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PARRY'S QUARRY WASTE TRANSFER STATION

BESPOKE ENVIRONMENTAL PERMIT APPLICATION

H1 ENVIRONMENTAL RISK ASSESSMENT

Prepared for

Parry's Landfill Ltd

TerraConsult

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Prepared for:

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DRAWINGS

Drawings referred to in this document are provided in the accompanying Technical Standards Document Reference 2661/R/002/1.

APPENDICES

Appendix A: Odour Management Plan

1 INTRODUCTION

1.1 Background

1.1.1 This report has been prepared in response to question 6 of the 'General New Bespoke Permit Part B2' form. The question asks for an Environmental Risk Assessment undertaken using H1 or an equivalent method. This report is a risk assessment undertaken in accordance with H1 where applicable and also provides justification for the use of other more specific risk assessment methodologies. This risk assessment process has been conducted by reference to Environment Agency Horizontal Guidance Note H1 – Annex A, v2.1 December 2011.

1.1.2 This H1 Environmental Risk Assessment has been prepared in parallel with the H1 Assessment for the associated landfill Permit application. For clarity, it has been prepared in consideration of the same environmental receptors as the landfill site, but will reflect the transfer operations and associated management controls.

1.2 H1 - Assessment of environmental risk

1.2.1 The H1 guidance document requires that everyone applying for a new environmental permit (other than a standard permit) or variation to an existing permit should present information in the form of risk assessment tables, one table each for odour, noise, fugitive emissions (including dust, bio-aerosols and visible plumes), pests and vermin. Identification of accident scenarios and their prevention through operational management should also be detailed.

1.2.2 Each table should identify the hazard, the potential receptors and the pathway from the hazard to those receptors. In addition the tables should also include the preventative risk management practices to be employed along with an assessment of the mitigated risk.

2 SCOPE OF THE ASSESSMENT

2.1 Proposed Operations

2.1.1 Parry's Landfill Ltd (PLL) has commissioned Terraconsult to prepare an H1 Environmental Risk Assessment for the application of a bespoke permit for a Waste Transfer Station (WTS) in a building at Parry's Quarry Landfill Site, in connection to an application for a Landfill Installation permit, (document ref. 2434-R01), which together will form a multi-operator permit installation (see Document ref: 2661/R/002/1). The WTS will be located within the existing site permit boundary (see Drawing referenced 2434/1/002) and will accept all waste delivered to the site for bulking prior to disposal to landfill.

2.1.2 The WTS will accept all non-hazardous waste to be directed to Parry's Quarry landfill for storage and bulking prior to disposal. Waste will be brought to the

WTS by road-going waste vehicles, which will access the site using the new road and weighbridge office to be constructed subject to planning permission. Vehicles arriving on site will be weighed at the weighbridge office for gross weight and load composition will be checked. Any load not meeting the waste types detailed in the Technical Standards document referenced 2661/R/002/1 will be rejected. After being weighed and checked, vehicles will proceed to the WTS along the existing quarry haul road.

- 2.1.3 The WTS will be located at the southwestern corner of the permitted future landfill site. All waste transfer activities at the WTS will be carried out inside a 60 m x 40 m split level building occupying an overall area of 2400 m² (see drawing ref. 2661/1/002). The building will be 12 m tall to the eaves and 17 m to the pitch of the roof. The 30 m x 30 m western portion of the building is for the reception of road-going waste vehicles (of varying sizes). The waste bulking hall to the east is immediately adjacent to the reception area. It also occupies an area of 30 m x 30 m and is also within the fully enclosed building. The waste bulking hall is fully enclosed by push walls on the east and south side and a 0.7 m high bund wall to the north and west. The waste reception and bulking hall are therefore separated by a 0.7 m high wall. The lower level at the northern side of the building is accessed via a 10 m wide ramp which descends to 6 m below ground level. This ramp levels out as it enters the building and draws level with the northern boundary of waste bulking hall. This forms a 10 m x 30 m waiting area 6 metres below ground for a dedicated site vehicle while it is loaded with waste from the waste bulking hall. The fully loaded tipping vehicle drives straight out of the loading bay at the eastern elevation of the site and down to the landfill. Access and egress from all points of the building (the waste reception hall and the loading bay ramp) are sealed by a roller shutter door.
- 2.1.4 The vehicles will reverse up to one of 5 tipping lanes and into parking bays marked up along the eastern edge of upper vehicle reception level. A 0.7 m high concrete wall will separate the vehicle reception area from the waste bulking hall. This will include a removable section for entry and removal of wheeled loading shovels. The waste delivery vehicles will deposit their waste loads over the barrier and into the bulking hall. The deposited waste will be visually inspected for suitability against the conditions of the permit. They will also be inspected for signs of 'hot loads' and if suspected, the surface temperature will be taken using a portable infrared thermometer. Any unsuitable loads will be transferred to a 10 m x 10 m quarantine area marked on the ground in the north east corner of the bulking hall. Unsuitable loads will be subsequently removed or if combustion is suspected, appropriate fire containment controls applied before it is removed. The boundary between the waste bulking hall and the loading bay will be separated with a 0.7 m high water tight concrete barrier to contain any fire water should a fire develop in the main waste bulking pile.
- 2.1.5 Suitable waste deposited into the bulking hall will be consolidated into one pile no larger than 450 m³ in volume. Subject to sufficient accumulation of

incoming loads, this will be immediately loaded into a dedicated site vehicle for subsequent deposit into the landfill. It is unlikely the consolidated stockpile will reach 450 m³ in volume and likely that all waste will be removed from the site by the end of the working day. Adverse weather conditions (e.g. high winds) may mean the landfill is not available and waste may be kept in the building overnight. No waste will be retained in the building for more than 72 hours.

- 2.1.6 Clean road and roof water will be drained into the existing quarry surface water management system for discharge to Alltami Brook to the northwest. Site personnel will use existing amenity facilities within the office building to the south of the WTS. Effluent within the WTS building will be collected in sealed storage tanks and then pumped to the public foul water sewer adjacent to the site on Mold Road through an existing foul water drain. Staff personnel will use the amenity facilities within the existing office building to the south of the WTS. There will be no pathway to surface or groundwater for effluent from the WTS or amenities, and emissions are not expected to occur as a result.

2.2 Site Location & Access

- 2.2.1 The planned WTS location is approximately 1.2 km to the south of Northop Hall, 1.6 km west of Ewloe and 1.2 km north of Buckley at a National Grid Reference of SJ27545 66297. The general location is shown on TerraConsult drawing referenced 2434/1/002 in the accompanying Technical Standards document. Access to the site is via Pinfold Lane, an unclassified road running adjacent to the site from the A494 trunk road. The surrounding area is predominantly rural, comprising arable farmland and woodland. The nearest sensitive receptor is a Buckley Clay Pits and Commons site within the permit boundary. Details of this and other potentially sensitive receptors are provided in Section 2.5.
- 2.2.2 The proposed WTS is located in an existing permitted site, Parry's Quarry, which operates as a landfill site and associated permitted activities. The WTS will be located in the southwest corner of the site and will utilise the same access road, weighbridge and wheelwashing facilities as the other activities within the permitted site.

2.3 Potential Hazards

Odour

- 2.3.1 The waste intake at the WTS will consist of the waste types detailed in Appendix B of document referenced 2661/R/002/1. This waste will be transported to the site by road-going waste vehicles and tipped in the waste reception area of the building. These wastes are considered to be potentially odorous waste streams.
- 2.3.2 A detailed Odour Management Plan is included as Appendix A to this document which highlights odour control mechanisms employed on the site in

order to minimise the contribution of the WTS to nuisance odours in the area. The risks associated with odour emissions are summarised in Table 2.

Noise & Vibration

- 2.3.7 Noise and vibration attributed to the WTS will be generated primarily by the movement and operation of site plant and machinery, and by the loading and unloading of waste during operational hours. The site will be located within the bounds of an existing busy landfill and quarry complex which is likely to generate noise and vibration emissions of its own.
- 2.3.8 It is anticipated that the WTS activities will not generate additional noise above levels currently associated with the quarry and inert wastes recycling facility. Noise emissions associated with landfill vehicle and machine operations have been considered in other permit and planning applications and found to be acceptable when appropriate management techniques have been employed.
- 2.3.9 The WTS operational management controls will minimise potential noise impacts associated with the activity. Furthermore, the recessed location combined with the adjacent raised landfill landform will provide a physical barrier to noise emissions, particularly to the north and east. Local receptors to the south and west immediately adjacent to the permitted site boundary are industrial sites likely to generate noise also, and are not regarded as being sensitive.
- 2.3.10 The most potentially sensitive receptors to noise disturbance are Parry's Cottages to the south east and a Holiday Inn to the northeast. Parry's Cottages are situated approximately 20 m from the site beyond a SSSI. The Holiday Inn is part of the westbound A55 Services layby 20 m to the north east and is separated from the site by a quarry wall. The landfill landform, when fully developed provides a physical barrier between the WTS and the sensitive receptors, reducing the probability of noise impact. The distances to each receptor are measured from the proposed installation boundary, and as such are regarded as highly conservative estimates for the purposes of this H1 Risk Assessment. A risk assessment summary for noise and vibration is presented in Table 3. See drawing referenced 2434/1/002 for receptor locations.

