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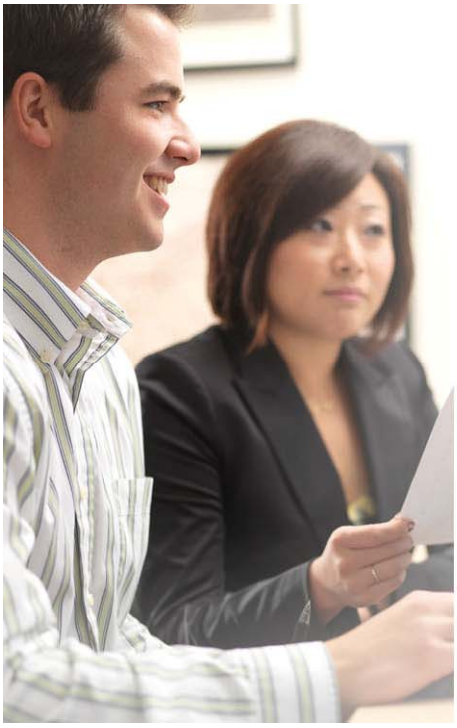
RJS Civil Engineering Ltd

Parry's Quarry Environmental Permit Application

Amenity and Health Risk Assessment



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AMEC Environment & Infrastructure UK Limited

Proposal for

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Contents

1. Introduction

This report sets out the Amenity and Health Risk Assessment of the proposed importation and subsequent landfilling of non-hazardous waste in support of the PPC application for the proposed landfill at Parry's Quarry, Flintshire, Wales. The proposed landfill site will be fully engineered and contained in accordance with the Landfill Directive and Environmental Permitting (England and Wales) Regulations 2010 (as amended).

The risk assessment for the proposed importation of non-hazardous waste materials has been based on the Environment Agency's guidance for Environmental Permit applications, *'H1 Environmental Risk Assessment Part 1 – A simple assessment of environmental risk for accidents, odour, noise and fugitive emissions'*[1] hereafter referred to as the H1 Guidance. This guidance sets out a risk screening methodology that identifies the potential risks from odour, noise and fugitive emissions. Fugitive emissions will include any releases not coming from a point source emission point. These include dust, volatile organic compounds (VOCs) and any potential problems with pests (birds, vermin and insects (bvi)), mud on roads, litter and accidents.

In addition to the above guidance, the criteria for which the risk assessments have been based have been determined upon consultation of the following documents:

- Technical Guidance Note H3 Guidance for Noise[2] (2004), hereafter referred to as the H3 Guidance;
- Technical Guidance Note H4 (2011) Odour Management[3], hereafter referred to as the H4 Guidance;
- M17: Monitoring of Particulate Matter in Ambient Air around Waste Facilities (2004)[4];
- EPR 5.02: How to comply with your environmental permit; Additional guidance for: Landfill (2009)[5] ;
- EPR 1.00: How to comply with your environmental permit (2010)[6] ; and
- Environmental Permitting Regulations: Inert Waste Guidance: Standards and Measures for the Deposit of Inert Waste on Land (2009)[7].

1 Environment Agency (April 2010) Horizontal Guidance Note H1 (2010) Environmental Risk Assessment for Permits.V2.0.
2 Environment Agency. IPPC H3 Horizontal Guidance for Noise. Part 1: Regulation and Permitting. Part 2: Noise Assessment and Control. June 2004
3 Environment Agency (2011) Integrated Pollution Prevention and Control. Odour Management Guidance. Technical Guidance Note IPPC H4.
4 Environment Agency (2004) M17: Monitoring of Particulate Matter in Ambient Air around Waste Facilities.
5 Environment Agency (2009) EPR 5.02: How to comply with your environmental permit; Additional guidance for: Landfill
6 Environment Agency (2010) EPR 1.00 How to comply with your environmental permit.
7 Environment Agency (2009) Environmental Permitting Regulations: Inert Waste Guidance: Standards and Measures for the Deposit of Inert Waste on Land.

1.1 Assessment Scope

The following amenity and health issues relevant to permit requirements and guidance have been assessed for the Parry's Quarry site: noise and vibration; odour; fugitive emissions (including those to air and water), pests (*i.e.*, birds, vermin and insects); mud on roads, litter; and accidents.

The Environmental Permit application also includes additional documents which assess the risk posed to groundwater, surface water, slope stability and landfill gas emissions all of which may have potential health impacts. This document should therefore be read in conjunction with supporting technical assessments such as the Environmental Site Setting and Design (ESID)[8], Landfill Gas Risk Assessment (LFGRA)[9], Hydrogeological Risk Assessment (HRA)[10], Stability Risk Assessment (SRA)[11] and the Surface Water Management and Monitoring Plan[12].

1.2 Structure of the Assessment

The remainder of the report is set out as follows:

Section	Aims and Objectives
Section 2	Summarises the approach and methodology of the risk assessment in accordance with H1 Guidance
Section 3	Briefly describes baseline conditions relevant to the assessment
Section 4	Identifies the pathways through which nuisance and health-related sources could potentially impact upon sensitive receptors in the vicinity of the Parry's Quarry site.
Section 5	Details the risk assessment for amenity and health
Section 6	Summarises the conclusions and recommendations of the amenity and health risk assessments.

8 AMEC E&I (2011) Parry's Quarry Environmental Site Setting and Design. Report Ref: 30030-01/R4150.
9 AMEC E&I (2011) Parry's Quarry Landfill Gas Risk Assessment. Report Ref: 30030/R4121.
10 AMEC E&I (2011) Parry's Quarry Hydrogeological Risk Assessment. Report Ref: 30030/R4120.
11 AMEC E&I (2011) Parry's Quarry Stability Risk Assessment. Report Ref: 30030-01/ R4155.
12 AMEC E&I (2011) Parry's Quarry Surface Water Management and Monitoring Plan. Report Ref: 30030-01/ R4177.

