reliability; where possible staff members who have been working within the RDF facility for an extended period will not conduct odour monitoring to avoid the desensitising effect caused by prolonged exposure (note this may not always be logistically possible. Where possible testing will be undertaken by non-operational staff and management

8. Odour report form

Odour report form			**Date:**	
Person carrying out test:			**Role:**	
IMPORTANT: START ALL ODOUR ASSESSMENTS UPWIND OF THE SOURCE (WHERE ACCESS IS POSSIBLE). RECORD ALL ODOURS INCLUDING OFF SITE SOURCES.				
Reason for test (see section on proactive and reactive monitoring)				
Time of test				
Location of test Use ref in tab 6.1				
Weather conditions (dry, rain, fog, snow, etc				
Temperature (very warm, warm, mild, cold, or degrees if known)				
Wind strength (none, light, steady, strong, gusting)				
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				

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

9. Biofilter Inspection Checklist

Inspection/test	Acceptance criterion	Pass/Fail
	Daily Checks	
Humidifier / scrubber	Back-pressure (should be <500Pa and roughly equal to bio-filter back-pressure)	
	Visually check the operating of the pumps and spray nozzles	
	Check pumps for cavitation	
	Water levels ok?	
Sensors	Tunnel temperature sensors showing expected value on scada?	
	Oxygen transmitter ok? Check transmitter corresponds with the value on pc	
	Wireless probes ok? Check transmitter corresponds with the value on pc	
Bio-filter	Temperature (30 - 40°C)	
	Back-pressure (<500Pa)	
	Weekly Checks	
Humidifier	Check water pressure either side of humidifier	
	Check water filter and high/low sensors and clean if it is dirty	
Watering system	Rotation sieve (clean collecting reservoir/check over flow/drum cleaning)	
	Water filters (check pressure either side & clean if below 2.4bar on outflow)	
	Tunnel spray system (check spray pattern and nozzel blockage)	
	Maturation spray system	
Compressor	Compressor (Drain and check pressure)	
Ductwork	Pressure transmitters (check hose connection and for any sign of blockage)	
Bio-filter	Biofilter water sprinklers	
Leachate	Ammonia concentration in leachate tank (<100mg/l)	
	Monthly Checks	
Bio-filter	Ammonia concentration before humidifier/scrubber	
	Ammonia concentration after humidifier/scrubber (<20ppm)	
	Ammonia concentration inside bio-filters or at stack (<5ppm)	
	Sample bio-filter media in several locations for moisture content (60-75%)	
	Sample bio-filter media in several locations for pH (6.5 - 7)	
	Sample humidifier water for pH (6.5 - 7)	
	Check temperature in several locations (should be consistent)	
	Uniform media	
	Uniform airflow	
	pH of biofilter	
	H_2S before biofilter	
	H_2S at stack	
	Checked walls around (cracks, leaks)	
Name	**Signature**	**Date & Time**

10. Ammonia Level Checklist

Date_____

Area	Date - Signed	Level	Action
Reception Hall			
Processing Hall			

11. Biofilter Crisis Procedure

Site specific work instruction on the biofilter crisis procedure based on the findings

Is ammonia going into biofilter within the limits (<20ppm)?

- Check C:N ratio is a minimum of 25 as any surplus N will be converted into ammonia
- Check temperature of tunnels is not too high as high temperatures increase ammonia volatilisation
- Check ammonia in leachate is not too high (max. 200mg/l)
- Check methane levels to ensure tunnels are aerobic. Anaerobic conditions will increase ammonia generation.

Is hydrogen sulphide going into the bio-filter within the limits (0ppm)?

- Check methane levels to ensure tunnels are aerobic. Anaerobic conditions will increase hydrogen sulphide generation.

Is the temperature within the limits?

Too Low

- Check the inlet air temperature, may need to heat tunnels using SCADA set points, prolong hygienisation phase
- Check the humidifier, if broken add more water from sprinklers to biofilter
- Check the sprinkler system to the biofilter, if broken, replace with spare sprinklers
- Check the biofilter water pumps, if broken contact Northsound to replace within 24hours

Too High

- Make sure the cooling valve is fully open at all times
- Check the inlet air temperature, may need to cool tunnels using SCADA set points, reduce composting phase temperatures (not hygienisation phase)
- Check the humidifier, if broken add more water from sprinklers to biofilter
- Check the sprinkler system to the biofilter, if broken, replace with spare sprinklers
- Check the biofilter water pumps, if broken contact Northsouth to replace within 24hours

Is there sufficient moisture?

- Should be around 60 - 75% moisture
- Check the humidifier, if broken add more water from sprinklers to biofilter
- Check the sprinkler system to the biofilter, if broken, replace with spare sprinklers
- Check the biofilter water pumps, if broken contact Northsound to replace within 24hours

Is the pH within the correct limits?

- Use pH sticks to check for the pH, should be between 6.5-7
- Contact Odournet or ADAS

Airflow

- Is the medium uniformly distributed, move with shovel
- Is the airflow moving through the entire medium, check the residence time, should be 45 seconds, use hand to measure on random areas or watch the steam move, if cannot tell use a smoke bomb, if significant preferential pathways, redistribute medium
- May need to top up periodically with fresh media if settling has occurred. Monitor the amount of settlement with markings on wall etc.

Replacement

- After 4 years the medium may need replacing, if all other changes do not help performance