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Odour Management Plan (OMP) [Biosolid liming]

v1.0

Environmental and sustainability solutions provided to

Enva Scotland Ltd



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REVISION LOG

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1.0 ODOUR BACKGROUND

The Environment Agency has a duty to regulate odour from certain industrial processes and waste sites. This is to protect and improve public health and wellbeing.

The British Standard EN 13725:2022 defines odour as a:

'sensation perceived by means of the olfactory organ in sniffing certain volatile substances.'

The standard also defines an odorant as a:

'substance which, when volatilised in neutral gas, has the potential to stimulate the human olfactory system so that an odour is perceived'

The Environmental Permitting (England and Wales) Regulations 2016 define pollution as:

any emission as a result of human activity which may:

- (a) be harmful to human health or the quality of the environment,*
- (b) cause offence to a human sense,*
- (c) result in damage to material property, or*
- (d) impair or interfere with amenities or other legitimate uses of the environment*

The Environment Agency will treat odorous emissions in the same way as any other polluting emission.

'If odour pollution is happening and you are not taking appropriate measures, you may be breaching your permit condition, which is a criminal offence.'

1.1 Site details

The site, operated by Enva Scotland Ltd (hereon referred to as 'Enva'), is a biosolids liming facility located in a rural area of County Durham and is currently seeking a Bespoke Environmental Permit for a sludge liming operation outside of a wastewater treatment facility.

1.2 Location

Enva Scotland Ltd Biosolids Liming Facility,
West Shaw Farm
Barnard Castle
County Durham
DL12 8UT

1.3 Site grid reference

NZ 08300 16981

1.4 OMP availability

This OMP will be made available to:

- All staff
- Site visitors (incl. Regulators)
- Contractors working at the site

2.0 INTRODUCTION

Biosolids is the term used to describe sewage sludge that has been through an approved and monitored treatment process allowing it to be recycled to agricultural land. Non-compliant biosolids is the term used to describe sewage sludge that has failed to meet those strict parameters. Lime stabilisation, addition of lime to raise pH above 11.5 for at least 2 hours, is recognised as an example of effective sludge treatment processes.

2.1 Site overview

Following a series of process breakdowns at various wastewater treatment facilities, several utility companies have contracted Enva, to recycle the non-compliant sewage sludge cake (biosolids) from these works during the breakdown periods. Enva intend treating non-compliant biosolids by lime stabilisation and then to apply the resultant treated sludge onto agricultural land under [The Sludge \(Use in Agriculture\) Regulations 1989](#).

It is the intention of Enva to use the location of this site as a hub site from which the compliant lime treated biosolids will be transported to various farmland in the surrounding area for spreading.

The biosolids liming site undertakes the controlled treatment of dewatered sewage sludge (biosolids) by the addition of alkaline materials (typically quicklime or hydrated lime) to achieve stabilisation, sanitisation, and odour control prior to beneficial use or recovery. The primary objectives of the liming process are:

- Pathogen reduction through elevated pH and temperature.
- Odour suppression during storage, handling, and onward use.
- Improvement of material handling characteristics and stability.

Production of a treated biosolids material suitable for recovery, typically land application in accordance with regulatory controls.

The operation constitutes a waste treatment activity under environmental permitting legislation, with the limed biosolids remaining waste until deployed under an appropriate recovery route.

2.2 Site location

The site is located within the farmland of West Shaws Farm near Barnard Castle in County Durham. The site is remote from neighbours (nearest neighbours being a farm steading, southeast of the site at 560m, and Humbleton, north-west of the site at 970m from the site).

2.3 Site description

The processing site itself will take place on an existing, fully refurbished, concrete slab. The slab is surrounded on three sides by a concrete lego block bund to form an enclosure, with heights ranging from 2- 3m.

2.4 Site layout and infrastructure

The site is configured to ensure segregation of activities, containment of materials, and protection of sensitive receptors. The site drainage system is in the form of falls to the rear of the slab, where any run-off will be absorbed back into the cake or retained in the gully to the rear of the slab. The concrete surface will be cleaned regularly with any water removed through the use of tankers or slurry spreading equipment.

Key infrastructure elements include:

- Designated reception area for incoming biosolids constructed of impermeable surfacing with sealed drainage.
- Liming/mixing area designed to reduce fugitive emissions.
- Treated biosolids storage area, sized to accommodate operational throughput and contingency storage, with measures to prevent runoff and leachate generation.
- Surface water and foul drainage systems, designed to segregate clean and contaminated waters and prevent uncontrolled discharges.
- All operational surfaces are maintained in good condition and inspected routinely to ensure integrity and containment.

2.5 Material description

Please see the *EPR-OP01 Waste Acceptance Procedure* and Table 2-1: Accepted waste streams below for waste streams to be accepted on to site. The material will be sourced from various wastewater treatment plants.

Table 2-1: Accepted waste streams

EWC	Description
19	WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTEWATER TREATMENT PLANTS AND PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION/INDUSTRIAL USE
19 02	wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)
19 02 06	wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)
19 06	wastes from anaerobic treatment of waste
19 06 06	digestate from anaerobic treatment of animal and vegetable (sewage sludge only)
19 08	wastes from waste water treatment plants not otherwise specified
19 08 01	screenings
19 08 05	sludges from treatment of urban waste water
19 08 09	grease and oil mixture from oil/water separation containing only edible oil and fats
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
19 12 12	Wastes from mechanical treatment of wastes other than those mentioned in 19 12 11 (sewage sludge only)
20	municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions
20 03	other municipal wastes
20 03 06	waste from sewage cleaning

2.6 Odour potential (i.e. very odorous)

Biosolids by their nature are an odorous substance. Similarly, the lime stabilisation process can also be considered odorous in nature. However the nature of the odour is temporary and can be managed through careful consideration of factors such as wind

direction, wind speed, general climatic weather conditions and general good housekeeping.

2.7 Odour profile (i.e.: how it changes with time)

The odour profile of the material is at its maximum when the load arrives on site and is tipped out for treatment. Thereafter the odour dissipates rapidly over time and reaches its minimum when left untouched or not moved. There will be an increase when the material is treated prior to be stored or moved again after storage, but this will be less severe than the original delivery odour.

2.8 Consistency and properties of material

As noted above, the reduction in odour over time is linked to the external crusting of the material in the air. This essentially locks in the odour or reduces it to a level that is unlikely to cause nuisance. Crusting normally starts as soon as the material is tipped and odour reduces dramatically over the first few hours. After 24 hours, the crust may be fully formed and odour potential at its minimum.

2.9 Waste types accepted

The site accepts only pre-approved biosolids streams, typically:

- Dewatered sewage sludge from wastewater treatment works.
- Sludges that have been characterised in accordance with WM3 and meet defined acceptance criteria.
- Each waste stream is subject to a documented waste acceptance procedure, including review of source, treatment history, chemical characteristics, and any contaminants of concern. Non-conforming or unauthorised wastes are rejected.

2.10 Liming process description

The liming process involves the controlled addition of alkaline reagent to biosolids using mechanical dosing and mixing equipment. The process typically comprises:

- Reception and verification of incoming biosolids.

- Metered addition of lime, based on sludge dry solids content and process requirements.
- Mechanical mixing to ensure homogeneous distribution of lime throughout the sludge matrix.
- Reaction phase, during which pH is elevated and temperature increases due to exothermic reactions.
- Verification monitoring, confirming achievement of target pH and residence time.
- Process control parameters (lime addition rate, mixing time, pH) are defined within the OMP and supported by operational records.

2.11 Process control and monitoring

Effective control of the liming process is achieved through:

- Routine measurement and recording of treated biosolids pH.
- The site-specific HACCP as required by the Biosolids Assurance Scheme.
- Visual inspection of mixing quality and material consistency.
- Calibration and maintenance of dosing and monitoring equipment.
- Process control is maintained through the adherence to the control measures set out in the site's HACCP.
- All monitoring results are recorded and retained to demonstrate compliance with permit conditions and operational standards.

2.12 Environmental risk controls

Odour management

Odour is controlled through rapid stabilisation of biosolids via liming, minimisation of open handling, and prompt transfer to storage or onward use. Activities are managed to avoid prolonged exposure of untreated material.

Dust and emissions

Dust from lime handling is controlled through enclosed delivery systems and appropriate personal protective equipment (PPE). The site layout minimises wind exposure and fugitive emissions.

Leachate and runoff

The process is designed to minimise free liquids. Any liquids generated are contained within impermeable areas and managed in accordance with site drainage controls.

Noise and visual impact

Plant and equipment are maintained to reduce noise emissions, with operational hours and activity locations selected to minimise off-site impacts.

Storage and material handling

Treated biosolids are stored only within designated areas and for durations consistent with operational need. Storage arrangements ensure:

- Continued containment and stability of material.
- Maintenance of alkaline conditions.
- Prevention of cross-contamination with untreated wastes.
- Stock rotation and capacity limits are defined within the OMP.