Visible Plumes

- 2.3.11 No activities carried out within the WTS will result in a visible plume. In the event of fire, a visible plume of smoke may be generated. A site Fire Management Plan has been prepared and accompanies this document (see document ref. 2661/R/005/1). Visible plumes will not be considered further in this assessment.

Dust

- 2.3.12 The waste stored at the site may have the potential to produce dust during deposition in the building and removal to landfill. All storage and transfer activities will be carried out in the main building, and doors will remain closed

at all times except during vehicle ingress and egress. All vehicles and exterior surfaces will be maintained and cleaned as necessary to minimise the accumulation of mud or dusty materials. Any dusty waste materials may be dampened down during dry periods if required. Dust control is part of the existing Site management system for the landfill site and includes monitoring and appropriate use of road sweepers and surface dampening techniques. These techniques will be adapted to incorporate the proposed transfer activities.

- 2.3.13 The risk associated with fugitive dust emissions and wind-blown litter (discussed below) are detailed in Table 4.

Litter

- 2.3.14 Wastes received on site will contain material which could present a litter risk. Wastes will be delivered into the building on site as described in Section 2.1. Stored waste materials will be checked routinely and managed to ensure that they do not cause a litter problem. Storage of wastes inside the building is expected to minimise the risk of mobilisation of litter.

- 2.3.15 Routine inspections will be carried out to ensure that any litter escaping the WTS or delivery vehicles will be collected on a regular basis. The site perimeter fence will be checked regularly and cleared of litter as necessary in accordance with the EMS (see document ref. 2661/R/010/1).

Bioaerosols

- 2.3.16 The waste types to be stored in the WTS may include waste that could generate bioaerosols due to biological degradation of putrescible components of the waste. Storage will take place inside an enclosed building, and storage times will be low, reducing the risk of bioaerosol emission. Waste to be removed from the site will be loaded into a dedicated site vehicle and transported directly to the adjacent landfill site. Waste will not be unduly agitated during storage and transfer operations. It is considered that the nature of the site activities and layout will be sufficient to prevent bioaerosol generation entirely and it will not be considered further in this report.

Mud and other debris

- 2.3.17 The site will be hard surfaced to the public highway and vehicles delivering waste will only use hard surfaced roads. The risk of tracking dirt onto public roads from the WTS is thus confined to tracking of any waste spilt on the ground during delivery or from stored wastes on site. A road sweeper will be used to minimise mud and waste accumulation on the access road and if practicable all vehicles will be kept clear of the immediate area to prevent further trafficking. Mud on the road will not be considered further by this assessment.

Contaminated water

- 2.3.18 The WTS is not located within a groundwater source protection zone. Contaminated water is not expected to be produced by routine activities, and is

expected to primarily originate inside the building from cleaning of the WTS, vehicles and plant, or in exceptional circumstances, from fire-fighting activities. Effluent within the WTS building will drain to sealed storage tanks. Effluent collected in the storage tanks will then be pumped to the public foul sewer adjacent to the site on Mold road via the existing foul water drain. Staff personnel will use the amenity facilities within the existing office building to the south of the WTS. There will be no pathway to surface or groundwater for effluent from the WTS or amenities, and emissions are not expected to occur as a result.

- 2.3.19 A risk assessment summary of the hazards and mitigation strategies for fugitive emissions to water is presented in Table 5.

Pests and Vermin (including flies)

- 2.3.20 Waste to be stored on the site has the potential to attract pests and vermin. All waste will be unloaded, processed and removed from site as quickly as possible, and in any case will not be retained on site for longer than 24 hours (if for example adverse weather conditions prevented it from being removed on the same day). This high turnover rate as well as the enclosed conditions of storage is expected to prevent pests from inhabiting the WTS. The WTS will be designed and sized according to expected throughput volumes and maintained in such a way as to prevent waste residue from accumulating.
- 2.3.21 WTS activities will take place in a building which will be maintained and sealed with doors closed except during vehicle ingress and egress. This will discourage birds from foraging on deposited waste. Constant vehicle operation on site will further discourage nesting and foraging on the WTS and removal of all waste during the working day will reduce the attractiveness of the site for birds. If necessary, bird control systems can be installed on site, which will restrict bird activity. Site staff will carry out regular visual inspection for pests and vermin and appropriate pest control systems can be installed on site if required. Records will be kept of any pest control activities carried out on site.
- 2.3.22 Regular inspection will be undertaken for the presence of pests and vermin. Inspections will be recorded in accordance with the EMS for the site. Should any pest or vermin be noted, immediate action will be undertaken that may include instructing pest control contractors, removal of waste and cleaning of surfaces. Any waste identified as being infested with flies or other vermin will be sent to landfill for disposal and covered as soon as practicably possible.
- 2.3.23 Investigation of complaints associated with flying insects or other pests or vermin will be in accordance with the EMS. Pests and vermin will not be considered further by this assessment.

2.4 Hazard Pathways

Hazard Pathways

- 2.4.1 When choosing the receptors, the closest and the most sensitive (if different from the closest) have been considered in each direction from the hazard.

Account has been taken of the mechanism of transport to the sensitive receptor e.g. wind direction for airborne dust.

Probability of Exposure

- 2.4.2 Probability of exposure is determined by the distance of the receptor to the site and the likelihood of the hazard reaching the receptor (e.g. frequency of prevailing wind in that direction). This stage of the assessment details the probability that exposure will result from an unmitigated emission.

2.5 Hazard Pathways and Receptors

- 2.5.1 The nearest sensitive receptors to the site are identified in drawing 2434/1/002. The distance of these receptors to the site boundary, their direction relative to the site and the frequency the wind blows in the direction of the receptor is detailed in Table 1.
- 2.5.2 The Buckley Clay Pits and Commons are located within the proposed installation boundary, approximately 10 m from the WTS. This location is classified as a Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) due to the presence of Great Crested Newts at the site, and may be potentially sensitive to emissions from the site. Additional sections of the collective Buckley Clay Pits and Commons SAC are located at 525 m to the south, 720 m to the north east and 1.1 km to the west. These sites are a considerable distance away from the WTS, and as such are not expected to be exposed to emissions from the WTS.
- 2.5.3 The potential impact to the portion of the Buckley Clay Pits and Commons SSSI and SAC immediately to the south of the site was considered as part of the planning application for the quarry (See Appendix H of report 2434/R01 which is the permit application for the landfill installation).

Amenity Receptors

- 2.5.4 A number of the identified receptors are unlikely to be sensitive to the types of emissions identified in Section 2.3 were they to occur. The agricultural land to the north and east would not be affected by noise or odour. Noise, odour, litter and vermin may have an amenity impact on the residents in the nearby domestic and commercial properties. The severity of any impacts on the commercial or industrial receptors may be influenced by the nature of the receptor activity, which itself may generate a potential nuisance e.g. the noise from the steel finishing works (Table 1, Receptor 1) or the quarry.
- 2.5.5 The entire activity is carried out on an impermeable surface with sealed drainage. Effluent is not expected to be produced in significant quantities, and will be managed as described in Section 2.3. Clean road and roof water will be allowed to drain into the existing quarry surface water management system for discharge to the Alltami Brook to the northwest of the permitted site. As no waste storage or processing activities will occur outside, there is no potential for contamination of surface or groundwater by clean runoff from the site.

Table 1: Sensitive Receptors

ID	Description	Type	Distance from Installation Boundary	Direction from Site	Frequency Wind Blows towards Receptor (%)
1	A55 Services (West Bound)	Commercial/Residential	20m	E	Crosswind
2	Parry's Cottages	Residential	20m	SE	Downwind
3	Industrial Units and Flintshire Council Highways Depot	Industrial	20m	SW	Crosswind
4	Industrial Estate	Industrial	40m	S	Downwind
5	Deeside Truck Services	Industrial	20m	N	Downwind
6	Gell Farm and Neighbouring Property	Residential	200m	NW	Downwind
7	Oaks Farm	Residential	350m	S	Crosswind
8	Properties on A494	Residential	450m	SW	Crosswind
9	Alltami Village	Residential	850m	SW	Crosswind
10	The Chase	Residential	940m	NW	Downwind
11	A55 Services (East Bound)	Commercial/Residential	300m	NW	Downwind
12	Northop Hall Country Hotel	Commercial/Residential	320m	N	Cross/Downwind
13	Northop Hall Village	Residential	525m	N	Cross/Downwind
14	Ewloe Green Village	Residential	590m	E	Cross/Downwind
15	Homestead	Residential	480m	SE	Downwind
16	Properties along B1527	Residential	850m	SE	Downwind
17	Buckley Claypits and Commons SSSI (part of Deeside and Buckley Newt Sites SAC)	Ecological	525m	S	Cross/Downwind
18	Connah's Quay Ponds and Woodland SSSI (part of Deeside and Buckley Newt Sites SAC)	Ecological	720m	NE	Crosswind
19	Buckley Claypits and Commons SSSI (part of Deeside and Buckley Newt Sites SAC)	Ecological	On-site	SE corner	Downwind
20	Alltami Brook	Surface Water	250m	N	Downwind
21	Wepre Brook	Surface Water	700m	NE	Downwind
22	Pinfold Lane leading to the A494	Public Highway	5m	W	Crosswind
23	The Box	Residential	10m	N	Downwind

* See Drawing No 2434/1/002: for location of receptors

3 RISK ASSESSMENTS & ACCIDENT MANAGEMENT PLANS

3.1 Risk Assessments

3.1.1 The specific risk assessments completed for Odour, Noise, Dust, Litter and Water Fugitive Emissions are detailed in Tables 2 to 6 below. In many cases there is an interrelationship between these specific risk assessments and meteorological conditions, where relevant this has been identified. The pathway is determined by the location of the receptor relative to the site, the distance from the site boundary (m) and the frequency (likelihood) the prevailing wind will blow in the direction of the receptor.