2. Approach

The risk assessment for the Parry's Quarry landfill is based on H1 Guidance, a staged approach to risk assessment. This guidance sets out a risk screening methodology that:

- identifies all potential hazards associated with the landfilling operations, *i.e.*, activities that result in releases;
- identifies all potentially sensitive target receptors, *i.e.*, individuals, properties or land uses potentially affected by a hazard;
- identifies all theoretical pathways, *i.e.* combinations of hazards and receptors involved in exposures;
- ranks the likely significance of each hazard/receptor pathway based on the potential level of emissions and the nature of the pathway; and
- identifies risk management and monitoring measures for each pathway.

Stage 1 Risk Assessments constitute a non-technical qualitative scoping exercise to indicate the likely level of susceptibility a site may have with regard to causing a nuisance or health effect. The assessments for the Parry's Quarry site were based on readily available information on surrounding land uses, other aspects of the site's location, waste inputs and operations at the proposed landfill.

Consistent with the H1 guidance, risk assessments are carried out initially on the assumption of no environmental risk management measures, and those measures are identified through a risk management process to identify landfill practices and site-specific mitigation systems appropriate for the particular waste management activity in question.

Only issues identified as having a moderate or high susceptibility to an issue are carried past the initial scoping stage (Stage 1 Assessments).

For each representative receptor, qualitative assessments of amenity risks have been made with reference to information on planned activities. Each receptor was considered on an individual basis in terms of the unmitigated risks of odour, fugitive emissions, litter, mud on the road and accidents. Risk levels were assigned for each hazard on the basis of the sensitivity of the receptor in terms of the type and location of the receptor, the nature of the pathway, wind speed and direction. In addition to this, when the risk of noise was considered, reference was also made to the nature of the site plant that would be involved in operations at the site, local topographical features and the presence of screening between current and future site operations and receptors.

3. Baseline Conditions

3.1 Environmental Setting

Details of the proposed installation design and the site's environmental setting are provided within the ESID Report.

In summary, the application site is located at the existing Parry's Quarry which lies approximately 1km north east of the village of Alltami, Flintshire, North Wales at NGR SJ 2755 6652. The site is bordered by Pinfold Lane (unclassified Road) to the west, and A494 Mold Trunk road to the south.

The Buckley Clay Pits and Commons SSSI are located along the south-eastern border of the site. A dismantled railway runs in a north – south direction along the eastern boundary of the site. Beyond this there is farmland, a service station, commercial premises (Costa Coffee and Subway), a hotel (Holiday Inn) and the main A55 dual carriageway. Several commercial premises and two residential properties are located to the north of the quarry.

The site is currently used as a quarry and waste transfer station. The site was granted planning permission to operate as a waste transfer station in October 2004. Existing baseline conditions at the site are therefore influenced by current operations, for example, with potential sources of atmospheric emissions including the generation and deposition of dust and vehicle related emissions associated with the provision of waste and removal of raw materials and plant engaged in quarrying activities at the site.

Quarrying at the site will continue in parallel with the proposed site restoration by landfilling with site-derived materials being utilised for engineering purposes as far as possible.

3.1.1 Meteorological Conditions

Information on wind speed and direction has been derived from Hawarden Airport located approximately 13km to the east southeast of the site. Meteorological data for the period 2005 – 2009, depict a prevailing south-easterly component with a lesser north-westerly component (Appendix A).

4. Identification of Hazards and Potentially Sensitive Receptors

4.1 Hazard Identification

The simple risk assessment Tables 5.1 to 5.4 provide information on the location and nature of the specific hazards at the Parry's Quarry site for all generic potential hazards. These have been grouped in relation to noise and vibration; odour; fugitive emissions (including dust, VOCs and pests *i.e.*, birds, flies and vermin); mud on road and litter; and accidents. The hazards assume that no mitigation is applied.

It is acknowledged that the location of certain release points for substances will move over time. To account for this, reference has made to the phasing and development plans. The risk over the whole life of the landfill is also considered.

4.2 Pathways

Human health risks from environmental contaminants can only arise if there is a complete exposure pathway that links a source of harmful contaminants with a human receptor potentially exposed to those contaminants. Potential routes include environmental pathways (air, soil, water) in addition to human activity; that sustain direct exposure pathways including inhalation, oral (soil ingestion), dermal (skin contact) and eye contact.

Risk assessment Tables 5.1 to 5.4 identify the range of source-receptor exposure pathways that may potentially result in exposures to pollutant emissions from the Parry's Quarry site.

4.3 Receptors

Sensitive receptors are those where the public may be subject to the release of pollutants from the site. This may be exposure to dust from on-site waste infill operations or exposure to gaseous pollutants from exhaust emissions from site traffic and traffic using adjacent roads. Potential receptors in the vicinity of the proposed landfill site are listed in Table 41.

Sensitive receptors have been identified in line with the list of generic categories of potential receptors which need to be considered with respect to nuisance, amenity and health factors as specified within the EA documents 'Guidance on the Management of Landfill Gas' and 'Procedures for Identifying Risks from Landfill Sites'.

Sensitive receptors have been identified in relation to the closest distance between the landfill site boundary and the receptor as summarised in Table 4.1. Note that the distance of the sensitive receptors from the site boundary have been determined on the basis of the operational areas.

There are a number of receptors at or close to the site boundary identified during the planning application including commercial properties, amenity areas and residential properties. The most significant downwind receptors are

located at the eastern perimeter of the site in a service area for the A55 and comprise a hotel and a number of restaurants. There are also residential properties adjacent to the south-eastern perimeter of the site. For the locations each of these receptors, reference should be made to Drawing No. ESID13B.

It is in response to concerns from these potential receptors that the inert wastes area at the eastern boundary of the landfill has been prescribed by planning conditions.