Product quality and compliance

Limed biosolids are assessed to confirm that treatment objectives have been met prior to recovery. Where material is destined for agricultural use, deployment is controlled under:

- The Sludge (Use in Agriculture) Regulations.
- Relevant landspreading permits or exemptions.
- Nutrient management planning and soil protection requirements.
- The operator maintains records demonstrating that treated biosolids are suitable for their intended recovery route.

Management systems and competence

The site operates under a documented management system that includes:

- Defined roles and responsibilities for site staff.
- Training in waste handling, liming operations, and environmental protection.
- Procedures for normal operations, maintenance, and abnormal events.
- Competence is maintained through refresher training and supervision.

Incident and contingency management

The OMP includes provisions for managing foreseeable incidents, such as:

- Equipment failure.
- Spillage of biosolids or lime.
- Non-conforming waste deliveries.
- Adverse weather conditions.

Contingency measures are designed to always maintain environmental protection and regulatory compliance.

Record keeping and review

Operational records include waste transfer documentation, monitoring data, maintenance logs, and incident reports. The OMP is reviewed periodically and updated to reflect changes in operations, regulation, or best practice.

2.13 Responsibility for the Odour Management Plan and training

Overall responsibility for the preparation, implementation, and ongoing effectiveness of this Odour Management Plan (OMP) rests with the Site Manager.

The Site Manager is responsible for:

- Ensuring the OMP is implemented in full during site operations.
- Ensuring that all site personnel involved in biosolids reception, liming, handling, storage, and dispatch are trained and competent to undertake their duties.
- Reviewing operational performance and initiating updates to the OMP where required.

Day-to-day compliance with the OMP is supported by the Site Supervisor, who is responsible for supervising operational activities and verifying that procedures are followed on site.

This allocation of responsibility satisfies the intent of Appropriate Measures (AM) 5.1–5.3 regarding defined management roles and competence.

2.14 Location and availability of the OMP

The OMP is:

- Held electronically within the operator's document management system; and
- Available in hard copy within the site office.

All operational staff have access to the OMP and are required to be familiar with the procedures relevant to their role. The document is made available to Environment Agency (EA) officers upon request during inspections or audits.

This arrangement aligns with AM 5.9 on document control and accessibility.

2.15 Review frequency of the OMP

The OMP is formally reviewed:

- At least annually; and
- Following any of the following triggers:
 - Material changes to the liming process or site layout.
 - Changes to permit conditions or regulatory guidance.
 - Identification of improvements following incidents, complaints, or compliance assessments.
 - Introduction of new waste streams or changes to waste acceptance criteria.

Reviews are recorded, and where amendments are required, the updated OMP is re-issued to site staff.

This satisfies AM 5.1.5 regarding periodic review and continuous improvement.

2.16 Training received by site staff

All staff involved in site operations have received training appropriate to their role, including:

- Waste acceptance and verification procedures for biosolids.
- Liming process principles, including:
- Safe handling of alkaline materials (lime).
- Process control parameters (including pH verification).
- Environmental protection measures, including odour, dust, and runoff control.
- Spill prevention and response procedures.
- Site-specific health, safety, and emergency arrangements.

Training is designed to ensure staff understand both the operational requirements and the environmental risks associated with biosolids liming.

This meets AM 5.3 on competence and training.

2.17 Training frequency and delivery

Training is delivered:

- As part of site induction for new staff.
- Through periodic refresher training, typically on an annual basis or more frequently where operational changes occur.
- Following any incident, non-conformance, or regulatory feedback where learning outcomes are identified.

Training is delivered by:

- The Site Manager or a suitably competent senior member of staff; and/or
- External training providers where specialist instruction is required (e.g. lime handling or health and safety).
- Training records are maintained and made available for inspection.

This approach reflects the proportional, risk-based expectations of AM 5.5.

2.18 Relevant sector guidance on which this OMP is based

In developing this OMP the following guidance documents, regulatory frameworks, and best practice references were consulted and applied:

Table 2-2: Odour guidance consulted

Guidance / Document	Source / Publisher	Publication date	Relevance to OMP
Odour management: comply with your environmental permit	Environment Agency	Dec 2025	Defines odour permit condition requirements and outlines how the EA assesses odour pollution and compliance. Describes the structure and essential content of an OMP, including odour risk assessment, odour source inventory, control measures, monitoring, and contingency planning. Explains “appropriate measures” and their proportionate application to odour control. Directly supports the odour risk assessment, appropriate measures selection, and monitoring and review sections of this OMP
OMP template (v2)	Environment Agency	May 2021	Provides a template for assessment by the EA.

Appropriate Measures for Waste Treatment and Transfer – Non-Hazardous and Inert Waste	Environment Agency	July 2017 (latest revision)	Provides the primary framework for the design, operation, and monitoring of waste treatment sites. AMs were specifically used to structure odour risk controls, staff competence requirements, storage, handling, and process monitoring.
Biological waste treatment: appropriate measures for permitted facilities	Environment Agency	November 2024 (latest revision)	Explains the standards (appropriate measures) that are relevant to permitted waste management facilities that handle organic waste, also known as biowaste. Sewage sludge means residual sludge from sewage plants treating domestic or urban waste waters. It also includes sewage sludge from other sewage plants treating waste waters that have a similar composition to domestic and urban waste waters.
Waste Management: The Duty of Care – A Code of Practice	Environment Agency	2016	Informs site procedures for waste acceptance, segregation, and minimisation of environmental impact, including odour management.
WM3: Waste Classification Technical Guidance	Environment Agency	2021	Used to confirm the status of incoming biosolids and ensure that limed sludge meets regulatory standards for stabilised waste.
Sludge (Use in Agriculture) Regulations 1989 (as amended)	UK Government	1989	Guidance on safe handling and treatment of biosolids for agricultural recovery, relevant for minimising odour and environmental impact.
Sewage sludge in agriculture: code of practice for England, Wales and Northern Ireland	Environment Agency	2018	The code shows the steps have been taken to follow the Sludge (Use in Agriculture) Regulations 1989 Great Britain. It helps understanding of how to: • follow good agricultural practice • look after the land so you can continue to farm it in the future • avoid public nuisance • avoid causing pollution • protect human, animal and plant health
Guidance on Managing Odour from Landspreading of Biosolids	Environment Agency	2004	Provided direct operational guidance on odour risk identification and mitigation measures, including site layout and timing considerations.
Health and Safety Executive (HSE) – Safe	HSE	2019	Informs staff training requirements, PPE, and handling practices for liming operations.

Handling of Lime and Alkaline Materials

Other relevant information

The OMP has been prepared using current and up-to-date guidance to ensure both compliance with regulatory requirements and adoption of proportionate risk-based measures.

Guidance selection was targeted toward non-hazardous biosolids treatment, odour mitigation, and operator competence, aligning with EA expectations for Appropriate Measures.

The OMP integrates these references into a site-specific framework, combining process design, operational control, staff training, and monitoring measures.

Where guidance documents have been superseded, the latest versions have been applied, and any material deviations have been justified in line with risk-based principles.

3.0 RECEPTORS

Identification and assessment of sensitive receptors is a fundamental component of effective odour risk management and forms a key part of the Source–Pathway–Receptor (SPR) model applied within this OMP. The purpose of this section is to identify who may be affected by odours arising from the site, to understand the potential pathways by which odour could travel beyond the site boundary, and to inform the selection of Appropriate Measures to prevent or minimise odour pollution.

Receptors are defined as people, property, or locations that may experience adverse effects as a result of odour emissions. These may include residential properties, commercial

premises, public buildings, outdoor recreational areas, workplaces, and other locations where people may reasonably be expected to be present for extended periods.

The identification of receptors has been undertaken with reference to:

- the nature of the activities carried out on site;
- the odour potential of materials handled and processes operated;
- the extent to which odorous activities are contained or otherwise controlled;
- prevailing and seasonal meteorological conditions;
- topography and local land use;
- the frequency and duration of site operations.

The distance of receptors from the site boundary has been considered as an indicative screening factor only. Distance alone does not determine odour risk; rather, risk is influenced by a combination of factors including:

- the effectiveness of odour prevention measures at source;
- whether activities are undertaken indoors or outdoors;
- the presence or absence of point source emissions (e.g. stacks);
- the duration, timing, and intensity of odour-generating activities;
- atmospheric dispersion conditions.

Accordingly, receptors located closer to the site boundary are not automatically considered to be at higher risk, nor are more distant receptors excluded from consideration where site characteristics or meteorological conditions could reasonably give rise to off-site odour effects.

Details of identified receptors are provided in Table 2.1, including receptor type, approximate distance and direction from the site boundary, and a qualitative sensitivity assessment. This information is supported by Figure 2.1, a scaled location plan showing the site boundary and the position of each receptor listed.

The receptor assessment presented in this section provides the basis for:

- the odour risk evaluation in Section 4;
- the selection of appropriate odour control measures and BAT in Section 5;

- the design of odour monitoring and complaint response procedures.