3.1.2 Numerical Weather Prediction (NWP) data has been obtained from the Met Office for the site location and has been calculated from the Hawarden Airport meteorological data/wind rose for 2010 taking into account site location and local terrain. The wind rose diagrams for the nearby Hawarden airport and the NWP2010 for the site are consistent with the default wind rose diagram for EA Wales North East which are utilised within the GasSim model for Tier 2 Assessments. The climate data and wind roses for Hawarden airport and the site are supplied as part of the permit application for the future landfill to be operated at Parry's Quarry (see document ref. 2434-R06) and indicate that there are predominant north westerly and south easterly components to the prevailing wind direction at the site which is likely due to influences from the local terrain and the Dee valley and coastal plain to the north/north west.

3.1.3 The risk assessment tables represent the risk of exposure to a hazard before mitigating controls are put in place. The probability of exposure is therefore not necessarily a reflection of the severity of the impact on the receptor, which may not be sensitive to the hazard. The severity of the unmitigated consequence presumes the receptor has been exposed to the hazard. However, if the receptor is unlikely to be exposed, then the overall unmitigated risk is low and vice versa. The mitigated risk is the residual risk presented by the hazard after control measures have been instigated. This is the most realistic representation of the risk as effective controls will be maintained under the requirements of the Environmental Permit, planning consent and operator's Site Management System (EMS).

Amenity Impacts

3.1.4 Of the potential amenity hazards considered in Section 2.3 it has been determined that the proposed activity may potentially be a source of odour, noise, dust and litter and these hazards are considered further in Tables 2 to 4 below. Carrying out the activity in an enclosed building and maintaining a high waste turnover rate is expected to minimise the risk of generating emissions. Few sensitive receptors are in close proximity to the WTS, and the site design and operational practices on site are expected to mitigate the risk of impacts on these receptors. Sensitive habitats in the area are unlikely to be impacted by emissions from the site, as site design and operational practices will mitigate the potential risk to acceptable levels. If however the site design

or nature of operational practices change at a point in the future, the operator should re-evaluate such risks.

Impacts to Surface Water

- 3.1.5 All waste management operations will be carried out in an enclosed building on a sealed and kerbed impermeable concrete surface. The stored waste is not expected to contain a significant moisture content, nor will it be exposed to rain resulting in the production of potentially contaminated effluent/leachate. Storage on a concrete surface will prevent any effluent from infiltrating into the ground. The potential impacts from contaminated water are considered in Table 5 below.

3.2 Environmental Accidents

- 3.2.1 The H1 Guidance requires the completion of an Accidents Risk Assessment and Management Plan to the template provided in Table A4 of the guidance. This should assess potential hazards associated with the proposed activity not described in the sections above. Environmental accident risks are assessed with reference to Table A4 of the H1 Guidance in Table 6 below. Detailed operational procedures for the management of the site will be listed in the EMS to be held on site.

Table 2: Odour Risk Assessment and Management Plan

Hazard/ Pathway	Receptor				Probability of exposure	Consequence	Overall Risk	Risk Management	Residual Risk
	No	Dist. (m)	Direc.	Location relative to wind dir.					
Odour through the air: from wastes received and site operations	1	20m	E	Crosswind	High – Close proximity, often crosswind	High – commercial/residential receptor	High	<p>All waste will be stored inside the building at all times and will not be stored for longer than 72 hours. Doors will remain closed except during vehicle ingress/egress. Odour monitoring will be undertaken daily during operational hours at the site boundary.</p> <p>All complaints received associated with odour will be recorded and investigated.</p> <p>Odour will be controlled in accordance with the detailed odour management plan. (Appendix A)</p> <p>The risk assessment presented in the odour management plan indicates that odour will have minimal impact.</p>	Low
	2	20m	SE	Downwind	High – Close proximity, often downwind	High – residential receptor	High		
	3	20m	SW	Crosswind	High – Close proximity, often crosswind	Medium – Industrial Receptor	High		
	4	40m	S	Downwind	Medium – Close proximity, often downwind	Medium – Industrial Receptor	Medium		
	5	20m	N	Downwind	High – Close proximity, often downwind	Medium – Industrial Receptor	High		
	6	200m	NW	Downwind	High – Close proximity, often downwind	High – residential receptor	High		
	7	350m	S	Crosswind	Medium – Medium proximity, often crosswind	High – residential receptor	High		
	8	450m	SW	Crosswind	Medium – Medium proximity, often crosswind	High – residential receptor	High		
	9	850m	SW	Crosswind	Low – Distant proximity, often crosswind	High – residential receptor	Medium		
	10	940m	NW	Downwind	Medium – Distant proximity, often downwind	High – residential receptor	High		
	11	300m	NW	Downwind	High – Close proximity, often downwind	High – commercial/residential receptor	High		
	12	320m	N	Cross/ Downwind	Medium – Medium proximity, often downwind, sometimes crosswind	High – commercial/residential receptor	High		
	13	525m	N	Cross/ Downwind	Medium – Medium proximity, often downwind, sometimes crosswind	High – residential receptor	High		
	14	590m	E	Cross/ Downwind	Medium – Medium proximity, often downwind, sometimes crosswind	High – residential receptor	High		
	15	480m	SE	Downwind	High – Medium proximity, often downwind	High – residential receptor	Medium		
	16	850m	SE	Downwind	Medium – Distant proximity, often downwind	High – residential receptor	High		

Refer to Table 1 for description and type of receptor.

Table 2: Odour Risk Assessment and Management Plan

Hazard/ Pathway	Receptor				Probability of exposure	Consequence	Overall Risk	Risk Management	Residual Risk
	No	Dist. (m)	Direc.	Location relative to wind dir.					
Odour through the air: from wastes received and site operations	17	525m	S	Cross/ Downwind	Medium – Medium proximity, often downwind, sometimes crosswind	High – ecological receptor	High	Continued	Low
	18	720m	NE	Crosswind	Low – Distant proximity, often crosswind	High – ecological receptor	Medium		
	19	On-site	SE corner	Downwind	High – Close proximity, often downwind	High – ecological receptor	High		
	20	250m	N	Downwind	High – Close proximity, often downwind	Low – Surface Water	Medium		
	21	700m	NE	Downwind	Medium – Distant proximity, often downwind	Low – Surface Water	Low		
	22	5m	SW	Crosswind	High – Close proximity, often crosswind	Medium – transient use by road/recreational users	High		
	23	10m	N	Downwind	High – Close proximity, often downwind	High – residential receptor	High		

Refer to Table 1 for description and type of receptor.