Table 4.1 Receptor Summary

Category of Receptor	Receptor and Distance from Planning Boundary	Direction from Site Boundary (Relevant Wind Directions)
Domestic Dwelling closer than 50m	None	/
Domestic dwellings between 50m and 250m	5 No.Parry's Cottages (150m from landfill operations) Ewloe Wood House (205m)	SSE (NW - NNW) NE (SE)
Domestic Dwellings between 250 and 500m	5 No. Pottery Cottages (320m) Gell Farm (325m) Old Farm Cottage (400m) Penfold Cottage (430m) Oaks Farm (360m) The Box (95m)	SE (NW) NW (SE) NNW (SSE) NW (SE) NNW (SSE) NNW (SSW)
Hospitals	None within 1km	/
Schools and Colleges	None within 1km	/
Offices, industrial units and commercial premises (within 500m)	Shell service station, A55 Holiday Inn, A55 OK Diner, A55 McDonalds, A55 Costa Coffee/Subway, A55 Kirby – Hulme Ltd Legal Services Dawson Rentals- Truck and Trailers Ltd AH Plant Hire Aggre- Tech Roberts and Jones Engineering Ltd CRC Stone General storage and warehouse area Flintshire County Council depot and offices Brock Plc Pinfold Lane Quarry SCANIA Flintshire Crane Hire Hunter Steel Coatings Ltd Various units within the Ewloe Barns Industrial Estate	NE (SW) ENE (WSW) NE (SW) NE (SW) ENE (WSW) NW (SE) NW (SE) NW (SE) NW (SE) NW (SE) NW (SE) NW (SE) SW (NE) NW (SE) NW (SE) SW (NE) NNW (SSE) SW (NE)

Table 4.1 (continued) Receptor Summary

Category of Receptor	Receptor and Distance from Planning Boundary	Direction from Site Boundary (Relevant Wind Directions)
Sensitive habitats	SSSIs	
	Buckley Claypits and Commons	SSE (NNW)
(distances within 2km and	SACs	
within 5 km)	Deeside and Buckley Newt Sites	Multiple directions
Public footpaths and bridleways	Located within 500m of the site's western and northern boundaries.	W (E) N (S)
Major highways and minor	Major roads within 500m	
roads	A55	E (W)
	A494	S (N)
	A minor road within 500m	
	Pinfold Lane (parallel to western boundary of site)	W (E)
	Magazine Lane near A55	E (W)
Farmland	None adjacent to site boundaries	All
	Within 500m of boundaries	
	farmland towards north-west, north-east and south	
Open spaces and parks	None within 500m	/
Air Quality Management Areas	No AQMAs within 500m of site boundary	/
Railway	Dismantled railway (approx 70m) runs alongside eastern boundary of site.	E (W)
Airports	Hawarden Airport (13km to ESE)	ESE (WNW)

5. Risk Assessment

All potential source-pathway-receptor linkages, risk management, impacts and overall risk assessment are detailed in Tables 5.1 to 5.6.

5.1 Noise and Vibration

A simple risk assessment has been undertaken for these issues using the Environment Agency's H1 Guidance (Section 2.1). The potential environmental effects concerning issues identified as having a moderate or high susceptibility associated with noise and vibration generation have been considered in detail as part of the planning application process. This comprehensive noise assessment, including an addendum that further considered noise and air quality implications of proposed the Costa Coffee and Subway developments, is provided in the Planning Application Environmental Statement, copies of which are provided in the Environmental Permit Application supporting documentation.

The assessment recommends noise mitigation including a *Construction Phase Noise Management Plan*. This and other risk management measures for noise and vibration are listed in Table 5.1.

5.2 Odour

The risk of odour generation from the proposed installation has been identified in the current screening assessment. Potentially significant odour sources in relation to the proposed installation, particularly fugitive emissions of landfill gas, have been examined through detailed quantitative assessment using complex dispersion modelling. This evaluation is provided in the Planning Application Environmental Statement, a copy of which is provided in Appendix B. A copy of the addendum, that further considered noise and air quality implications of proposed the Costa Coffee and Subway developments, is provided in the Environmental Permit Application supporting documentation.

These detailed evaluations, in addition to the LFGRA[9], concluded that any potential odour impacts associated with the proposal would be intermittent and of 'minor significance' in the absence of appropriate odour control measures. The implementation of an *Odour Management Plan* (OMP), previously submitted in line with the detailed odour assessment, would mean that the potential odour impacts arising from the installation would be manageable to 'negligible' levels. A copy of the OMP for the proposed installation is provided in Appendix B.

5.3 Fugitive Emissions

5.3.1 To Air

The simple risk assessment for fugitive dust emissions demonstrates that any potential adverse impacts from dust emissions would at worst be 'minor' and that such emissions could be controlled adequately by mitigation

measures, such that residual impacts would be 'negligible to low' for the construction phase and 'negligible' for the operational phase.

The risk of adverse impacts as a result of VOC generation from fugitive emissions of landfill gas (LFG) has been identified in the current screening assessment and detailed further in the LFGRA[9]. The current assessment concluded that any potential LFG impacts associated with the proposal would be of 'low significance' in the absence of appropriate control measures. The implementation of a *Landfill Gas Management Plan*, as detailed in the accompanying LFGRA[9], would also mean that potential LFG impacts arising from the installation would be manageable to 'negligible' levels.

5.3.2 To Water

The simple risk assessment for fugitive emissions to water demonstrates that any potential adverse impacts from such emissions would at worst be 'low' risk and that such emissions could be controlled adequately by mitigation measures, such that residual impacts would be 'negligible to low' for the operational phase.

The risk of adverse impacts as a result of fugitive emissions to water have been identified and detailed further in the HRA and SWMMP. The current assessment concluded that any potential impacts associated with the proposal would be of 'low significance' in the absence of appropriate control measures. The implementation of the respective ground and surface water management plans would also mean that potential impacts arising from fugitive emissions to water from the installation would be manageable to levels of 'negligible to low' significance.

5.3.3 Pests (Birds, Vermin and Insects)

The risk of adverse impacts as a result of pests (*i.e.*, birds, vermin, insects) has been identified in the current screening assessment and considered in detail as part of the planning application process. The qualitative amenity assessment is provided in the Planning Application Environmental Statement, a copy of which is provided in the Environmental Permit Application supporting documentation.