Through this structured approach, the Operator ensures that odour risks are assessed proportionately, managed effectively, and reviewed in the context of potential impacts on neighbouring receptors.

The sensitive receptors are based on the following distances from the site:

- landfill – 2km
- biowaste – 1.5km
- farming – 1km
- food – 1km
- waste treatment – 0.5km

Table 3-1: List of sensitive receptors

Receptor list	Land use	Direction	Distance to boundary	Sensitivity to odour
SR1	Residential / Agricultural	SE	470m	Low
SR2	Agricultural	SE	770m	Low

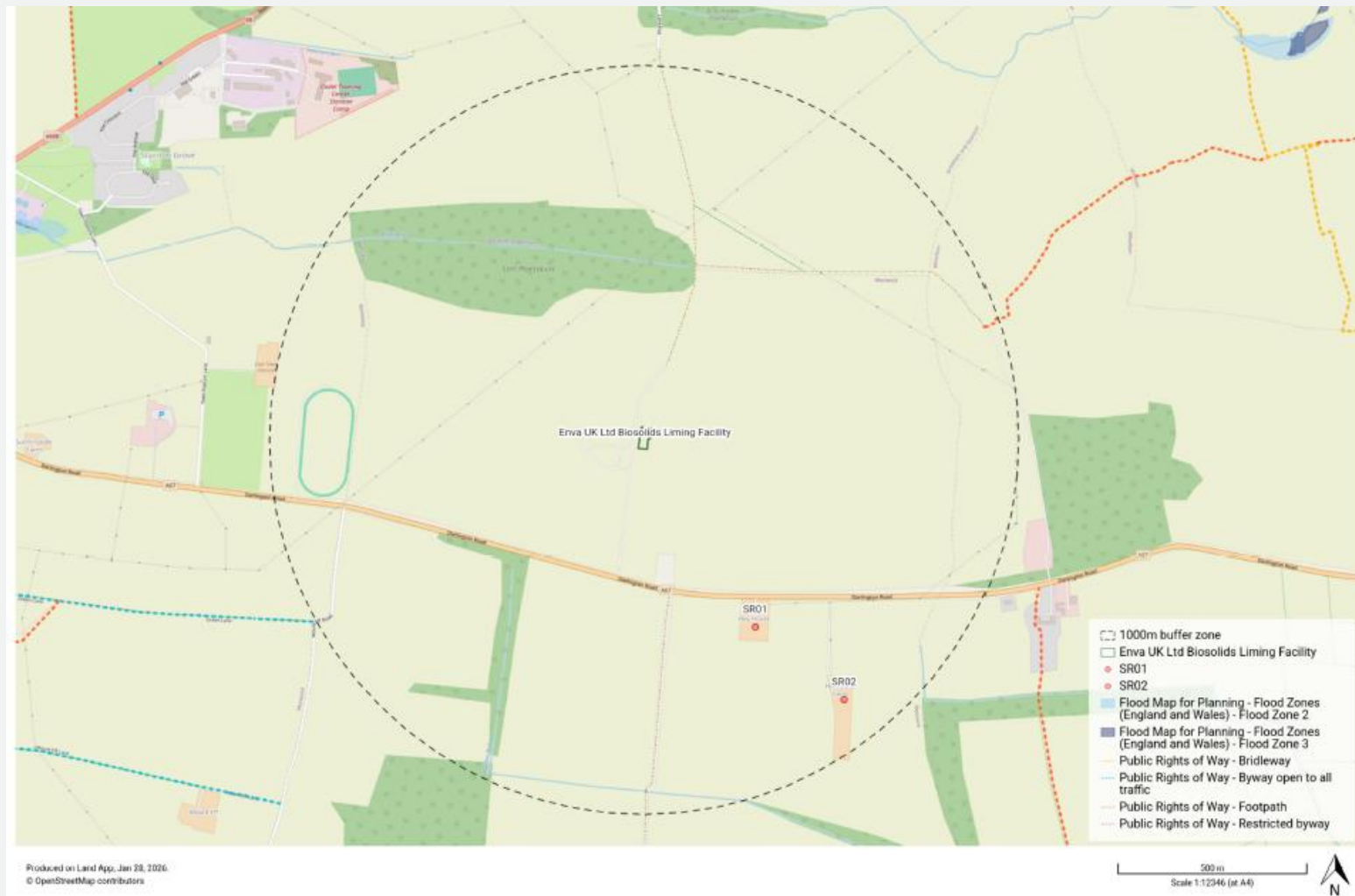


Figure 3-1: Sensitive receptor map

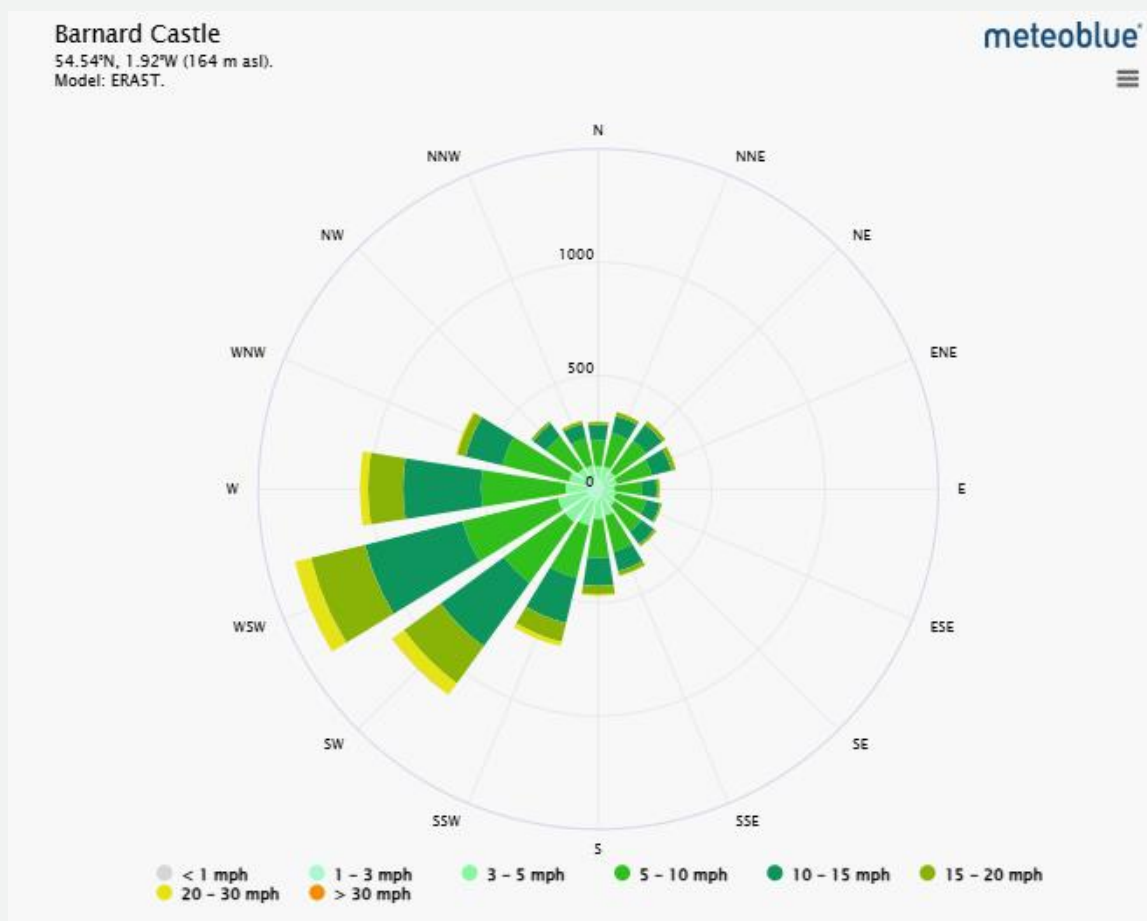


Figure 3-2: Wind direction data for the local area of Barnard Castle

4.0 SOURCES OF ODOUR AND SITE PROCESSES

The site undertakes the treatment of dewatered non-compliant biosolids through the controlled addition of alkaline reagents (typically quicklime or hydrated lime) to achieve stabilisation, sanitisation, and odour reduction prior to onward recovery. While the liming process itself is an effective odour mitigation measure, odour may arise from specific activities, materials, or operational conditions, particularly during the handling and reception of non-compliant biosolids.

This section identifies the potential sources of odour associated with site operations and provides an overview of the processes through which odour could be generated or released. It forms the foundation for a risk-based assessment of odour impacts and the implementation of proportionate control measures in accordance with EA guidance on odour management and the principles of AM 6.3.1-6.3 and 11.5 (biowaste).

4.1 Key considerations:

Incoming biosolids:

- Untreated biosolids received from wastewater treatment works may carry inherent odour due to biological activity, residual organic matter, and microbial decomposition.
- Potential odour generation is highest during transport, unloading, and temporary storage prior to treatment.

Reception and storage areas:

- Areas where biosolids are temporarily held prior to liming are a primary potential source of fugitive odours if material remains exposed or untreated for prolonged periods.
- Site design and operational controls aim to minimise exposure and odour dispersion.