Table 3: Noise and Vibration Risk Assessment and Management Plan

Hazard/ Pathway	Receptor				Probability of exposure	Consequence	Overall Risk	Risk Management	Residual Risk
	No	Dist. (m)	Direc.	Location relative to wind dir.					
Noise & Vibration: (through the air/ground) from site operations and vehicle movements	1	20m	E	Crosswind	High – Close proximity	High – commercial/residential receptor	High	Vehicle movements associated with the facility will be restricted in accordance with the planning permission and site speed limits.	Low
	2	20m	SE	Downwind	High – Close proximity	High – residential receptor	High		
	3	20m	SW	Crosswind	High – Close proximity	Medium – Industrial Receptor	High		
	4	40m	S	Downwind	High – Close proximity	Medium – Industrial Receptor	High		
	5	20m	N	Downwind	High – Close proximity	Medium – Industrial Receptor	High		
	6	200m	NW	Downwind	Medium – Medium proximity	High – residential receptor	High	Plant (loading shovels) to be used at the site will be restricted to indoor activities.	
	7	350m	S	Crosswind	Low – Distant proximity	High – residential receptor	Medium		
	8	450m	SW	Crosswind	Low – Distant proximity	High – residential receptor	Medium	Building doors will remain closed at all times except during vehicle ingress/egress. Building is expected to limit emissions from all activities at the WTS.	
	9	850m	SW	Crosswind	Low – Distant proximity	High – residential receptor	Medium		
	10	940m	NW	Downwind	Low – Distant proximity	High – residential receptor	Medium	All plant, equipment and vehicles are to be properly maintained with functioning exhaust silencing where appropriate.	
	11	300m	NW	Downwind	Medium – Medium proximity	High – commercial/residential receptor	High		
	12	320m	N	Cross/ Downwind	Medium – Medium proximity	High – commercial/residential receptor	High		
	13	525m	N	Cross/ Downwind	Low – Distant proximity	High – residential receptor	Medium		
	14	590m	E	Cross/ Downwind	Low – Distant proximity	High – residential receptor	Medium		
	15	480m	SE	Downwind	Low – Distant proximity	High – residential receptor	Medium		
	16	850m	SE	Downwind	Low – Distant proximity	High – residential receptor	Medium		
	17	525m	S	Cross/ Downwind	High – Close proximity	High – ecological receptor	High		
	18	720m	NE	Crosswind	Low – Distant proximity	High – ecological receptor	Medium		
	19	Onsite	SE	Downwind	High – Close proximity	High – ecological receptor	High		
	20	250m	N	Downwind	Medium – Medium proximity	Low – Surface Water	Low	All events or complaints received associated with noise will be documented in the site's EMS.	
	21	700m	NE	Downwind	Low – Distant proximity	Low – Surface Water	Low		
	22	5m	SW	Crosswind	High – Close proximity	Medium – transient use by road/recreational users	High		
	23	10m	N	Downwind	High – Close proximity	High – residential receptor	High		

Refer to Table 1 for description and type of receptor.

Table 4: Dust and Fugitive Emissions Risk Assessment and Action Plan

Hazard/ Pathway	Receptor				Probability of exposure	Consequence	Overall Risk	Risk Management	Residual Risk
	No	Dist. (m)	Direc.	Down-wind Freq.					
Dust & Litter from wastes as received and site operations	1	20m	E	Crosswind	High – Close proximity, often crosswind	High – commercial/residential receptor	High	<p>Wastes will be delivered to site in covered or enclosed vehicles.</p> <p>All waste will be stored indoors, and doors will remain closed except during vehicle ingress/egress to prevent dust mobilisation.</p> <p>Site to be kept tidy and hard standings to be kept clean to minimise dust. A road sweeper will be used if required.</p> <p>Any potential windblown litter in waste will be confined by the building, which will also minimise waste exposure to wind.</p>	Low
	2	20m	SE	Downwind	High – Close proximity, often downwind	High – residential receptor	High		
	3	20m	SW	Crosswind	High – Close proximity, often crosswind	Medium – Industrial Receptor	High		
	4	40m	S	Downwind	Medium – Close proximity, often downwind	Medium – Industrial Receptor	Medium		
	5	20m	N	Downwind	High – Close proximity, often downwind	Medium – Industrial Receptor	High		
	6	200m	NW	Downwind	High – Close proximity, often downwind	High – residential receptor	High		
	7	350m	S	Crosswind	Medium – Medium proximity, often crosswind	High – residential receptor	High		
	8	450m	SW	Crosswind	Medium – Medium proximity, often crosswind	High – residential receptor	High		
	9	850m	SW	Crosswind	Low – Distant proximity, often crosswind	High – residential receptor	Medium		
	10	940m	NW	Downwind	Medium – Distant proximity, often downwind	High – residential receptor	High		
	11	300m	NW	Downwind	High – Close proximity, often downwind	High – commercial/residential receptor	High		
	12	320m	N	Cross/ Downwind	Medium – Medium proximity, often downwind, sometimes crosswind	High – commercial/residential receptor	High		
	13	525m	N	Cross/ Downwind	Medium – Medium proximity, often downwind, sometimes crosswind	High – residential receptor	High		
	14	590m	E	Cross/ Downwind	Medium – Medium proximity, often downwind, sometimes crosswind	High – residential receptor	High		
	15	480m	SE	Downwind	High – Medium proximity, often downwind	High – residential receptor	Medium		
	16	850m	SE	Downwind	Medium – Distant proximity, often downwind	High – residential receptor	High		

Refer to Table 1 for description and type of receptor.

Table 4: Dust and Fugitive Emissions Risk Assessment and Action Plan

Hazard/ Pathway	Receptor				Probability of exposure	Consequence	Overall Risk	Risk Management	Residual Risk
	No	Dist. (m)	Direc.	Down-wind Freq.					
Dust & Litter from wastes as received and site operations	17	525m	S	Cross/Downwind	Medium – Medium proximity, often downwind, sometimes crosswind	High – ecological receptor	High	Continued	Low
	18	720m	NE	Crosswind	Low – Distant proximity, often crosswind	High – ecological receptor	Medium		
	19	On-site	SE corner	Downwind	High – Close proximity, often downwind	High – ecological receptor	High		
	20	250m	N	Downwind	High – Close proximity, often downwind	Low – Surface Water	Medium		
	21	700m	NE	Downwind	Medium – Distant proximity, often downwind	Low – Surface Water	Low		
	22	5m	SW	Crosswind	High – Close proximity, often crosswind	Medium – transient use by road/recreational users	High		
	23	10m	N	Downwind	High – Close proximity, often downwind	High – residential receptor	High		

Refer to Table 1 for description and type of receptor.

Table 5: Water Fugitive Emissions Risk Assessment and Action Plan

Hazard	Receptor	Probability	Consequence	Overall Risk	Risk Management	Residual Risk
Contaminated Water from wastes as received and site operations Spillages of liquids on site Leakages from vehicles Leakages from storage tanks	Neighbouring businesses	Low – lack of pathway	Medium – human health	Low	No pathway linkage to amenity receptors from site. All collected surface water runoff from waste storage areas will be discharged to storage tank and exported off site.	Low
	Local Groundwater	Low – site surfaced	Medium – groundwater pollution	Low	Engineered sealed concrete surface and drainage system will prevent uncontrolled surface water runoff from site. Liquid from operational areas will be drained to a dedicated storage tank before being exported off site. Spill kit kept on site and site operatives aware of spillage procedures All site plant/vehicles to be properly maintained	
	Drainage System	Low – direct discharge to surface water, but no connection to internal operations	Medium – Unknown effluent quality	Medium	Waste stored on an impermeable surface with sealed drainage system. No waste will be stored outdoors, and will not be exposed to rainwater that could produce potentially contaminated effluent. Wash water and firewater will be drained to separate dedicated storage tank and removed from site to public sewer. Waste storage areas will be bunded by sealed push walls and will provide containment for water used in washing surfaces or fighting fires. All storage tanks to be properly maintained	

Table 6: Accident Management Plan

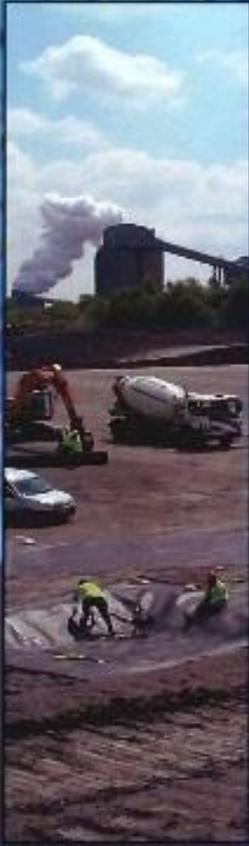
Hazard	Receptor	Pathway	Probability	Consequence	Overall Risk	Risk Management	Residual Risk
Fuel / engine oil leak	Surface Water	Site drainage / Runoff	Low	Medium - pollution of surface water	Medium	All vehicles on site will be road worthy and well maintained. Site covered by sealed surface which is isolated from external surface water.	Low
Fire Uncontrolled burning of wastes or site facilities	Surface Water	Site drainage	Low	Medium - pollution of surface water through firewater run-off or leaks from damaged equipment	Medium	No smoking on site No highly flammable wastes to be accepted, Site vehicles and plant subject to regular preventative maintenance in line with site procedures. Firefighting equipment will be on hand, and Fire and Rescue Services will be contacted in response to a fire in accordance with Site Procedures. No deliberate burning of waste or other fires to be undertaken at site. Conditions in site Fire Management Plan (document ref. 2661/R/005/1) will be implemented at all times.	
	Receptors listed in Table 1 above Site personnel	Airborne	Low	High - smoke / odour annoyance High – Site personnel injury			
Explosion Compressed gas cylinders, combustion of fuel	Site personnel	Airborne	Low	High - danger of serious injury	Medium	No smoking on site Compressed gases not required and therefore not present for operation of installation. No fuels to be stored on site. Visual screening of waste to ensure no hazardous materials (gas cylinders) enter waste stream	
	Surface Water	Site drainage	Low	Medium - pollution of water through leaks from damaged equipment			
Wastes processed Chemical reaction of incompatible wastes	Receptors listed in Table 1 above Site personnel	Airborne	Low	High - odour annoyance or smoke from oxidising agents High – Site personnel injury	Medium	Waste acceptance protocols will exclude the receipt of chemically reactive wastes. Those accepted will be of a non-hazardous nature and will not generate noxious gases.	
Vandalism Damage to site vehicles, plant, or buildings.	Groundwater	Site drainage	Low	Medium - pollution of groundwater through leaks from damaged equipment	Low	Site security will prevent access by unauthorised persons.	