The current assessment concluded that any potential impacts associated with the incidence of pests arising from the proposed installation would be of 'minor significance' in the absence of appropriate control measures. The Fugitive Emissions Management and Monitoring Plan[13], submitted as part of the Environmental Permit Application in response to concerns regarding the possible impact on aircraft using Broughton airfield, identifies measures to deal with the risk of bird concentrations around the landfill that also incorporates suggestions from Airbus, the airfield operator.

[13] AMEC E&I (2011) Parry's Quarry Fugitive Emissions Management and Monitoring Plan. Report Ref 30030/R4176.

5.3.4 Mud on Road(s) and Litter

Information regarding mud on roads and litter are as set out in Table 5.3. The evaluation presented herein indicates that no further assessment is warranted for this issue. The risk management measures listed in Table 5.3 are considered to be adequate for prevention of significant nuisance.

5.4 Accidents

The measures listed in Table 5.4, including the implementation of an Accident Management Plan[14], submitted in line with the Environmental Permit Application, are considered to be sufficient to reduce the susceptibility for accidents and incidents at the proposed installation to 'low'.

5.5 Public Health

The detailed public health risk assessment, prepared as part of the planning process, evaluated all potential exposure pathways that occur as a result of operations at the proposed site. The assessment, a copy of which is provided in Environmental Permit Application supporting documentation, indicated low risks of adverse effects for all pathways, either because the pathway would not be complete or, if complete, would not result in significant risks as a result of the characteristics of the site and its location and/or the risk management measures employed.

[14] AMEC E&I (2007) Parry's Quarry Accident Management Plan. Report Ref 30030/R4164.

Table 5.1 Noise and Vibration

Hazard	Location	Receptors	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Construction Phase								
Noise disturbance from earth moving plant	Engineering works: Construction of the southern and eastern section of the haul road	Holiday Inn	Air	High	Moderate adverse impact of noise annoyance to occupants	Moderate	Recommended that a Noise Management Plan is submitted to Flintshire County Council prior to commencement of the construction phase	Low impact at the Holiday Inn
		Ewloe Wood House	Air	High	Minor adverse impact of noise annoyance to residents	Low		No impact at receptors Ewloe Wood House
		Council Offices	Air	High	Negligible of noise annoyance to workplace	Negligible		No impact at receptors Council Offices
		Parry's Cottages	Air	High	Major adverse impact of noise annoyance to residents	High		Low impact at Parry's Cottages (Note that is the acoustic screen is constructed along the southern boundary prior to any site preparation this is likely to be negligible).
Noise disturbance from earth moving plant	Engineering works: Construction of the western section of the haul road	Holiday Inn	Air	High	No impact of noise annoyance to occupants	No impact	Recommended that a Noise Management Plan is submitted to Flintshire County Council prior to commencement of the construction phase	Low impact at the Holiday Inn
		Ewloe Wood House	Air	High	Minor adverse impact of noise annoyance to residents	No impact		No impact at receptors Ewloe Wood House
		Council Offices	Air	High	No impact of noise annoyance to workplace	No impact		No impact at receptors Council Offices

Table 5.1 (continued) Noise and Vibration

Hazard	Location	Receptors	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
		Parry's Cottages	Air	High	No impact of noise annoyance to residents	No impact - Negligible		Low impact at Parry's Cottages (Note that is the acoustic screen is constructed along the southern boundary prior to any site preparation this is likely to be negligible).
Noise disturbance from earth moving plant	Engineering works: Cell Preparation Works – Cell 1	Holiday Inn	Air	High	Negligible impact of noise annoyance to occupants	Negligible	Recommended that a Noise Management Plan is submitted to Flintshire County Council prior to commencement of the construction phase	Low impact at the Holiday Inn
		Ewloe Wood House	Air	High	No impact of noise annoyance to residents	Negligible		No impact at receptors Ewloe Wood House
		Council Offices	Air	High	Negligible impact of noise annoyance to workplace	No impact		No impact at receptors Council Offices
		Parry's Cottages	Air	High	Negligible impact of noise annoyance to residents	Negligible		Low impact at Parry's Cottages (Note that is the acoustic screen is constructed along the southern boundary prior to any site preparation this is likely to be negligible).

Table 5.1 (continued) Noise and Vibration

Hazard	Location	Receptors	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Noise disturbance from earth moving plant	Cell Preparation Works – Cell 2 – 4	Holiday Inn	Air	High	Negligible impact of noise annoyance to occupants	Negligible	Recommended that a Noise Management Plan is submitted to Flintshire County Council prior to commencement of the construction phase	Low impact at the Holiday Inn
		Ewloe Wood House	Air	High	No impact of noise annoyance to residents	No impact		No impact at receptors Ewloe Wood House
		Council Offices	Air	High	No impact of noise annoyance to workplace	No impact		No impact at receptors Council Offices
		Parry's Cottages	Air	High	Minor adverse impact of noise annoyance to residents	Low		Low impact at Parry's Cottages (Note that is the acoustic screen is constructed along the southern boundary prior to any site preparation this is likely to be negligible).
Noise disturbance from water pumps	Drainage of Lagoons	Holiday Inn	Air	High	No impact of noise annoyance to occupants	No impact	None required	No impact
		Ewloe Wood House	Air	High	No impact of noise annoyance to residents	No impact		
		Council Offices	Air	High	No impact of noise annoyance to workplace	No impact		
		Parry's Cottages	Air	High	No impact of noise annoyance to residents	No impact		

Table 5.1 (continued) Noise and Vibration

Hazard	Location	Receptors	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Operational Phase								
Noise disturbance from lorry movements and unloading	In accordance with waste sequencing	Holiday Inn	Air	High	Negligible impact of noise annoyance to occupants	Negligible	A hard metalled surfaced internal haul road, to minimise vehicle noise Restriction of the vehicle speed along the haul road to avoid body slap from entry lorries. A landfill maintenance programme, with particular attention being given to maintaining improving the noise muffling system on landfill construction and waste/cover soil placement equipment. A close board fence about the northern boundary of the site, which should attenuate noise propagation to Ewole Wood House and the Box.	Low impact
		Ewloe Wood House	Air	High	No impact of noise annoyance to residents	No impact		No impact
		Council Offices	Air	High	No impact of noise annoyance to workplace	No impact		No impact
		Parry's Cottages	Air	High	Minor adverse impact of noise annoyance to residents	Low		Moderate impact