Liming and mixing operations:

- The addition of alkaline material induces chemical reactions that raise pH and temperature, rapidly stabilising the biosolids and suppressing odour.
- Odour release during mixing is reduced when procedures, residence times, and mixing protocols are correctly applied.

Treated material storage:

- Once limed, biosolids are substantially stabilised, and odour potential is greatly reduced.
- Storage areas are designed to prevent dust or fugitive odours, in line with EA guidance on containment and appropriate measures.

External factors:

- Weather, wind direction, and ambient temperature may influence odour dispersion.
- Operational procedures take these factors into account when planning deliveries, unloading, and treatment activities.

The assessment of sources and processes presented in this section supports the proportionate selection of odour control measures, including procedural controls, staff training, containment infrastructure, and monitoring arrangements. It ensures that all reasonably foreseeable odour emissions are identified, managed, and minimised, consistent with the Environment Agency's expectation for risk-based, proportionate odour management.

4.2 Odorous materials entering and leaving site

Biosolids are delivered exclusively by road vehicles directly from Wastewater Treatment Works (WWTW). There is no use of rail or canal transport for this operation.

Biosolids delivery vehicles follow approved access routes to minimise exposure to sensitive receptors and reduce potential odour impacts during transit.

Deliveries are typically received up to daily, depending on production schedules at source wastewater treatment works and site storage capacity.

Delivery and collection schedules are planned to minimise prolonged storage of untreated biosolids and allow timely treatment via liming.

This ensures that odour risk from prolonged storage of untreated material is minimised, satisfying the proportionality principle under [Control and monitor emissions for your environmental permit - GOV.UK](#) guidance.

This arrangement is consistent with Appropriate Measures AM 2.4–3.2, and AM6 (biowaste), which emphasise controlled delivery and prevention of environmental impact from transport.

4.3 Container types for material delivery

Biosolids are delivered in dedicated, sealed 'cake tight' vehicles, typically steel trailers designed for sludge transport.

The containers are designed to maintain material containment and minimise fugitive odour emissions during transit.

This approach directly mitigates odour exposure and aligns with AM 2.4 and 5.1 on containment and odour management.

Vehicle sealing and coverage

All trailers delivering biosolids to site are sealed and/or covered, as per statutory and EA requirements. LGV drivers are instructed to maintain vehicle integrity during transit and unloading to prevent odour release. This is consistent with the *prevent odour emissions during transfer* principle in EA Odour Management guidance and AM 6.3.

4.4 Instructions provided to customers / drivers

Drivers are provided with site-specific instructions prior to delivering odorous material, which include:

- Maintaining vehicle seals until material is unloaded.
- Using designated access routes to minimise exposure to off-site sensitive receptors.
- Observing hygiene, health, and safety protocols on site.
- Reporting any leaks, damage, or unexpected odour emissions immediately to the site supervisor.
- Instructions are provided via written site induction, driver briefings, and included on any waste acceptance documentation.

This measure ensures compliance with AM 2.2 (competence and supervision) and EA odour guidance (risk communication and operational control).

4.5 Protocol for unacceptable or non-conforming materials

All incoming biosolids are subject to a Waste Acceptance Procedure (EPR-OP01) that includes verification against pre-agreed source, quality, and odour characteristics.

Unacceptable or non-conforming deliveries are handled as follows:

- The driver is immediately instructed to return the load to source;
- Waste Rejection Protocol is activated, recording:
 - Date and time of delivery.
 - Vehicle identification and driver details.
 - Reason for rejection (e.g., odorous, contaminated, or incorrectly characterised waste).
 - Corrective action taken.

This ensures odorous or otherwise unsuitable material does not enter the treatment area or compromise odour management measures.

This approach is aligned with AM 3.1–3.4 and EA guidance on prevention of odour from incoming waste.

4.6 Odour release during treatment

While the chemical reactions induced by adding alkaline materials ultimately stabilize biosolids, the mixing phase triggers a significant short-term release of odorous gases. The primary odours released during mixing include:

Ammonia release

Mixing alkaline materials (like lime) into biosolids causes an immediate spike in pH, which converts dissolved ammonium (NH_4^+) into volatile ammonia gas (NH_3).

Concentration: The highest ammonia concentrations in the entire stabilization process are typically found during the mixing and curing stages.

Mechanism: Because the pKa of the $\text{NH}_4^+/\text{NH}_3$ equilibrium is approximately 9.26, raising the pH above 10, and especially to 11.5, rapidly forces nitrogen into its gaseous form, which then escapes into the atmosphere.

Decaying Volatile Organic Compounds

The mixing process physically agitates the biosolids, facilitating the release of other trapped volatile organic compounds (VOCs) and volatile sulphur compounds (VSCs).

Amines

Alkaline addition causes the release of trimethylamine (TMA), which produces a characteristic fishy odour.

Sulphides: While high pH eventually suppresses hydrogen sulphide, the physical action of mixing can release existing pockets of VSCs, such as dimethyl disulfide (DMDS) and dimethyl trisulfide (DMTS), which have decaying or rotten vegetable odours.

4.7 Operational control through mixing quality

The intensity and duration of these odours depend heavily on mixing efficiency:

Poor mixing: Leads to cold spots or regions with low pH where microbial activity continues, resulting in prolonged and more offensive odours over time.

Good mixing: While it may increase the initial burst of ammonia, a thorough and uniform mix ensures the pH stays high across the entire mass, preventing the long-term biological production of more offensive sulphur odours.

4.8 Additional relevant information

Scheduled unloading:

Deliveries are scheduled during operational hours to allow immediate treatment via liming, further reducing odour potential.

Segregated reception area:

Incoming vehicles are unloaded in a designated reception area with impermeable surfaces and minimal exposure to public areas.

Contingency measures:

Spill kits and temporary covers are available in case of accidental release or containment failure during unloading.

Records:

All deliveries, waste verification, and rejection actions are logged for auditability, as required under AM 3.4 and EA Odour Management guidance.

Table 4-1: Odorous materials

Odorous and potentially odorous material	Odour potential	Maximum quantity on site (t/day)	Maximum time held on site	Location on site	Additional comments
Non-compliant biosolids	High risk	250	1 day	Non-compliant cake storage area.	Single source waste with contract in place

4.9 Overview of odorous processes and emissions

The site is designed for the reception, treatment, and storage of biosolids via controlled lime addition (liming). The layout ensures odour sources are identified, segregated, and managed in accordance with risk-based odour control principles.



Figure 4-1: Site layout schematic

Pre-inspection of material and rejection of unsuitable material.

The material is pre-inspected at the production sites, prior to being accepted as a load by the haulage contractor. Regular audits and contacts with staff at the wastewater treatment plants

also help to establish if there have been any significant changes to the process or cake that could result in an increase in odours (e.g. by treatment of liquids and sludges that are old or “septic” at the water treatment plant). This helps to confirm that the sludge accepted at the processing site is uniform in nature and character.

Acceptance of material (meterological condition).

Recording of weather conditions on site and forecasting of future weather conditions allows the site supervisor to decide whether materials can be accepted onto a site, or if the site should be temporarily suspended pending a change in weather conditions. This is of particular importance when considering wind direction and speed, as a change in direction could increase the potential for odours to become an issue to other neighbours not normally considered. Other factors such as rainfall, temperature and humidity are also considered.

Covering of lorries

Lorries will be covered and secured prior to leaving the waste water treatment plant. These covers will not be removed until the lorry arrives at the site, and is ready to tip. At that point the covers are removed and the lorry discharges its load into the designated area. Once this is complete, the covers are then replaced and the exterior of the lorry checked to ensure no material are stuck to the outside of the vehicle. If there is, then this is cleaned off thoroughly prior to leaving site.

Site details

The processing site will take place on an existing concrete slab with a concrete lego block bund around three sides.

Controlled tipping of received material only in the presence of Enva operatives

Materials will only be received onto site and tipped on the site in the presence of an operator/banksman. As such, the material can then be immediately treated and then taken for use or storage within the shortest time frame possibly. Lorries will not be permitted onto the site outwith the working hours stated above, and will not be allowed to be tipped without the presence of an operator/banksman.

Minimisation of material movement around site (ie limited or no double handling).

The biosolids will be treated, used and stored within the shortest timeframe possibly, to minimise the potential odour impact. Once the material is stored, it will not be moved again until it is required to be used, allowing the odour controlling crust to form over the material. There will be no requirement for double-handling of the material at any time.

Covering of temp storage areas/materials.

As the material forms a natural crust to retain any potential odour and protect the material from the elements, it is not envisaged that covering of the stockpiles will be required. Stockpiling of material will be minimised as far as reasonably practicable.

Semi-enclosed nature of mixing process.

The mixing process is enclosed within a concrete lego block bund on three sides and on a concrete surface. Atomisers blowing odour controlling surfactants may be utilised within these confined spaces to help to control any odours created.

Covering of material during treatment/curing process.