4 CONCLUSIONS

- 4.1.1 The risk assessments detailed in Tables 2 to 6 within this document and the accompanying Odour Management Plan (Appendix A) indicate that site activities are unlikely to cause any disturbance to the surrounding area. Residential properties are most sensitive to the proposed site operations, however given the noise, dust, litter and odour mitigation measures employed at the site these residential properties are unlikely to be affected by the activity.
- 4.1.2 Accidents such as fire, explosion or leakages are considered unlikely as the proposed operations on site do not create an inherent fire risk. Nevertheless safe site working practices, effective control measures and strict waste acceptance criteria further reduce the potential for such accidents to occur.
- 4.1.3 The site design provides effective surfacing to limit contamination of surface water and ground water. Storage and transfer of waste will be carried out inside a building on an impermeable surface.
- 4.1.4 The containment of all site operations inside the building (excluding transport of waste to and from site) will limit dust, litter and odour emissions. It will also reduce the potential for site activities to attract pests and vermin. This will be supported by daily visual inspections will proactively identify issues and reduce the environmental risk associated with the site.
- 4.1.5 The proposed operational procedures detailed within this report and the accompanying Odour Management Plan are considered sufficient to minimise the impact of odour emissions on sensitive receptors.
- 4.1.6 It has been concluded that with the use of appropriate mitigating controls, where necessary, the transfer of non-hazardous waste streams within the confines of the building will not present a significant risk to surrounding receptors.

APPENDIX A

Odour Management Plan



January 2016
Report No 2661/R/003/Appendix A/1

PARRY'S QUARRY WASTE TRANSFER STATION BESPOKE ENVIRONMENTAL PERMIT APPLICATION

ODOUR MANAGEMENT PLAN

Prepared for

Parry's Landfill Ltd

TerraConsult

PARRY'S QUARRY WASTE TRANSFER STATION

BESPOKE ENVIRONMENTAL PERMIT APPLICATION

ODOUR MANAGEMENT PLAN

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DOCUMENT INFORMATION AND CONTROL SHEET

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DRAWINGS

Drawings referred to in this document are provided in the accompanying H1 Environmental Risk Assessment Document Reference 2661/R/003/1.

1 INTRODUCTION

1.1 Background

- 1.1.1 This Technical Standards Document has been produced in support of an Environmental Permit application by Parry's Landfill Ltd (PLL). PLL propose to operate a Waste Transfer Station (WTS) within an area of Parry's Quarry, Alltami as part of a multi-operator permit installation, which will be used for storage and bulking of non-hazardous waste prior to disposal to landfill.
- 1.1.2 The proposed facility will accept non-hazardous waste from a number of outlets and store it for bulking prior to disposal to the associated landfill. The activity will be carried out entirely inside a building. The facility will accept and transfer the total annual waste throughput of the associated landfill activity for bulking prior to disposal. This throughput will be approximately 325,000 tonnes of waste per annum, with an anticipated maximum of up to 400,000 tonnes per annum. This equates to an average of 1040 tonnes per day (assuming a 6 day working week). However due to the dynamic nature of waste inputs and exports from the site, it is unlikely that this amount of waste will be present on site at any one time.
- 1.1.3 The planned WTS location is approximately 1.2 km to the south of Northop Hall, 1.6 km west of Ewloe and 1.2 km north of Buckley at a National Grid Reference of SJ27545 66297 (see drawing ref. 2434/1/002). The site is accessed via an unnamed access road off of Pinfold Lane. The surrounding area is predominantly rural, comprising arable farmland and woodland. The nearest receptor is Buckley Clay Pits and Commons SSSI and SAC located on site to the south of the WTS. The nearest receptor sensitive to odour is identified as Parry's Cottages, located at 20 m to the southeast of the permit boundary. Details of other potentially sensitive receptors are detailed in the accompanying H1 Environmental Risk assessment (document referenced (2661/R/003/1)).

1.2 Reference to the Guidance

- 1.2.1 This Odour Management Plan (OMP) has been prepared in accordance with the following guidance documents:
- *Appendix 8 Guidance on Odour Management Plans of Explanatory Notes on Part B of Application Form for an Environmental Permit;*
 - *European Commission Waste Treatment Industries BREF (August 2006) and,*
 - *H4 – Horizontal Odour Guidance.*
- 1.2.2 The Explanatory Notes concerning Odour Management Plans on Part B1 of the Environmental Permit Application Form details a suggested Source → Pathway → Receptor model be adopted with an emphasis on implementing effective and robust controls for odour abatement at the earliest stages possible (i.e. at source). The guidance acknowledges that assessment and control of

odour can be difficult due to dispersal and the episodic nature of odour events. Assessments therefore are usually based on conservative worst case scenarios and are not a reflection of the preventative operational practices at the site.

- 1.2.3 The 'H4' guidance provides a regulatory framework by which a permitting officer can ensure an installation's compliance by the provision of specific conditions. H4 states that the Best Available Technique (BAT) is often site-specific and can be determined by the controls necessary to meet benchmark odour concentrations at ground level at sensitive receptors.
- 1.2.4 This document provides a summary of the physical and management controls that will be employed to minimise odour release. It provides a site-specific assessment of the potential sources of odour, the pathways odour can take from the site and the receptors it is likely to impact. The potential release points of odour are identified, as are the management systems to prevent and control fugitive odour emissions. Monitoring and reporting systems are also described, as are emergency contingency plans.

1.3 Appraisal of Applicable Monitoring Techniques

- 1.3.1 The applicable monitoring techniques in this context are interpreted as the daily odour monitoring methodologies (olfactory) up and down wind of the site. Monitoring of operational control measures are listed separately. These have been reviewed in the context of the most recent guidance (i.e. H4) and updated accordingly.

1.4 Operational Control Measures and Monitoring Techniques

- 1.4.1 The operational control measures and monitoring techniques to be implemented are detailed in this management plan and consider the odour source term identification process in Section 2.

2 ODOUR SOURCE TERM CHARACTERISATION

2.1 Odour Source

2.1.1 The following sources of potential odour are considered in this section of the assessment:

- Odours from stored wastes in the building (prior to processing or transfer);
- Odours from the wastes stored following treatment; and

2.1.2 Each of the above source terms are described in greater detail below in the context of specific sources, and potential release points.

2.2 Waste Reception

2.2.1 Table 1 summarises the odour potential of each waste stream on site, the relative odour risk that waste stream may present to receptors and odour mitigation in terms of residence times.

Table 1. Individual Waste Streams Odour Potential

Waste Stream	Odour Potential	Reason	Approximate Proportion of Waste Received	Compositional Consistency of Waste Stream	Priority
Non-hazardous waste	High	Waste streams identified by the supplier / operator to have a higher proportion of putrescible food waste e.g. from MSW, restaurant collection contracts or large businesses which may have on site catering facilities	70 %	Relatively consistent as each business will cater to a defined number of customers and volume / type of waste will reflect that.	First
	Low	Collection rounds from non-food industry rounds e.g. factories which may contain higher proportions of mixed packaging or miscellaneous items.	30 %	Relatively consistent due to defined nature of business and volume of waste generated.	Secondary

Non-putrescible waste

2.2.2 All of the waste accepted on the site will consist of non-hazardous and inert wastes from a variety of sources. A proportion of this waste stream is likely to consist of non-putrescible materials as detailed below although this will depend primarily on the nature of the supplier. The largest components by weight of this waste are likely to be in order:

- Soils and inert wastes;
- paper and card;
- plastics;
- glass;
- metals; and

- textiles.

2.2.3 Any waste containing a high proportion of the material above is likely to have a low potential for odour generation although there may be an incidental amount of degradable wastes mixed with these.

Putrescible waste

2.2.4 Many waste loads brought to site will likely contain a higher proportion of organic material such as food waste. This type of waste has a much higher potential for odour generation, and may be mixed with non-putrescible waste. The odour generation potential of these wastes is considered high as it is expected to contain a much greater proportion of putrescible components. The odour generation potential is linked to the age of waste prior to collection and climatic factors i.e. temperature.

2.2.5 The Chartered Institute of Wastes Management (CIWM) and the Waste Resources Action Programme (WRAP) commissioned a review¹ that considered the odour generation potential of stored residual MSW. The review indicates that the volatile organic compounds (VOCs) from domestic waste generally peaked at one week whilst other compounds such as ammonia continued to increase over a 14 day storage period. Weather and storage conditions were also found to affect odour production. Overall, the review indicated that some odorous compounds may diminish and some increase between 7 to 14 days. The review reports typical odours that may be generated from residual MSW include those linked to microbial decomposition of the organic fraction and those associated with packaging materials and household products such as detergents. In general typical odour compounds are reported to include:

- VOC's including chlor-organics,
- hydrogen sulphide (rotten eggs),
- mercaptans (rotten vegetation e.g. cabbage) and
- amines (fishy smell).