Table 5.1 (continued) Noise and Vibration

Hazard	Location	Receptors	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Noise disturbance from earth moving plant	Redistribution and compaction of waste – Sequence 1-4	Holiday Inn	Air	High	Negligible impact of noise annoyance to occupants	Negligible	The landfill operator should use the quietest available plant to carry out the task effectively. The landfill operator should emphasise the need to minimise noise through training of site personal. The landfill operator should ensure there is a comprehensive compliant procedure. Position an acoustic screen along the southern boundary of the site to minimise noise disturbance at Parry's Cottages.	Low impact
		Ewloe Wood House	Air	High	No impact of noise annoyance to residents	No impact		No impact
		Council Offices	Air	High	No impact of noise annoyance to workplace	No impact		No impact
		Parry's Cottages	Air	High	Minor adverse impact of noise annoyance to residents	Low		Moderate impact

Table 5.1 (continued) Noise and Vibration

Hazard	Location	Receptors	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Noise disturbance from earth moving plant	Redistribution and compaction of waste – Sequence 5-8	Holiday Inn	Air	High	Minor adverse impact of noise annoyance to residents	Low		Low impact
		Ewloe Wood House	Air	High	Negligible impact of noise annoyance to occupants	Negligible		No impact
		Council Offices	Air	High	Negligible impact of noise annoyance to occupants	Negligible		No impact
		Parry's Cottages	Air	High	Moderate adverse impact of noise annoyance to residents	Moderate		Low impact
Noise from gas flares	Operation of gas flares	Holiday Inn	Air	High	No impact (day) Negligible impact (night)	No impact – Negligible	None required	No impact – Negligible
		Ewloe Wood House	Air	High	No impact (day) Negligible impact (night)	No impact – Negligible	None required	No impact – Negligible
		Council Offices	Air	High	No impact	No impact	None required	No impact
		Parry's Cottages	Air	High	No impact	No impact	None required	No impact

Table 5.1 (continued) Noise and Vibration

Hazard	Location	Receptors	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Noise from gas engines	Operation of gas engines	Holiday Inn	Air	High	No impact (day) Negligible impact (night)	No impact – Negligible	None required	No impact – Negligible
		Ewloe Wood House	Air	High	No impact (day) Negligible impact (night)	No impact – Negligible	None required	No impact – Negligible
		Council Offices	Air	High	No impact	No impact	None required	No impact
		Parry's Cottages	Air	High	No impact (day and night)	No impact	None required	No impact
Increase in traffic noise	Increase in traffic noise	Holiday Inn	Air	High	Negligible	Negligible	None required	Negligible
		Ewloe Wood House	Air	High	Negligible	Negligible	None required	Negligible
		Council Offices	Air	High	Negligible	Negligible	None required	Negligible
		Parry's Cottages	Air	High	Negligible	Negligible	None required	Negligible

Table 5.2 Odour

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Operational Phase								
Odour from the deposit of non-hazardous malodorous waste/ uncovered waste	Redistribution and compaction of waste – Sequence 1-4 Active cell prior to application of intermediate cover	Receptors as listed in table 2.1 and shown in drawing 30030/EISD/02	Air	Low – due to 100m minimum separation distance (inert waste wedge)	Low – odour nuisance, loss of amenity.	Low	No additional mitigation is considered necessary on the basis that procedures for the operation of landfill sites are defined and outlined within a number of Environment Agency documents. A 100m minimum separation distance (inert waste wedge) will be implemented along the most sensitive boundary Additional mitigation measures are limited to : o Management and monitoring of odour as set out in OMP (Appendix B) o Stack and engines monitoring and maintenance o Landfill gas management plan, as described in LFGRA[9] The site manager will be responsible for implementing risk management measures.	Negligible to Low
Odour from the generation and migration of landfill gas from landfilling/ degradation of wastes	Redistribution and compaction of waste – Sequence 1-4	Receptors as listed in Table 2.1 and shown in drawing30030/EISD/13B	Air	Low – due to 100m minimum separation distance (inert waste wedge)	Low – odour nuisance, loss of amenity.	Low		Negligible to Low
Landfill Gas Management: Odour from uncontrolled landfill gas release	Restored and unrestored disposal areas	Receptors as listed in Table 2.1 and shown in drawing 30030/EISD/13B	Air	Low	Low – odour nuisance, loss of amenity.	Low		Negligible to Low
Landfill Gas Management: Emissions from engines and Flares	Emissions from engines and Flares to the northeast corner of the site	Receptors as listed in Table 2.1 and shown in drawing 30030/EISD/13B	Air	Low	Low – odour nuisance, loss of amenity.	Low		Negligible to Low

Table 5.2 (continued) Odour

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Leachate	Restored and unrestored disposal areas	Receptors as listed in Table 2.1 and shown in drawing 30030/EISD/13B	Air	Low – due to management techniques	Low – odour nuisance, loss of amenity.	Negligible to Low	The operation and maintenance of active leachate extraction and management systems will be in place. Leachate risk management measures detailed within the Odour Management Plan. The site manager will be responsible for implementing risk management measures.	Negligible