As detailed above, as the material naturally forms a crust, it is not anticipated that covering of the material after treatment will be required. As the material is treated as soon as it arrives on site, it is not anticipated that any covering of materials prior to treatment will be required.

Dealing with failing material (ie re-treat so go to treatment controls).

The material is treated in accordance with the Enva HACCP process. Materials that fail the testing process at the critical control point will be re-processed immediately and retested until the material meets the requirement of the HACCP.

Minimise movement of material to storage area.

Should storage of the treated material be required, this will be minimised in order to further control any potential to create odours. Materials will not be double handled and will only be stored at registered S3 exemption sites. These storage areas will be kept as close as possible to the production site and also final usage point.

Covering of stored material.

As noted above, as the material naturally crusts over rapidly, the use of covers on stockpiled material will not be required.

Containment (or otherwise) of liquid run-off (storage tank) and measures related to the emptying/management of this tank.

Any liquid run-off from the processing site will be contained by the impervious nature of the slab and bunds, and also by the falls leading to the rear of the slab. Any run-off retained on the slab will be absorbed back into the cake or removed at regular intervals from the gully, with the material removed by road tanker and disposed to suitably licensed facilities.

Operational only during normal working hours.

The site will only be operational during the hours stated above. However, attention is once again drawn to the fact that although the site opening hours are as stated, the amount of time the actual receipt and processing of sewage sludge takes place on site will be significantly less than this. No materials will be allowed to be tipped on the processing site without the presence of a banksman/operator, and no untreated materials will be left overnight or during closed times without being treated.

Table 4-2: Sources of odour and site processes

Odour source	Process description/odour origin	Control / mitigation measures	Monitoring / verification
Incoming biosolids	Biological activity in dewatered sludge; residual microbial decomposition; odour may release during unloading	All deliveries sealed or covered; drivers instructed on odour management procedures Reception area located on impermeable surfacing with minimal exposure to public areas Scheduled deliveries to minimise storage time prior to treatment Immediate processing or controlled temporary storage	Visual inspection of incoming loads pH and moisture verification for batch consistency Record of vehicle seal integrity and WAP compliance
Reception / temporary storage areas	Untreated biosolids held prior to liming may emit odours if exposed or stored for prolonged periods	Designated, segregated storage areas Minimised storage duration (rapid transfer to liming area) Covered storage where necessary Regular housekeeping to prevent material accumulation	Daily inspection logs of storage areas Record of storage duration for each batch Visual and olfactory checks by staff
Liming and mixing operations	Exothermic reactions during lime addition; potential for fugitive odours if mixing incomplete	Metred lime addition based on dry solids content Mechanical mixing to ensure homogeneity pH monitoring to confirm adequate treatment Operations undertaken in partially enclosed area or downwind of sensitive receptors where practicable	Process records (lime dosage, batch ID, pH readings) Daily operational supervision Incident log for any odour complaints or deviations
Treated material storage	Treated biosolids can generate minor odour if pH drops or material becomes exposed	Storage area designed for containment and minimal exposure Stock rotation to prevent prolonged storage Maintenance of alkaline condition	Periodic inspection of treated material pH verification for stockpiles if stored longer than operational norm
Spillage or accidental release	Minor spillage during unloading or transfer can lead to odour emissions	Spill kits readily available Staff trained in immediate containment and clean-up- Procedures for reporting and recording incidents	Incident reporting log Follow-up inspection to confirm complete remediation

			Review of procedures after any event
External factors (weather / wind)	Wind direction, temperature, or inversion conditions can affect odour dispersion	Operational scheduling to avoid unloading/treatment during sensitive conditions where feasible Monitoring of local wind direction when planning deliveries or outdoor handling	Staff visual/olfactory checks Incident or complaint log correlated with meteorological conditions

Table 4-3: Site layout and process description controls

Site area / infrastructure	Description / purpose	Processes undertaken	Odour potential	Controls / mitigation	Notes / mobile plant
Reception / delivery area	Open, impermeable area adjacent to site entrance. Designated for vehicle unloading.	Unloading of non-compliant biosolids deliveries.	Medium (non-compliant biosolids)	Vehicles sealed and covered Drivers instructed on odour control procedures Unloading scheduled during operational hours Spill kits on hand	Loading shovel for transferring biosolids from unload area to treatment area.
Access roads	Site access control and vehicle weighing; access roads lead directly to unloading.	Vehicle movement; tracking of deliveries	Low	Restricted vehicle routes to avoid sensitive receptors Vehicle hygiene and spill prevention	Mobile plant: loader movement
Storage area (untreated biosolids)	Segregated, impermeable area with limited exposure.	Short-term holding of biosolids prior to liming	Medium	Minimise storage duration Covered if prolonged storage required Regular housekeeping and inspection	Mobile plant: loader for stockpile management
Liming area	Open area; impermeable surface. Includes mechanical mixing equipment.	Addition of quicklime/hydrated lime Mechanical mixing to ensure homogeneity pH monitoring	High (during mixing if lime not fully reacted)	Accurate lime dosing pH verification Partial enclosure / downwind operations- Staff PPE for dust	Fixed plant: lime dosing hopper, mixer, conveyor Mobile plant: loader for lime
Treated material storage / stockpiles	Segregated, impermeable area; designated for stabilised biosolids.	- Storage prior to recovery/dispatch	Low	- Maintain alkaline conditions- Stock	Loader for stockpile management

				rotation- Covered if required	
Loading area for recovery / dispatch	Adjacent to treated storage, impermeable surface.	Loading of stabilised biosolids for transport	Low	Sealed vehicles Minimise exposure time Staff trained in handling	Mobile loader for vehicle loading
Plant and equipment locations	Fixed plant includes lime dosing hopper, mechanical mixer, conveyors (if used). Mobile plant: loaders.	Supports liming and material movement	Variable (high during mixing)	Routine inspection and maintenance Equipment sited downwind from sensitive receptors	Plant layout designed to minimise odour escape and allow segregation of odorous operations
Odour emission points	Potential odour sources include: Unloading of untreated biosolids Liming/mixing operations- Short-term storage of untreated material	Temporary odour release during material handling	Medium–High (untreated material); Low (treated material)	Control measures as above Mixing plant is fully sealed Monitoring and housekeeping	Emission points mapped in Figure 3.3

Figure 4-2: Site plan showing odorous process locations / odorous emissions / storage



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Table 4-4: Sources of odour, processes, and mitigation measures

Process / material	Control measures/Appropriate Measures	Frequency of monitoring	Process parameters monitored	Trigger levels / limits	Corrective actions if outside limits
Incoming biosolids (trailer deliveries)	Delivered in sealed trailers Unloading on impermeable, dedicated reception area Drivers instructed on odorous material handling Minimise storage duration before treatment Spill kits available	Visual inspection of trailer integrity upon arrival Daily inspection of unloading area	Seal integrity Visual assessment of spills or leaks	Broken seals Spills observed	Immediate containment and clean-up using spill kit Record incident and notify site manager
Temporary storage of untreated biosolids	Segregated storage area on impermeable surface Covered if prolonged storage required Rapid transfer to liming area Good housekeeping	Daily inspection of storage area Weekly review of storage duration	Storage duration Exposure to open air	Material held >24–48h Odour complaints from site boundary	Immediate transfer to liming Additional covering if necessary Review scheduling of deliveries
Liming / mixing operations	Controlled lime addition based on solids content Mechanical mixing for homogeneity Partial enclosure to reduce fugitive emissions PPE for staff	Continuous operator supervision during mixing Daily inspection of mixer and lime dosing equipment	pH of material Lime dosage per tonne Mixing duration	pH <11.5 or >13 Inconsistent dosing or incomplete mixing	Adjust lime dosage Extend mixing time Repeat pH verification Suspend batch until parameters met
Treated material storage / stockpiles	Segregated stockpiles with alkaline stabilisation Stock rotation to prevent prolonged storage Covered if necessary	Weekly visual inspection pH measurement for stockpiles stored >7 days	Material pH Stockpile moisture	pH <11.5 Moisture >target range (excess water may cause odour)	Re-mix or re-lime affected material Remove excess water if required Update stockpile records
Loading for dispatch	Loading only into designated vehicles Minimise exposure time	Inspection prior to loading each vehicle	Vehicle seal/sheet condition	Vehicle not sheeted	Reject loading or resheet vehicle Reschedule to reduce exposure

	Staff trained in odour handling	Spot checks during loading	Duration of exposure	Loading duration excessive (>20 minutes)	Record incident
Spillage / Accidental Release	Spill kits and containment procedures Staff trained in immediate clean-up Bunded areas where feasible	Inspection of spill containment areas weekly Following each incident	Presence of residual material outside containment Clean-up completion	Material outside containment Uncontained odour release	Immediate clean-up Apply corrective containment measures Incident logged and reviewed
Airborne / fugitive odours from liming	Partial enclosure for mixer Downwind positioning relative to sensitive receptors	Daily visual and olfactory inspection Maintenance checks monthly	Odour intensity at site boundary (qualitative)	Odour detected beyond site boundary	Adjust operational schedule based on wind direction Notify Compliance Manager and log event
Monitoring and records	Maintain odour logbook Record all inspections, pH measurements, and incidents Cross-reference with standalone AM monitoring plan	Continuous during operations Weekly review of all records	All process parameters (pH, exposure duration, equipment function, odour intensity)	Any deviation from optimum performance parameters	Implement site corrective action plan Investigate root cause Update procedures as necessary

Table 4-5: Process, control measures, trigger levels and actions

Process	Stage or Event	Likelihood of Odour Generation at levels likely to cause pollution	Control Measures	Trigger level	Action if trigger level exceeded
Receipt of material	Approval of material	N/A – Off site	Only suitable material accepted and approved for site treatment.	Unsuitable material identified at source and rejected.	Material not accepted – source site informed not to send material to treatment site.