2.2.6 Additionally it has been reported that alkanes, alkybenzenes and terpenes have been responsible for undesirable odours from kerbside waste containers².

2.2.7 The CIWM/WRAP review indicates that composition of the odorous chemicals change with time, some diminish whilst others increase, however overall it is recognised that the longer the storage time the greater the odour generation potential. In addition it is also understood that the warmer the waste the greater the odour production potential. The volume of waste stored and the depth of waste (which may result in anaerobic conditions and heat) are all factors that influence odour generation. These issues are all addressed in this report.

¹ Scoping Study of Potential Health Effects of Fortnightly Residual waste Collection and Related Changes to Domestic Waste Systems, Final Report, July 2009

² Statheropoulos M., Agapiou A., Pallis G. (2005) A study of volatile organic compounds evolved in urban waste disposal bins. Atmospheric Environment 39:4639–4645

Summary

- 2.2.8 The components of odorous compounds in the wastes are likely to vary depending on proportion of the incoming wastes accepted. Odour tends to consist of a complex mix of chemicals in gaseous form, as described above wastes of the nature to be accepted exhibit the following typical odours: VOC's including chloro-organics, hydrogen sulphide (rotten eggs), mercaptans (rotten vegetation e.g. cabbage) and amines (fishy smell).
- 2.2.9 The age of waste received and storage temperature will influence odour type and generation. It is recognised that in general increased odours are linked to longer storage of municipal type waste. However only a minority of odorous compounds appear to increase consistently with longer storage, therefore targeting particular odorous compounds is difficult. It is considered that actions aimed at reducing storage times, limiting stockpile sizes, minimising temperature, limiting evaporative losses and controlling odorous inputs are preferable and more practical control methods.
- 2.2.10 A summary of the activities carried out at waste reception and how they might influence the odour potential of specific waste streams is detailed in Table 2.

Controls

- 2.2.11 Control systems and management controls are discussed in Section 3 below.

Table 2. Odour Potential of Waste Streams

Waste Stream	Deposit of waste in bay	Loading and transfer of waste
Non-hazardous waste	<p>Medium / High</p> <ul style="list-style-type: none"> • Bagged MSW may reduce odour emissions. • Odour which may have built up in vehicle will be released on deposit of wastes • Deposit of wastes on floor may cause bags / containers to split releasing odour • Odorous wastes may taint other non-odorous material 	<p>Medium / High</p> <p>Waste will be disturbed when excavated from pile and when deposited but not agitated excessively</p>

n.b. inert waste does not have odour potential and is therefore not considered above.

Potential Release Points

- 2.2.12 Incoming waste loads are to be offloaded in the waste reception area. There is a potential for odours to be generated as a result of disturbance of waste during delivery, particularly in waste that has been awaiting collection for an extended period. It is the operator's aim to transfer all waste in the reception area by the end of each working day. No waste will be stored on site for longer than 72 hours.

Storage and bulking

- 2.2.13 Suitable waste deposited into the bulking hall will be consolidated into one pile no larger than 450 m³ in volume. Subject to suitable accumulation of waste, this will be immediately loaded into a dedicated site vehicle in the 6 m deep loading bay for subsequent deposit into the landfill. It is unlikely the consolidated stockpile will reach 450 m³ in volume and likely that all waste

will be removed from the site by the end of the working day. Adverse weather conditions may mean the landfill is not available and waste may be kept in the building overnight. Extended storage of waste in the stockpiles has the potential to cause anaerobic conditions to develop, particularly in stockpiles exceeding the 450 m³ maximum volume. This can lead to odour generation. It is the operator's aim to remove all stockpiled waste to landfill by the end of the working day if practicable, and not later than 72 hours after arrival; therefore these potentially odour generating conditions will be avoided.

Removal from site

- 2.2.14 Accumulated waste materials in the WTS building will be loaded into bulk trailers at the loading ramp inside the building using wheeled loading shovels. The loaded vehicles will then deliver the wastes for disposal in the adjoining landfill.

Potential Release Points

- 2.2.15 It is not proposed to install any physical full height separation between the reception area and storage stockpiles. The potential release points are identified as the main vehicle access doors and associated personnel doors to the reception area and storage area. These will be sealed at all times except during ingress/egress of vehicles and personnel.

3 ODOUR MANAGEMENT AND CONTROL

3.1 Waste Receipt, Storage and Treatment

Receipt

3.1.1 Control of incoming wastes will be managed according to the operator's waste acceptance procedures. All incoming loads will be weighed at the weighbridge and a record of received wastes will be made and retained in accordance with the Duty of Care Regulations. The following records will be retained for each load of waste delivered:

- Date and time of delivery
- Vehicle details (registration)
- Description (including any associated strong odours);
- Origin (if known)
- Quantity

3.1.2 A waste acceptance check will be undertaken at the weighbridge with an additional visual check being undertaken at the point of offloading. If waste acceptance checks show that the wastes are not permitted, the load will be rejected.

3.1.3 After passing over the weighbridge, all wastes will be delivered to the waste reception area. Any non-conforming wastes identified following deposit will be placed in a quarantine area pending removal from the site to a suitable permitted facility. This will be actioned as soon as is practicable, ideally within 24 hours but no later than 72 hours after receipt.

3.1.4 A record will be made of wastes found not to be permitted which will include the following information:

- waste type;
- waste carrier;
- date of receipt; and
- the producer.

Following rejection, the operator will inform the Agency and direct the waste for alternative treatment or disposal. Actions will be undertaken to identify the origin of the waste and to prevent re-occurrence of the issue. Any associated odour issues will be addressed as soon as practicable.

3.1.5 Operations staff will be vigilant for particularly malodorous wastes and daily olfactory odour checks will be undertaken as detailed in Section 6.2 below. Doors will be checked daily to ensure effective operation and building infrastructure will be checked daily for integrity. Daily checks will be made of any waste stored in the building, which will consider odour, storage time and stockpile size. The nature of the operation is such that it is unlikely wastes will be stored in the building for periods in excess of 72 hours and it is

anticipated during normal operation that wastes will be transferred to the landfill by the end of each working day.

- 3.1.6 The site will be operated in accordance with the EMS which details housekeeping measures and daily inspections to identify potential sources of odour and potential release points e.g. structural damage. Daily checks are reinforced and supported by weekly supervisor and monthly manager inspections. All damage and faults are to be reported to the Site manager for action.
- 3.1.7 Routine cleansing of the waste storage and handling areas of the site, will be undertaken as required. These will be arranged to ensure there is no disruption to the continuity of operations. Given that the cleanliness of site forms part of the daily, weekly and monthly inspections cleaning will be undertaken as required, but monthly as a minimum.
- 3.1.8 In addition to the above, staff will be instructed to ensure that all external areas of the site are clear of any litter or other wastes.

Storage

- 3.1.9 Waste arriving on site will be removed from site within 24 hours if practicable, but no later than 72 hours to minimise the possibility of odour generation or self-combustion. If wastes stored on-site present an excessive odour risk, contingency measures will be implemented as detailed in Section 6.7 and 6.8 and the associated action plan in Table 3.

Evaporation Minimisation

- 3.1.10 Evaporation from warm wet waste may mobilise airborne odorous chemicals. Evaporative losses will be minimised by limiting total storage times to a maximum of 72 hours total and managing stockpile.

Air Management

- 3.1.11 The delivery doors to the reception area will be kept closed when no access/egress is required. No further air treatment technologies or point source emissions are proposed for operation of the facility.

3.2 Drainage

- 3.2.1 Drainage infrastructure will be inspected, maintained and repaired as necessary. In the unlikely event that odour should become an issue as result of the onsite drainage system, a full review of the infrastructure will be conducted and cleaning and inspection frequencies adjusted accordingly.

4 ODOUR PATHWAY CHARACTERISATION

4.1 Overview

4.1.1 The principle mechanism for the transit of odorous emissions from site operations to adjacent sensitive receptors is via ambient air. The distance and direction that these emissions will be carried is determined by the following factors:

- Source Related Pathways;
- Meteorological Conditions; and
- Topography.

4.2 Source Related Pathways

4.2.1 The pathway an odorous emission takes from a site may depend on the specific source term and / or location it arises from. The nature of the source related pathway, e.g. a vent, opening or doorway, could also influence the scale of the resulting impact on a sensitive receptor.

4.3 Meteorological Conditions

Wind Direction

4.3.1 The main controlling factor in determining the pathway of odour is the ambient meteorological conditions. This is fundamental to the transportation of odour to sensitive receptors. The prevailing wind direction will determine which receptors will be affected and at what frequency.

Wind Velocity

4.3.2 Wind velocity will affect the distance an odour emission will travel. Conversely, increased wind speed could also beneficially improve dispersal. However; receptors closest to the installation are still at the highest potential risk of a negative impact.

Air Temperature

4.3.3 Warm air may carry odours upwards by convection for their dispersal away from the site. However, warm weather will encourage the onset of biodegradation of exposed or temporarily stored wastes and therefore increase odour potential.