Table 5.3 Fugitive Emissions

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
To Air - Construction Phase								
Generation and deposition of dust	Site preparation and construction activities including new site entrance and access road and provision of site infrastructure	Vegetation and sensitive habitats (SSSI)	Air	Low	Low – harm to ecological receptors	Low	Implementation of CEMP including various measures to reduce the potential for dust generation and dispersion including: • Speed limits of site access road • Spraying site access road to damp down and loose particles • Locating stockpiles away from sensitive receptors and provision of windbreak netting • On site materials handling in enclosed areas	Negligible to Low
Generation and deposition of dust	Site preparation and construction activities including new site entrance and access road and provision of site infrastructure	Receptors as listed in Table 2.1 and shown in drawing 30030/EISD/13B	Air	Low	Low – nuisance and health risk to site workers and local receptors	Low		Negligible to Low
Vehicle and exhaust related emissions	Site preparation and construction activities including new site entrance and access road and provision of site infrastructure	Local air quality	Air	Low	Low – nuisance and health risk to site workers and local receptors	Low	Implementation of CEMP including measures to reduce impacts associated with vehicle and exhaust related emissions including use of well maintained plant, Restricting idling engines and using pre determined routes for construction traffic.	Negligible

Table 5.3 (continued) Fugitive Emissions

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
To Air - Operational Phase								
Dust generation and dispersion from delivery and placement of waste	Redistribution and compaction of waste – Sequence 1-4 Active cell prior to application of intermediate cover	Receptors as listed in table 2.1 and shown in drawing 30030/EISD/13B	Air	Low	Low – nuisance and health risk to site workers and local receptors	Low	Measures to minimise dust nuisance at the site shall include: • Surfacing of access roads/ hardstandings in and around the site entrance area • Speed limits of site access road • Instructions to all vehicles with regard to the sheeting of loads • Grading and other regular maintenance of internal haul roads to minimise potholes • Use of a water bowser on-site to suppress dust on unsurfaced haul routes and active working areas Compaction and covering of the waste to reduce wind erosion.	Negligible
Traffic and vehicle related emissions from delivery and placement of waste	Sequence 1-4 Active cell prior to application of intermediate cover	Receptors as listed in Table 2.1 and shown in drawing 30030/EISD/13B	Air	Very Low	Low – nuisance and health risk to site workers and local receptors	Negligible to Low		Negligible

Table 5.3 (continued) Fugitive Emissions

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Landfill Gas Management: VOCs from uncontrolled landfill gas release	Restored and unrestored disposal areas	Receptors as listed in table 2.1 and shown in drawing 30030/EISD/02	Air	Low	Low – odour nuisance, loss of amenity.	Low	Landfill gas management plan, as described in LFGRA[9] The site manager will be responsible for implementing risk management measures.	Negligible to Low
To Water								
Flooding	Non-specific	Receptors as identified in HRA	Water	Low	Low - Site not in defined flood zone.	Low	Site not in defined flood zone.	Negligible to Low
Contamination of groundwater	Non-specific	Receptors as identified in HRA	Transport through soil/groundwater then extraction at borehole	Low	Very low: There are no abstractions within 2km from site. Site is not above a major aquifer. Hydrogeological conditions imply very low probability of local site contamination of groundwater transmitting up to 1km from site (see Hydrogeological Assessment). Site engineered to Landfill Design requirements. Risk management actions should prevent this.	Low	All potentially polluting fluids will be stored within sealed containers in secondary containment. Strict adherence to daily inspections as per procedures in the Site Specific Environmental Management system. Waste types non hazardous; strict adherence to waste acceptance criteria.	Negligible to Low

Table 5.3 (continued) Fugitive Emissions

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Contamination of surrounding surface water, land and groundwater	Run-off from the car parks and internal access road	Receptors as identified in SWMMP	Surface water	Low	Low – due to preventative measures in place Hydrogeological conditions imply very low probability of local site contamination of surface waters (see HRA and Surface Water Management Plan). Risk management actions should prevent this.	Low	A SWMMP has been included as part of the EP application	Negligible to Low

Table 5.3 (continued) Fugitive Emissions

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Pests (Birds, vermin and Insects)								
Birds, vermin and insects attracted to landfill	Active and completed cell prior to application of intermediate cover and restoration materials and suitable habitats such as areas of standing water, restored areas suitable for loafing birds.	Receptors as listed in Table 2.1	Land and air	Low	Low – nuisance and loss of amenity and harm to human health	Low	Daily visual inspection of the site by site management will identify any issues with pests. Operational management controls: • Vehicle movements at the face will be controlled such that the wastes are compacted or buried immediately following discharge; • Completed tipping faces will be covered to a sufficient depth and with an appropriate inert or other suitable material to deny access by pests to the waste; • Transporters shall deposit their waste loads in their entirety before leaving the tipping area; • Any spillages outside the tipping area shall be cleared the same day;	Negligible to Low

Table 5.3 (continued) Fugitive Emissions

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
							• Daily temporary cover will be used; • Bird exclusion netting on the active tipping face and the standing water bodies will be used if required; • Where flies are being 'imported', the appropriate authorities and hauliers will be advised to enable corrective actions to be taken; • Contact will be maintained with nearby sites, which may also suffer from fly infestations, such as sewage treatment works, to obviate the potential for imported flies; and When required, an appropriate pest contractor will be appointed as soon as practicable.	

Table 5.3 (continued) Fugitive Emissions

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Litter/ Mud on roads								
Litter from site and/or delivery vehicles to/from the landfill	Active and completed cell prior to application of intermediate cover Access roads to site	Receptors as listed in Table 2.1 and shown in drawing 30030/EISD/13B	Tracked by vehicles arriving and leaving the site. Wind entrainment.	Low – due to nature of operations and control procedures in place	Low – nuisance and loss of amenity.	Low	Control measures include: • vehicles entering or leaving the site are to be sheeted/ enclosed; • daily visual inspection of the site by management will identify mud/ litter issues to be rectified as soon as practicably possible The site manager will be responsible for implementing risk management measures.	Negligible to Low
Litter contained within waste inputs	Active and completed cell prior to application of intermediate cover	Receptors as listed in table 2.1 and shown in drawing 30030/EISD/13B	Wind entrainment	Low – due to nature of operations and control procedures in place	Low – nuisance and loss of amenity.	Low	Strict adherence to Waste Acceptance Criteria. The extent of the active tipping area will be kept to a practicable minimum and deposited waste will be adequately compacted and covered. Regulation of tipping during windy conditions. Erection & maintenance of litter nets close to the tipping face and boundary fencing. Sheeting of all incoming/outgoing loads. Daily site inspection and litter picking on/off site. Record monitoring and actions in site diary.	Negligible to Low