	Transport to site	N/A – Off site	Lorries sheeted etc.	Unsheeted vehicles observed	Operator warned on first offence, refused access to site and no longer used for repeated offences.
	Unloading of material	High	Only tipping in presence of Digit Site Personnel Material to be treated within 1 hour of arrival. Attention paid to weather conditions prior to arrival on site and whilst on site.	Odour detectable at level 3 at processing site. Odour detectable at level 4 at processing site.	Operations suspended and senior staff members alerted. Consider cancelling further deliveries. Operations halted and lorries diverted/returned until conditions improve or wind direction changes.
	Movement around site	High	Material tipped in appropriate location so no requirement to move. If material is to be moved should be done a minimum of times and as efficiently as possible.	Odour detectable at level 4 at processing site.	Operations suspended until conditions improve or wind direction changes.
	Temporary storage of material	Low	Stored material minimised by prompt treatment of imported material.	Not Applicable	Not Applicable
Mixing and treatment	Movement and loading	High	Movement of materials restricted by tipping only at required location.	Odour detectable at level 4 at Processing Site.	Suspend operations until conditions improve or wind direction changes.

	Mixing of material with Lime	Moderate	Atomisers used to locally control odours, attention paid to weather conditions.	Odour detectable at level 4 at Processing Site.	Suspend operations until conditions improve or wind direction changes.
	Treatment/curing period	Moderate	Atomisers used to locally control odours, attention paid to weather conditions.	Odour detectable at level 4 at Processing Site.	Suspend operations until conditions improve or wind direction changes.
	Failure of material	N/A	Testing process	pH<11.5	Material re-treated – control measures as per original treatment stages.
Removal of material for storage	Loading of material	High	Loading to be carried out with proper loading plant, and in shortest time possible. Attention paid to weather conditions and wind direction/strength.	Odour detectable at level 3 at loading site.	Loading suspended until conditions improve.
	Transport to stockpile	Moderate	Transport of material to closest location possible for its use or storage.	Odour detectable at level 3 at loading site.	Transporting suspended until conditions improve.
	Unloading and stockpile	High	Attention paid to weather conditions and wind direction/speed.	Odour detectable at level 3 at loading site.	Stockpiling suspended until conditions improve.

	Prior to stockpiling	N/A	Registration of stockpile with EA under S3 exemption. Risk assessment of storage location carried out and approved by senior Digit personnel.	N/A	N/A
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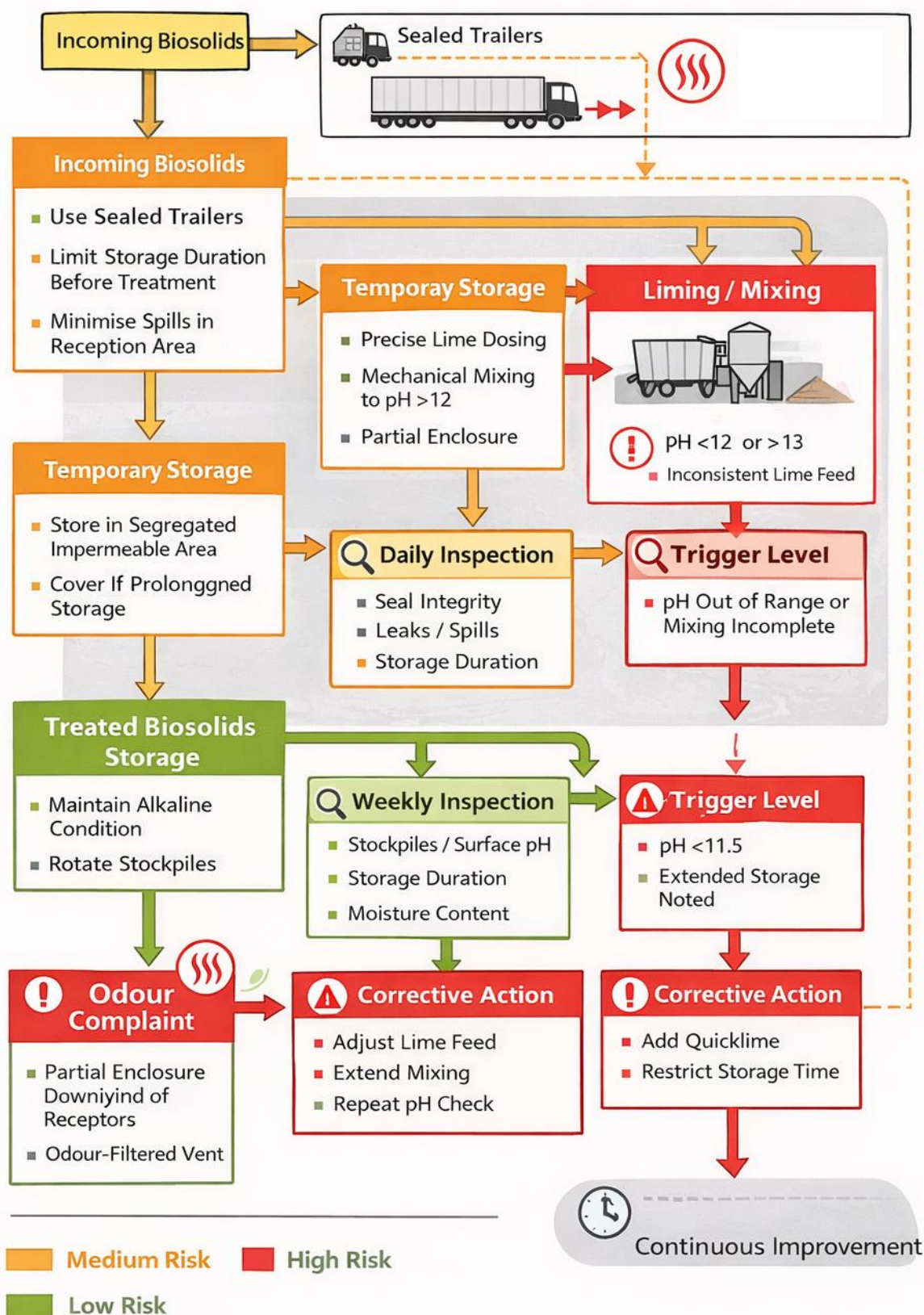


Figure 4-3: Biosolids odour control process flow chart

5.0 ODOUR REPORTING

The site is committed to proactive and reactive management of odour in line with its environmental permit and the principle of being a good operator. All odour complaints or observations are taken seriously, investigated promptly, and recorded systematically. Records of complaints are used to review and improve site operations, in line with [Develop a management system: environmental permits - GOV.UK](#) guidance.

5.1 Complaints reporting

1. Procedure:

Receipt of Complaint: Any odour pollution notification, whether by telephone, email, or in-person, is recorded immediately in the site **Odour Complaint Log**.

2. Acknowledgement: The complainant is acknowledged within 24 hours, confirming that the complaint has been received and will be investigated.

3. Investigation: The site team will investigate within 48 hours of the notification, in accordance with permit conditions. Investigation includes:

- Inspecting relevant process areas (reception, storage, liming/mixing, treated material stockpiles).
- Reviewing process records (pH, storage duration, lime dosing, odour monitoring logs).
- Conducting olfactory assessment at the site boundary and near sensitive receptors if required.

4. Recording and Reporting: The complaint, investigation findings, and actions taken are logged in the **Odour Complaint Log**, which includes:

- Date/time of complaint
- Complainant details
- Description of odour (source, intensity, duration)
- Investigation steps and results
- Corrective actions implemented
- Follow-up with the complainant

5. Review and improvement:

- Complaints are reviewed monthly to identify trends or recurring issues.
- Actions are implemented to prevent recurrence (e.g., scheduling changes, additional containment, process parameter adjustments).
- Findings are incorporated into staff training and OMP updates as part of a continual improvement cycle.

Complaint forms and logs can be cross-referenced to the site's standard Environmental Incident Reporting Procedure.