4.4 Adverse Weather Conditions

4.4.1 Unusual weather conditions may increase the risk of odour emissions from the site as existing countermeasures may not be as effective. Site staff will be vigilant to unusual trends in the meteorological data or forecasts which may indicate strong winds or extremes of temperature which may cause a potential problem. The types of weather conditions that may impact on odour generation and emissions and appropriate contingency actions are detailed in Section 5.

5 ODOUR RECEPTOR CHARACTERISATION

5.1 Identification of Receptors

5.1.1 Locally sensitive receptors can be characterised as follows:

- Domestic dwellings or workplaces;
- Public rights of way;
- Locally Sensitive Sites

Sensitivity of Receptors

5.1.2 The sensitivity of each receptor is based on the impact of unmitigated fugitive emissions to air (i.e. odour) from the facility. For example, a school or dwelling would have a high sensitivity, a retail showroom would have a medium sensitivity and a scrap yard or farm would be of a low sensitivity. This is determined by:

- Immediate locality (e.g. heavy industry or countryside);
- Frequency of receptor use or periods of occupancy;
- Who or what uses the receptor (children at school, wildlife in a SSSI);
- Any pollution contributed by the receptor itself.

Domestic Dwellings or Workplaces

5.1.3 There are domestic dwellings within 250m of the proposed installation boundary to the east and south-east. In addition, there are a number of industrial units and other workplaces to the west and north within 500m of the installation boundary. These distances are considered to be conservative for the purposes of this odour management plan, as the proposed installation boundary covers a significantly larger area than the proposed WTS.

5.1.4 Receptors are described within the H1 Environmental Risk Assessment document referenced as 2661/R/003/1 as summarised in Table 5 and located on drawing 2434/1/002.

Public Rights of Way

5.1.5 At its closest point, the North Wales Expressway is 100 m to the northeast of the proposed installation boundary. Pinfold Lane runs adjacent to the western boundary of the permitted site, approximately 5 m from the proposed installation boundary. The A494 trunk road runs from east to west approximately 10 m from the proposed installation boundary. Use of these roads is by transitory vehicles and the consequence of odour to the users of this road is considered to be low.

Locally Sensitive Sites

5.1.6 There are a number of areas classified as Sites of Special Scientific Interest (SSSI) and Special Areas of Conservation (SAC) due to the presence of newts around the permitted site, collectively named the Buckley Claypits and Commons. Several such sites are within 1 km of the site. The locations of these sites are detailed in the accompanying H1 Risk Assessment (see

document ref. 2661/R/003/1). It is considered unlikely that odour nuisance will have a significant effect on biodiversity or protected species populations at either site.

Table 1: Sensitive Receptors

ID	Description	Type	Distance from Installation Boundary	Direction from Site	Frequency Wind Blows towards Receptor (%)
1	A55 Services (West Bound)	Commercial/ Residential	20m	E	Downwind
2	Parry's Cottages	Residential	20m	SE	Cross/Downwind
3	Industrial Units and Flintshire Council Highways Depot	Industrial	20m	SW	Upwind
4	Industrial Estate	Industrial	40m	S	Crosswind
5	Deeside Truck Services	Industrial	20m	N	Cross/Downwind
6	Gell Farm and Neighbouring Property	Residential	200m	NW	Crosswind
7	Oaks Farm	Residential	350m	S	Upwind
8	Properties on A494	Residential	450m	SW	Upwind
9	Alltami Village	Residential	850m	SW	Upwind
10	The Chase	Residential	940m	NW	Crosswind
11	A55 Services (East Bound)	Commercial/ Residential	300m	NW	Crosswind
12	Northop Hall Country Hotel	Commercial/ Residential	320m	N	Cross/Downwind
13	Northop Hall Village	Residential	525m	N	Cross/Downwind
14	Ewloe Green Village	Residential	590m	E	Cross/Downwind
15	Homestead	Residential	480m	SE	Crosswind
16	Properties along B1527	Residential	850m	SE	Crosswind
17	Buckley Claypits and Commons SSSI (part of Deeside and Buckley Newt Sites SAC)	Ecological	525m	S	Upwind
18	Connah's Quay Ponds and Woodland SSSI (part of Deeside and Buckley Newt Sites SAC)	Ecological	720m	NE	Downwind
19	Buckley Claypits and Commons SSSI (part of Deeside and Buckley Newt Sites SAC)	Ecological	On-site	SE corner	Crosswind
20	Alltami Brook	Surface Water	250m	N	Cross/Downwind
21	Wepre Brook	Surface Water	700m	NE	Downwind
22	Pinfold Lane leading to the A494	Public Highway	5m	W	Upwind
23	The Box	Residential	10m	N	Cross/Downwind

* See Drawing No 2434/1/002: for location of receptors

6 MONITORING, REPORTING & CONTINGENCIES

6.1 Overview

- 6.1.1 Prevention is viewed as the most effective means of controlling odour before an impact occurs. The Source → Pathway → Receptor model allows for the identification of the critical control points where odour can arise, how it can travel to a receptor and the likely impact.
- 6.1.2 It is intended the odour management system will mitigate any potential odour impacts of the installation on the identified receptors. Should complaints be received, procedures will be in place to effectively deal with the issue in a sensitive, efficient and auditable manner.
- 6.1.3 The controls for the source term are detailed in previous sections of this report. The management of those controls will be based on the on-going monitoring regime at site. The monitoring regime can work as an early warning system to potential problems (e.g. meteorological monitoring) or a diagnostic tool to establish the cause of an odour event (e.g. perimeter monitoring).

6.2 Monitoring

Off-Site Olfactory

- 6.2.1 The Site Manager will be responsible for ensuring that regular inspections are made of the site and its perimeter in order to identify any sources of odour and to establish whether any odours are discernible. This will include odour arising from vehicles arriving at site and from the facility itself.
- 6.2.2 Off-site olfactory monitoring will also be carried out with reference to the protocol in Appendix 1 of the H4 Technical Guidance Note, with an odour assessment form being completed (Appendix A). All site personnel will be responsible for reporting any odour problems immediately to the site manager or the next level of management if the manager is not available.
- 6.2.3 The following locations will be targeted for odour monitoring by the nominated site staff, being mindful of landfilling activities operating adjacent to the site at the time. It is noted that at several locations, particularly to the north and east, landfill activities will be carried out between the WTS and the monitoring location, and odours from either activity may have to be differentiated if practicable:
- At least four points around the perimeter of the WTS (with particular attention to potential point source emissions e.g. doors);
 - Weighbridge (continuous monitoring of vehicles);
 - Inside eastern perimeter fence of landfill site (landfill to east of WTS means that any odours detected may be landfill derived and must be distinguished by type of odour if possible);

- At steel finishing works to north of site. If odour is detected then position inside the Parry's Quarry perimeter fencing at the north of the site will be visited (landfill to north of WTS means that any odours detected may be landfill derived and must be distinguished by type of odour if possible);
- At the industrial unit to the west of the site. If odour is detected then position inside the Parry's Quarry perimeter fencing at the east of the site will be visited;
- Site Entrance. If odour is detected then position inside the southern perimeter fencing will be visited.

6.2.4 The following information will be recorded during each round of monitoring:

- Time and location of round of monitoring;
- Weather conditions and temperature during round of monitoring e.g. dry, rain, fog etc;
- Wind strength during round of monitoring (e.g. none, light, strong, or actual wind speed if known);
- Intensity of odour during round of monitoring (see odour reporting form, Appendix A)
- Duration of test
- Persistence of odour (e.g. constant, intermittent, etc)
- Character of odour (e.g. fishy, rotten eggs, stagnant etc)
- Receptor sensitivity (see odour reporting form, Appendix A) Records of the likely source of any odour even if it is not from the facility;
- Details on the corrective action taken, realistic timeframes for remedial works and any subsequent changes to monitoring and operational procedures.

6.2.5 The site manager will be informed immediately of any findings of odour attributed to the site and will authorise further investigations, if required, and remedial measures to be taken.

6.3 Complaints Management and Reporting

6.3.1 Any complaints received at the Facility or via the Regulatory bodies including Natural Resources Wales and Flintshire county Council, will be recorded and will instigate further investigation and olfactory monitoring at the location of the complaint and on site to determine the extent and location of the odour, the potential source of the odour and the characteristics of the odour e.g. sweet, sour, rotten eggs etc. Where possible, as much information and detail about the complaint will be recorded, whether this is from the relevant authority or complainant direct to site. This information will assist in the investigation and determining the source of the odour and may include:

- Complaints received including name and contact details of complainant (if known), and complainants description of the odour;

- Nature of problem including date, time, duration, prevailing weather conditions and cause of the problem;
- Onsite activities and operational condition at the time of the complaint;
- Records of the likely source of the odour even if it is clearly not from the facility;
- Details on the corrective action taken, and any subsequent changes to monitoring and operational procedures;
- Natural Resources Wales/ Flintshire County Council will proactively be informed by the operator of the complaint and the operator will confirm to the best of its knowledge the information described above.