Table 5.3 (continued) Fugitive Emissions

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Mud on roads	Local highways	General public using local highways	Vehicles entering and leaving the site	Low – due to nature of operations and control procedures in place	Low – nuisance and loss of amenity.	Low	All vehicles will be checked. Where mud is found the site remove this prior to leaving the site. All loads to be sheeted/ covered to prevent escape of waste. Daily monitoring of highways. Any debris mud to be cleared from highway as soon as practicable. Employment of road sweeper in the unlikely event of mud/dust deposition on public highway. Provision of wheel-washer. The site manager will be responsible for implementing risk management measures.	Negligible to Low

Table 5.4 Accidents

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Loss of containment or spillage of fuel oil. Including over filling and transfer of fuel oil.	Possible contamination of land, surface and groundwater.	Surface water/ groundwater	Direct run-off from site across ground surface, infiltration and via surface water drains.	Low – due to distance of surface water receptor and risk management measures.	Low – due to preventative measures in place	Low	All fuel storage tanks will be bunded and spill kits will be kept on site. The surface water lagoons will have a cut off valve to isolate the system in the event of a spill. Action Plans and mitigation measures are outlined in the EMS. The Site Manager will be responsible for implementing risk management measures.	Negligible to Low
Build up of landfill gas and migration - explosions	Operational and restored areas	Receptors as listed in Table 2.1 and shown in drawing 30030/EISD/13B	Land, Air	Low – due to procedures in place	Harm and nuisance to local population, emergency services and site staff.	Low	Operating procedures will be in place to minimise the potential for explosions on site which would restrict the severity to a maximum. The operation and maintenance of active gas extraction and management systems will be carried out as described in the accompanying LFGRA. The Site Manager will be responsible for implementing risk management measures.	Negligible to Low

Table 5.4 (continued) Accidents

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Major breach of the landfill liner during the installation of the liner	Groundwater	Groundwater	Land – leakage of leachate: pollution of groundwater and leakage of landfill gas.	Low – due to mitigation practices in place.	Harm and nuisance to local population, emergency services and site staff.	Low	Any defects will be detected during the installation phase and damaged sections will be removed and replaced. A robust engineering design will be supported by liner installation in the CQA procedures.	Negligible to Low
Major breach of installation liner during the placement of waste	Groundwater	Groundwater	Land – leakage of leachate: pollution of groundwater and leakage of landfill gas.	Low – due to mitigation practices in place.	Harm and nuisance to local population, emergency services and site staff.	Low	The site will comply with the requirements set out in the Stability Risk Assessment (Ref 30030/R4155). The Site Manager will be responsible for implementing risk management measures.	
Subsidence and landslides	Operational and restored areas	Receptors as listed in Table 2.1 and shown in drawing 30030/EISD/13B	Land	Low – due to mitigation design features and contingency plans	Harm and nuisance to local population, emergency services and site staff.	Low	The design and construction of the landfill will take into consideration the conclusions of the Stability Risk Assessment (Ref 30030/R4155). The Site Manager will be responsible for implementing risk management procedures.	Negligible to Low

Table 5.4 (continued) Accidents

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
Fire – Landfill	Operational and restored areas	Groundwater and local air quality	Air transport of smoke, spillages and contaminated firewater by direct run off from site and via surface water drains.	Low – due to mitigation practices in place.	Harm and nuisance to local population, emergency services and site staff.	Low	All completed areas of the landfill will be capped as soon as practicable. Action Plans and mitigation measures are outlined in the AMP [Ref. 30030/R4164. The Site Manager will be responsible for implementing risk management measures.	Negligible to Low
Vandalism/unauthorised access causing loss of containment or fire.	Non specific		Land, Air.	Low – due to mitigation practices in place.	Harm and nuisance to local population, emergency services and site staff. Contamination of land and surface water.	Low	The site will be securely fenced and security lighting used. Security measures are in place and include padlocks for all access points to the fuel storage tanks. The flare and generation compound have 2.0m high steel palisade fencing installed to prevent unauthorised access. There will also be a mobile security patrol presence and CCTV cameras when the site is closed.	Negligible to Low

Table 5.4 (continued) Accidents

Hazard	Location	Receptor	Pathway	Probability of Exposure	Consequence	What is the Overall Risk?	Risk Management	Residual Risk
							All permanent pipework will be buried and all control valves outside secure compound will be locked. The Site Manager will be responsible for implementing risk management measures.	
Flooding	Surface water	Land and surface water	Flood waters over land	Low	Contaminated flood waters may contaminate buildings and land.	Minor	Register to receive flood alerts from Natural Resources Wales' existing service. Check weather conditions daily for any adverse weather conditions, storm events; Make weekly inspections of the surface water management system for any signs of damage or blockages and clear where necessary. In the event of an incident or event: Pumping from the attenuation lagoon will be reduced to the existing consented rate of 14 l/s for the duration of the Flood Alert or event, or Reduced to zero if Natural Resources Wales deemed it necessary to ensure the safety of people located downstream.	Negligible to Low

6. Conclusions and Recommendations

The Stage 1 risk assessment, completed in accordance with regulatory H1 Guidance, has indicated that the susceptibility of the application site to odour, dust, litter, bird, fly and vermin (rats and mice) nuisances is low not significant due to the nature of the waste inputs and the historic use of the site for mineral extractions. The risk factors considered in this report are not of a magnitude either individually or in combination to outweigh the application site's overall low susceptibility arising from these features.

Nevertheless, the proposed operations include a number of relevant risk management and monitoring measures pertaining to these issues (Tables 5.1 – 5.4). These measures, which are consistent with good practice, will serve to reduce the risk of adverse amenity effects even further, providing a high level of confidence that the site will not give rise to adverse effects associated with odour, dust, litter, bird, fly and vermin (rats and mice) nuisances.