5.2 Community engagement

Approach:

- The site maintains an open channel with neighbouring businesses, residents, and community representatives.
- Communication methods include:
 - Email or phone contact for complaints or enquiries
 - Periodic updates/newsletters for local stakeholders where appropriate
 - Availability of the site manager for meetings or discussions regarding odour management
- Engagement is proactive and responsive, ensuring community concerns are addressed promptly and respectfully.
- Feedback received is reviewed alongside complaints and odour monitoring records to inform operational adjustments and OMP improvements.

This approach fosters good neighbour relationships and can pre-empt complaints through early notification of operational activities that may result in odour, such as deliveries or large batches of untreated biosolids.

5.3 Pro-active odour monitoring

Routine monitoring:

- Daily olfactory inspection ('sniff test') of key site locations and downwind boundary points is conducted, regardless of complaints.

- Monitoring points include:
 - Reception/unloading area
 - Temporary storage of untreated biosolids
 - Liming/mixing area
 - Treated material stockpiles
- Observations are recorded in the **Odour Monitoring Log**, including odour intensity, direction of prevailing wind, and any unusual odours.

Additional Checks:

- During periods of high odour risk (hot weather, high wind speeds, backlog of deliveries), additional monitoring rounds are performed.
- Staff are trained to recognise odours associated with incomplete lime treatment or prolonged storage.

Proactive monitoring allows early identification of potential odour events, supporting timely corrective actions before complaints are received.

5.4 Reactive odour monitoring

Following a complaint:

- In addition to the investigation described in 5.1, reactive monitoring includes:
 - On-site inspection of process areas associated with the suspected source.
 - Boundary odour assessment at sensitive receptor locations if accessible.
 - Verification of process parameters (e.g., pH, lime dosing, storage time) to identify deviations.
 - Recording environmental conditions such as wind speed and direction, temperature, and precipitation.

Post-complaint follow-up:

- Findings are logged and corrective actions implemented immediately (e.g., additional lime, extended mixing, reduced storage duration).
- Follow-up monitoring confirms that corrective actions have resolved the odour issue.

- Results are reviewed alongside the complaint log and inform updates to site procedures and the OMP.

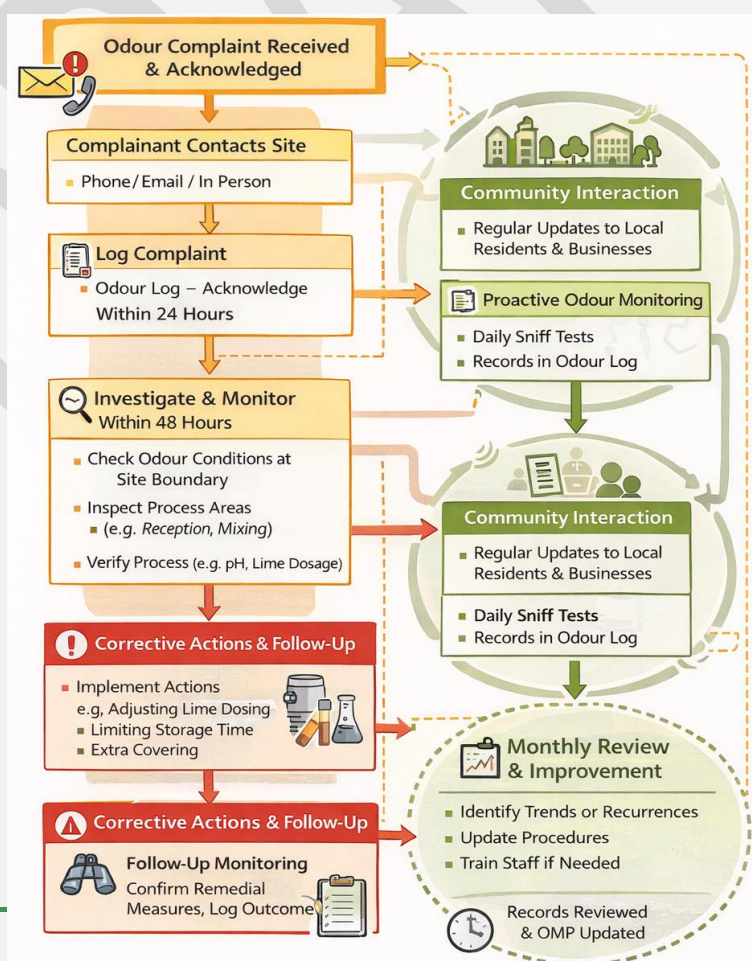
5.5 Summary

The site adopts a robust and proactive approach to odour management:

- Complaints are recorded, investigated within 48 hours, and form part of a continuous improvement process.
- Community engagement ensures stakeholders are informed and concerns are addressed.
- Proactive monitoring identifies odour risks before they affect receptors.
- Reactive monitoring ensures complaints are investigated thoroughly, and corrective actions are implemented.

This integrated system ensures compliance with EA permit conditions, odour management guidance.

Figure 5-1: Odour complaints monitoring process flowchart



6.0 ABNORMAL EVENTS

This section identifies reasonably foreseeable abnormal events that could place pressure on site operations and increase the risk of odour pollution. For each event, the table below sets out the planned recovery steps and control measures in place to prevent, minimise or mitigate odour impacts should such events occur.

Abnormal events are managed in accordance with the following site procedures:

- Odour Management Plan (this document),
- Site Management System,
- Waste Acceptance Procedures,
- Business Continuity and Emergency Response arrangements.

Where relevant, this section cross-references existing procedures rather than duplicating them. All abnormal events are recorded, reviewed, and used to inform continual improvement of odour control measures.

6.1 General principles applied during abnormal events

In all cases, the following principles apply:

- Odour prevention takes precedence over throughput or operational convenience.
- Incoming waste acceptance is restricted or suspended if odour risks cannot be adequately controlled.
- On-site material residence time is minimised.
- Enhanced monitoring (including sniff testing) is implemented.
- Sensitive receptors and prevailing meteorological conditions are considered.
- The EA is notified where required by permit conditions.

Table 6-1: Abnormal events and recovery steps

Abnormal event	Planned recovery / mitigation steps
Inability to remove treated material from site (e.g. outlet closure, contractor failure)	Suspend or significantly reduce incoming biosolids deliveries. Prioritise treatment and dispatch of the most odorous or oldest material first. Increase lime dosing (within process specification) to maintain elevated pH and suppress biological activity. Consolidate treated material into the smallest practicable footprint to reduce exposed surface area. Increase odour inspections and sniff testing frequency. Notify waste producer and haulage contractors of intake restrictions. Escalate to management if storage capacity thresholds are approached.
Delayed collections / increased backlog of untreated biosolids	Activate intake control procedures and impose delivery caps. Reschedule deliveries to avoid adverse meteorological conditions (e.g. low wind, temperature inversions). Prioritise immediate treatment of untreated biosolids upon arrival. Reject loads if safe and compliant processing cannot be guaranteed. Record event and corrective actions in site log.
Failure or breakdown of liming or mixing equipment	Immediately suspend acceptance of untreated biosolids. Isolate any partially treated material and prevent disturbance until treatment can resume. Arrange rapid repair or deployment of standby/mobile equipment where available. Apply interim containment measures (sheeting, sealing, minimising handling). Increase odour monitoring frequency.

	Resume operations only once equipment functionality and odour control are restored.
Power failure	Suspend waste acceptance and processing activities. Secure untreated and treated materials to minimise exposure and disturbance. Deploy backup power where available for critical treatment and odour control systems. Monitor for odour release during outage and record findings. Resume normal operations only once power is stable and systems are fully functional.
Adverse weather conditions (e.g. high temperature, low wind speed, temperature inversion)	Reduce or pause odorous activities during high-risk meteorological conditions. Avoid unloading or handling untreated biosolids during calm or inversion conditions. Increase lime dosing or treatment rate where appropriate to rapidly stabilise material. Re-schedule non-essential operations to more favourable conditions. Document decisions and monitoring observations.
Equipment fire (including external fire impacting operations)	Follow site procedures detailed in Emergency Response and Accident Prevention and Management and Plan. Cease waste acceptance and processing immediately. Secure odorous materials and prevent disturbance unless required for safety reasons. Liaise with emergency services and regulators as required. Conduct post-incident odour risk assessment prior to restarting operations.
Flooding or extreme rainfall	Suspend waste acceptance where floodwater could contact odorous materials. Prevent mobilisation of contaminated runoff and odorous leachate. Relocate or secure stored material to higher ground if required.

	Inspect site drainage and containment systems following the event. Resume operations only once odour and pollution risks are demonstrably controlled.
Spillage or accidental release of untreated biosolids	Stop the source of the spillage immediately. Contain and recover material promptly. Apply lime to stabilise recovered material where appropriate. Clean affected surfaces without generating additional odour. Record incident, root cause and corrective actions.
Receipt of unusually odorous or non-conforming waste	Reject or return waste if it does not meet Waste Acceptance Criteria. If accepted, treat immediately with enhanced lime dosing. Notify waste producer and update acceptance controls as necessary. Record incident and review supplier performance.
Short staffing or absence of key trained personnel	Implement minimum staffing thresholds for odorous activities. Suspend non-essential or high-risk odorous operations if competence cannot be assured. Deploy trained backup staff where available. Prioritise odour-critical activities only. Record staffing impacts and any operational limitations applied.