6.3.2 All complaints and queries will be logged in accordance with the EMS as soon as is practicably possible. All complaints logged will be subject to investigation and complainants responded to within 48 hours of receipt. All responses will be dealt with by trained and experienced staff.

6.3.3 In the event that an odour complaint is received, additional monitoring will be undertaken at the nearest sensitive receptors. The person conducting the survey shall make note of any odours at each monitoring point including those not of obvious waste facility site origin.

6.3.4 The operator will ensure that the complainant has all the relevant contact details of the site (i.e. the Site Manager) and the officer responsible at the Natural Resources Wales/ Flintshire County Council. The operator will be in regular contact with the complainant and the Agency whilst the cause of the odour is being investigated and remediated.

6.3.5 An evaluation of the effectiveness of the techniques used will be carried out on completion of any remedial measures or if the complaints persist. The complaints investigation procedure is an iterative process which continues until the complaint is addressed. Records of the above will be retained by site for future reference and where applicable lessons learnt from the investigation process will be used to update and improve the EMS.

6.4 Means of Contact

6.4.1 The facility will be readily contactable to outside organisations and to members of the public. The site signage board (placed in a readily visible location) contains the necessary contact details for both the site operations and Regulatory Bodies.

6.5 Complaint Screening

6.5.1 Each odour complaint received will be objectively assessed against the wider environment to ensure that the source of the emission is traced back to the correct source. As discussed earlier in this OMP, it is essential that the source is correctly identified in order that mitigating measures can be applied

effectively and correctly. The complaint will also be assessed against previous records to place the nature of the complaint into context.

- 6.5.2 If patterns in complaints emerge, community groups or individuals (subject to their agreement) will be called upon to act as an additional odour monitoring resource.

6.6 Complaint Investigation

- 6.6.1 In the event that odour is found to be causing a problem at the Facility, as determined and confirmed by investigation into off site complaints or during routine monitoring; measures will be taken to determine the source, and the following courses of action as detailed below shall be taken;

- Additional olfactory monitoring as detailed above to identify the extent of the plume and potential cause for the odour i.e. waste material and / or process activity;
- Examination of the operational activities at the Facility at the time of the odour complaint or odour identification;
- Examination of the meteorological conditions at the time of the complaint or odour identification;
- Carry out a review of the operational procedure and instigate any control measures immediately following identification of the problem; and
- Further olfactory monitoring will be carried out to ensure the issue has been addressed and to monitor the effectiveness of any control measures undertaken.

- 6.6.2 It is the operator's experience that complaints submitted to regulatory authorities can be made long after the actual odour event or delayed in their relay to the Permit holder for action, thereby making some investigations difficult due to the often transitory nature of odour or changing meteorological conditions. All complaints will be investigated, however, direct calls to site from complainants will allow for an immediate response and review.

6.7 Contingency and Emergency Plans

- 6.7.1 In the event that odour is proven to be from the site and found to be causing a nuisance, as determined by the investigation of off-site complaints or during routine on-site monitoring, action will be taken to determine the source, and the following courses of action as detailed below shall be taken.

Malodorous Waste

- 6.7.2 It is deemed unlikely that the proposed wastes will be malodorous to such a degree that any particular waste cannot be accepted.

6.8 Abnormal Events

6.8.1 The Odour Management Plan assumes that the facility will be running under expected operational conditions. There are however a number of circumstances which could result in an odorous emission from the site if not appropriately considered in advance.

Temperature Inversions

6.8.2 The conditions that can facilitate a temperature inversion (warm odorous air trapped beneath a layer of cold air under still conditions) can be predicted by simple regard to weather forecasts and/or the site meteorological data. If such conditions look possible, particular scrutiny will be given to ensuring that doors remain closed and are only opened for the minimal duration required for access and egress. Olfactory monitoring (detailed in Section 6.3 above) will focus on the downwind boundaries of the site to monitor for the early signs of low level odour movement.

Strong Winds

6.8.3 Wind pressure effects on the building from strong winds can induce positive pressure on the upwind side of a building and negative pressure on the downwind side. This can potentially lead to increased propagation of odour and dust from the site, through open doors and other openings.

6.8.4 The facility design will ensure the integrity of the building is maintained in all weather conditions. The external skin of the building is of a proprietary steel cladding construction with all joints and edges sealed by fasteners or other sealants where required for weather-proofing purposes. All openings for personnel and vehicle access and egress will be provided with doors.

6.8.5 All penetrations to the building for mechanical and electrical services will also be sealed for weather-proofing and this will also prevent potential fugitive odour release via these pathways.

6.8.6 Routine visual inspection of the infrastructure will be undertaken and recorded. Additional inspection for damage resulting from high wind events will also be undertaken.

Snow / Ice

6.8.7 Severe cold weather may result in disruption to waste deliveries and removal of materials to landfill. Disruption may result in waste being delivered to site that has been stored at the point of production for longer than anticipated. However the corresponding colder temperatures are likely to compensate for the increased storage time and result in waste with similar odour generation potential as would normally be expected. Inability to remove waste from site as a result of severe weather conditions is likely to coincide with the inability to deliver waste to the site. As a result the most likely scenario is a short term need to store accumulated waste. The storage plan for doing this is detailed in the tables below.

Hot Conditions

6.8.8 The warmer the waste the greater the potential to generate odour therefore an increase in ambient air temperature may result in increased odour from incoming wastes and wastes stored in the WTS. Daily inspections will be undertaken of the waste being stored to ensure that wastes are being transferred to the landfill site promptly and within 72 hours of receipt. During prolonged periods of hot weather inspection frequency will be increased, the surface area of stored waste will be kept to a minimum.

Anaerobic Decomposition of Waste

6.8.9 When bacteria and fungi break down raw materials provided by the waste they utilise oxygen and the primary product is carbon dioxide, which is odourless. When oxygen is deficient or absent, anaerobic metabolism of waste uses a range of substances instead of oxygen. This therefore results in different by-products being released; many of these substances are odorous. Anaerobic decomposition may occur if incoming materials are kept for too long in the storage area. The operational control measures identified in previous sections of this report, in particular indoor storage of waste and short storage durations, will minimise the potential for waste to become anaerobic.

Implementation of the Contingency Plan and/or Emergency Plan

6.8.10 Should unscheduled maintenance be required, for example during emergency situations, site staff will implement measures to clear stored wastes and divert incoming wastes as required and the site manager will notify NRW.

Table 4. Contingency Plans

ISSUE	PERIOD	CONTINGENCY PLAN
<u>Actions for waste deliveries</u> Facility not available as the delivery location. e.g. complete power failure / structural failure, storage capacity full.	1 day	Direct deliver to alternative facility.
	Up to 72 hours	Direct deliver to alternative facility.
	1 week	Direct deliver to alternative facility.
	1 month	Direct deliver to alternative facility.
	3 months or longer	Identify alternative long term delivery point – potentially temporary transfer station.
<u>Actions for waste already on site</u> Facility not available as the delivery location e.g. complete power failure / structural failure, storage capacity full.	1 day	Remove stored wastes to landfill.
	Up to 48 hours	Remove stored wastes to landfill.
	Up to 72 hours	Direct deliver to alternative facility.
	1 week / month	Direct deliver to alternative facility.
	3 months or longer	Identify alternative long term delivery point.

Review and Update of Contingency and Emergency Plans

6.8.11 The Contingency Plan and Emergency Plan will be reviewed following any incident where they have had to be followed. They will be updated as necessary with any lessons learned.

6.9 Records and Reviews

6.9.1 A daily record relating to the management and monitoring of odour will be maintained. It will include the following details:

- The results of inspections and olfactory monitoring carried out by installation personnel;
- Weather conditions including atmospheric pressure, wind speed and wind direction;
- Problems including date, time, duration, prevailing weather conditions and cause of the problem;
- Complaints received including address of complainant; and
- Details of the corrective action taken, and any subsequent changes to operational procedures.

6.9.2 The Odour Management Plan will be reviewed on an annual basis along with the scheduled review of the EMS or following any changes made in response to complaints or operational practices.

Appendix A
Odour Monitoring Form

Odour Reporting Form

Odour Report Form			Date:	
Time of test				
Location of Test e.g. street name etc.				
Weather conditions (e.g. dry, rain, fog, snow, etc.)				
Temperature (very warm, warm, mild, cold, very cold or degrees if known)				
Wind strength (none, light steady, strong, gusting etc. or use actual wind speed if known)				
Intensity of Odour (see below)				
Duration of Test				
Constant or intermittent in duration of test				
What does it smell like? (e.g. fishy, rotten eggs, stagnant etc.)				
Receptor Sensitivity (see below)				
Is the odour source evident?				
Comments/observations				

Intensity*	Description
0	No odour
1	Very faint odour
2	Faint odour
3	Distinct odour
4	Strong odour
5	Very strong odour
6	Extremely strong odour

Receptor sensitivity
Low (e.g. footpath, road)
Medium (e.g. industrial or commercial workplaces)
High (e.g. housing, pub/hotel, restaurant)

* Ref German Standard VDI 3882, Part 14

Sketch location of odour monitoring location and any potential sources of odour and potential receptors.