Potential environmental effects associated with noise and odour generation were considered in detail as part of the planning application process. The noise assessment recommends noise mitigation including a *Construction Phase Noise Management Plan* and indicated that temporary acoustic screens would be required during operations to reduce noise levels to insignificant levels. Further risk management measures for noise are listed in Table 5.1.

The detailed odour assessment concluded that impacts associated with the proposal would be intermittent and of 'minor significance' in the absence of appropriate odour control measures. The implementation of an *Odour Management Plan* (OMP), previously submitted in line with the planning application, would mean that the potential odour impacts arising from the installation, as identified in Table 5.2, would be manageable to 'negligible' levels. A copy of the OMP for the proposed installation is provided in Appendix B.

The measures listed in Table 5.3 are considered to be sufficient for prevention of significant nuisance from fugitive emissions at the proposed installation. Risk assessment Table 5.3 identified several potential sources of airborne dust that have the potential to pose a threat to amenity and human health. Although it is considered that risk management actions should greatly minimise these potential risks, it is considered appropriate to undertake daily visual monitoring.

The detailed public health risk assessment, prepared as part of the planning process, evaluated all potential exposure pathways that occur as a result of operations at the proposed site. The assessment indicated low risks of adverse effects for all pathways, either because the pathway would not be complete or, if complete, would not result in significant risks as a result of the characteristics of the site and its location and/or the risk management measures employed.

Given the above, it is concluded, that the proposed operations will not give rise to adverse amenity or health effects.

Appendix A
Meteorological Data

Figure A.1 2005 Wind Rose

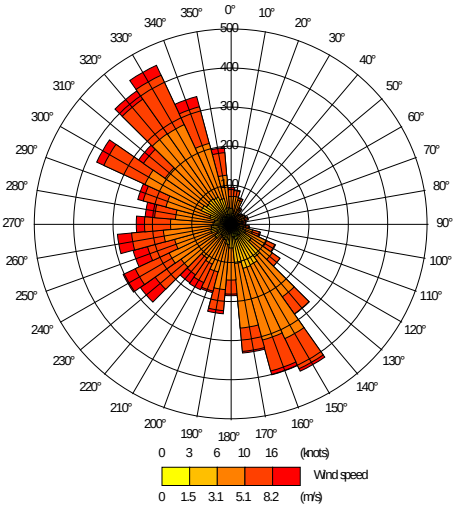


Figure A.2 2006 Wind Rose

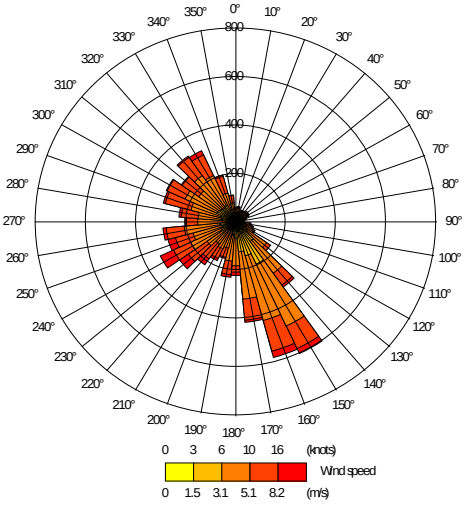


Figure A.3 2007 Wind Rose

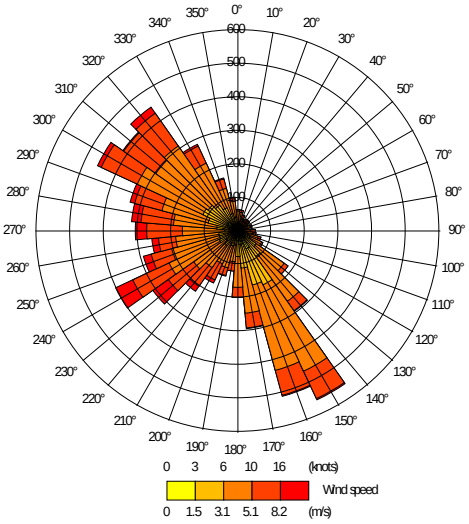


Figure A.4 2008 Wind Rose

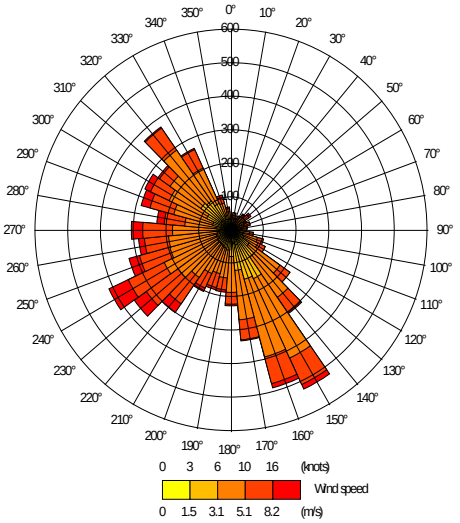
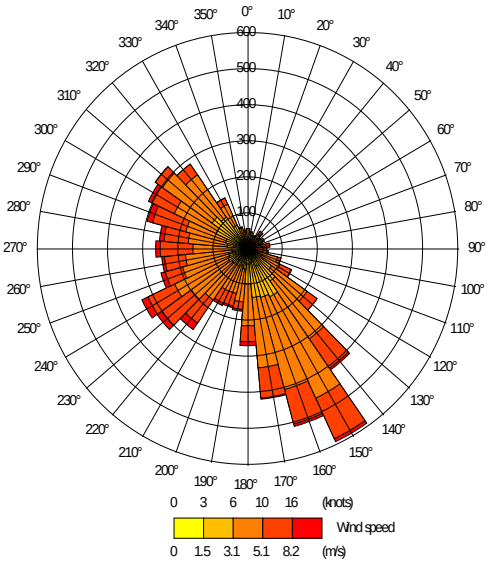


Figure A.5 2009 Wind Rose



Appendix B
Odour Assessment

To Follow