Table 6-2: Abnormal events aligned to Appropriate Measures (non-hazardous and biowaste)

Abnormal Event (from Table 8)	Relevant EA Appropriate Measures clauses	Compliance explanation / linkage
Inability to remove treated material from site	AM 2.1 & 5.1 (Management systems) AM 2.4 & 5.10 (Contingency planning) AM 4.1-13 & 7 (Waste storage – quantities and duration) AM 6.3 & 11.5 (Odour risk management)	Intake restrictions, prioritisation of oldest material, and suspension of acceptance demonstrate effective contingency planning and control of storage duration. Actions explicitly minimise odour risk at source in line with AM 7.1.
Delayed collections / backlog of untreated biosolids	AM 3.2 & 6.1 (Waste acceptance procedures) AM 4.0 & 7 (Storage limits) AM 6.3 & 11.5 (Odour control)	Waste acceptance caps and rejection protocols ensure storage capacity and residence time are not exceeded. Immediate treatment aligns with odour prevention at source rather than reliance on end-of-pipe controls.
Failure or breakdown of liming / mixing equipment	AM 2.4 & 5.10 (Contingency and abnormal operations) AM 5 & 8 (Process control and monitoring) AM 6.3 & 11.5 (Odour risk management)	Suspension of acceptance and isolation of untreated material reflect proportionate control during abnormal operations. Restart only after odour risk is demonstrably controlled aligns with BAT expectations.
Power failure	AM 2.3-4 & 5.10 (Emergency and abnormal events) AM 7.1 & 11.2 (Monitoring and control) AM 6.3 & 11.5 (Odour risk management)	Immediate cessation of odorous activities and securing of materials demonstrates compliance with emergency planning and odour prevention obligations.
Adverse weather conditions (low wind, inversion, high temperature)	AM 2.3-4 & 5.10 (Contingency and abnormal operations) AM 7.1 & 11.3 (Odour – consideration of meteorological conditions)	Adjusting or suspending activities during adverse meteorology is explicitly supported by EA odour guidance and reflects BAT for outdoor waste treatment operations.

Fire (on-site or nearby)	AM 2.3 & 5.4 (Emergency planning) AM 7.1 (Odour management during abnormal events)	Emergency response procedures prioritise safety while preventing unnecessary disturbance of odorous material, consistent with AM expectations.
Flooding or extreme rainfall	AM 2.4 & 5.10 (Contingency planning) AM 4.0 & 4.2-4.3 (Containment and protection of materials) AM 6.3 & 11.5 (Odour risk management)	Suspension of acceptance and securing of materials prevents odour generation and uncontrolled emissions during abnormal environmental conditions.
Spillage or accidental release of untreated biosolids	AM 2.3 & 5.4 (Management systems) AM 4.0 & 5.5 (Containment and housekeeping) AM 6.3 & 11.5 (Odour risk management)	Rapid containment, recovery, and stabilisation using lime demonstrates good practice, AM and prevents secondary odour impacts.
Receipt of unusually odorous or non-conforming waste	AM 3.3 & 6.3 (Waste acceptance procedures) AM 6.3 & 11.5 (Odour risk management)	Rejection, or immediate treatment demonstrates effective waste acceptance controls and prevents odour pollution from unsuitable inputs.
Short staffing / absence of trained personnel	AM 2.2 & 5.3 (Competence and training) AM 2.1 & 5.1 (Operational resilience) AM 6.3 & 11.5 (Odour risk management)	Minimum staffing thresholds and suspension of high-risk activities demonstrate compliance with competence and odour prevention requirements.

7.0 SUMMARY

The Operator has identified all reasonably foreseeable abnormal operating conditions that could increase the risk of odour pollution from the installation. These include, but are not limited to, restrictions on waste removal, equipment or power failure, adverse meteorological conditions, staffing shortages, equipment fire, flood and the receipt of unusually odorous or non-conforming waste.

For each identified abnormal event, proportionate and pre-planned recovery measures are in place. These measures are designed to ensure that odour emissions are prevented where practicable and otherwise minimised, and that the risk of off-site odour impact is controlled at all times.

During abnormal operating conditions, the Operator will:

- Restrict or suspend waste acceptance where odour risks cannot be adequately controlled;
- Limit the quantity and duration of waste storage on site;
- Prioritise the treatment and removal of the most odorous materials;
- Avoid or suspend odour-generating activities during adverse meteorological conditions;
- Implement enhanced odour monitoring, including increased sniff testing and inspections;
- Ensure that only trained and competent personnel undertake odour-critical activities.

The recovery measures set out in Table 8 align with the Environment Agency Appropriate Measures for waste treatment and represent Best Available Techniques (BAT) for the operation of a biosolids liming facility. In particular, the measures demonstrate compliance with requirements relating to:

- effective management systems and contingency planning;
- control of waste acceptance, storage capacity, and residence time;
- prevention of odour emissions at source;
- management of odour risk during abnormal and emergency situations.

Where abnormal events occur, details will be recorded, investigated, and reviewed in accordance with the site management system. The effectiveness of the response actions will be assessed, and the Odour Management Plan will be updated where necessary to reflect lessons learned and to ensure continual improvement.

7.1 Appropriate Measures (AM)

There are two sets of Appropriate Measures that have been considered in the OMP, namely;

[Non-hazardous and inert waste: appropriate measures for permitted facilities - Guidance - GOV.UK](#), and

[Biological waste treatment: appropriate measures for permitted facilities - Guidance - GOV.UK](#)

7.2 H4 guidance

What the EA expect an operator to do to manage odour from an environmental permit holder.

- a risk assessment and odour management plan for approval
- comply with the odour permit condition
- prevent serious pollution

The EA odour guidance covers:

- what the law says must be done to manage odour
- how the EA assesses odour from regulated activities, including permit compliance
- how to carry out an odour risk assessment
- what must be included in an odour management plan
- what serious odour pollution is
- the best available techniques (BAT) and appropriate measures for activities that are potentially odorous

[Odour management: comply with your environmental permit - 6. Writing an odour management plan - Guidance - GOV.UK](#)

7.3 Monitoring and trigger levels

pH is used as the key chemical parameter for odour suppression; deviations indicate incomplete treatment.

Duration of storage and exposure is monitored to prevent decomposition-related odour.
Visual and olfactory inspection provides practical early-warning for fugitive emissions.

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8.0 CONCLUSION

These measures collectively demonstrate that the site applies proportionate, risk-based controls over odour from deliveries, consistent with EA [Odour management: comply with your environmental permit - Guidance - GOV.UK](#) (Dec 2025), WM3 principles, and the relevant sections within Appropriate Measures.

8.1 Operation overview

Adding alkaline materials to biosolids induces specific chemical reactions that simultaneously raise the pH and temperature while suppressing odours longer term. When quicklime (calcium oxide) is added to wet biosolids, it reacts with the moisture present in a process known as hydration or slaking. In this reaction, one mole of calcium oxide reacts with one mole of water to produce one mole of calcium hydroxide (slaked lime). The process is highly exothermic, releasing approximately 65kJ of heat per mole of CaO reacted. In the context of biosolid treatment, this heat generation and the resulting increase in pH are critical for pathogen reduction and the stabilization of organic matter.

This process, known as alkaline stabilisation, is a standard method for treating sewage sludge to meet environmental standards.

- Raising pH - The primary chemical reaction involves the addition of alkaline reagents like lime (calcium oxide or hydrated lime), fly ash, or cement kiln dust.
- Reaction - Reagents like hydrated lime (Ca(OH)_2) release hydroxide ions (OH^-), directly increasing the alkalinity.
- Result - The pH is raised to 11.5 or higher for at least 2 hours, at this level, the environment becomes toxic to pathogens and halts biological activity.
- Raising temperature - The increase in temperature occurs primarily through an exothermic (heat-releasing) reaction when using specific alkaline materials.
- Quicklime reaction - When quicklime (CaO) is added to wet biosolids, it undergoes an exothermic reaction with the water present (slaking) ($\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$)
- Odour suppression - Alkaline treatment suppresses odours through several chemical and biological mechanisms.

- Halting decay - The high pH stops the biological decay (putrefaction) process by killing the odour-producing bacteria.
- Sulphide locking - Raising the pH above 9–10 converts dissolved hydrogen sulphide gas (a "rotten egg" smell) into non-volatile liquid forms, effectively "locking" the odour in the liquid phase.
- Ammonia - While it suppresses sulphur-based odours, the high pH and temperature will increase ammonia odours in the short term by converting organic nitrogen into volatile ammonia gas (NH_3). Proper mixing and stabilization are required to minimise these nuisance odours over time.

The Operator considers that, with the implementation of the measures described in this section, odour pollution is unlikely beyond the site boundary, including during abnormal operating conditions.