Greater Manchester Waste Disposal Authority

Cringle Road Methane Stripping Plant Facility

Supporting Statement

17 June 2008

Entec UK Limited

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1. Introduction

1.1 Background to the Development

This supporting statement sets out the planning case in respect of a proposal by the Greater Manchester Waste Disposal Authority (GMWDA) to construct a methane stripping plant facility on land which forms part of the closed Cringle Road landfill site. The facility would be designed to prevent high levels of dissolved methane in the leachate from the landfill being discharged untreated to the sewer system.

The site is located in the Levenshulme area of Manchester, to the east of the A6 and is located at grid reference SJ882393. The location of the landfill is shown in **Figure 1.1**.

The proposal has been prepared in the context of current waste management and environmental policy at the international, national, regional and local levels, in particular the Manchester City Unitary Development Plan. Furthermore, it will provide environmental enhancement through the treatment of leachate to prevent permitted discharge consents being exceeded.

1.2 The Site and its Environs

GMWDA is responsible for the maintenance of a number of closed landfill sites around the Greater Manchester area, including the Cringle Road landfill site. The site was inherited from Manchester City Council in 1974 (who had actively tipped before that date) and tipping ceased in mid 1979 with restoration taking place during 1981 to 1982. GMWDA documents state that the site is recorded to have an estimated capacity of 0.5 million m^3 of waste.

The application site comprises an area of approximately 0.03 hectares immediately adjacent to the existing leachate pumping station and is located on the site of the former brickworks. It comprises predominantly rough grassland with some shrubs and woodland. The existing gated site access from Broom Avenue will be utilised. **Figure 1.2** defines the area covered by this planning application.

There are residential properties to the west and south west of the site as well as allotment gardens. The nearest residential property is located opposite the gated entrance to the existing pumping station, although this part of the site is well screened by mature trees. The St Andrew's Primary School is located 110 m to the west of the site.

The larger area of the former landfill is used by local residents as informal open space and forms part of the Highfield Country Park. Nelstrop Road runs north-south along the eastern boundary of the former landfill site and forms the Manchester City Council boundary with Stockport Metropolitan Borough Council. The Houldsworth golf course is located beyond Nelstrop Road to the north east of the site.

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1.3 Statutory Requirements

The application has been prepared in accordance with the provisions of the Town and Country Planning Act 1990. The Planning Application Forms and certificates are enclosed as **Appendix A.**

It is not considered that the proposal falls within the provisions of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999. This is because it is not included as a Schedule 1 development, where an Environmental Impact Assessment (EIA) is mandatory; nor does it fall under Schedule 2 development, where an EIA is required when development would cause significant environmental effects. Section 4 of this statement details the environmental issues raised by the application and the proposed measures and operational controls to minimise environmental effects. These measures would ensure that the effects of the proposed development would not be significant and would not therefore fall within Schedule 2.

A request for a Screening Opinion was submitted to Manchester City Council in August 2007 and in their response (dated 19 September 2007), the Council confirmed the proposal does not fall within either Schedule 1 or Schedule 2 development and that an EIA is **not** required.

In their Screening Opinion, the Council set out that any planning application would need to be accompanied by the following details:

- A planning statement, outlining the approach to the design of the development, with a visual assessment of the works involved;
- An acoustic survey relating to the works/structure proposed to enable any appropriate mitigation to be agreed;
- A methodology statement relating to works/measures which would be implemented should odours/vapours be released on the site;
- A landscape assessment and full details of any new landscaping proposals;
- Full details of how the MSP functions, including details of what happens to the methane after it has been stripped;
- Confirmation that no new pathway(s) would be created for leachate to travel along and potentially contaminate areas outside the site;
- Full details of any staffing and any vehicular movements to/from the site;
- Elevations details of all structures proposed.

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Figure 1.1
Site Location

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Fellowfield Brook
Existing leachate pumping station
N
Key
Planning application boundary
Land ownership boundary
Existing site access road
MSP location
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Figure 1.2
Planning Application Area
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2. The Proposed Development

2.1 Reasons for the Development

Leachate from the site is currently untreated and is discharged directly to foul sewer. Methane is known to be present in the leachate entering the sewer system and, as a responsible operator, GMWDA is seeking to development a methane stripping plant to address this problem.

2.2 Facility Details

2.2.1 Overview

The proposed MSP will consist of:

- Control kiosk;
- x3 Air blowers;
- x8-10 Methane stripping tanks;
- x1 Chamber with sewer discharge pump (below ground);
- Internal modifications to the existing inlet pumping chamber (below ground);
- Lighting columns.

The proposed site plan of the facility is shown on **Figure 2.1**. Note that some details of the project may need to change following the procurement of the facility, although the changes are likely to be relatively minor. GMWDA is therefore seeking a consent which facilitates some minor project amendments, with the written approval of the planning authority.

The proposed MSP facility will be located immediately adjacent to the existing leachate pumping station, which will effectively be extended to form one enclosed compound. The MSP facility will cover an area measuring approximately 21 m by 8 m (equivalent to approximately 0.02 ha), as shown in Figure 1.2.

The site will be accessed using the existing site access from Broom Avenue.

2.3 Description of the Methane Stripping Process

2.3.1 Introduction

The following provides a summary of the methane stripping process. Further operational details would be provided as part of any amendments to the trade effluent discharge consent, including detailed site engineering and drainage.

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2.3.2 Proposed Development

The proposed MSP facility would consist of a series of methane stripping tanks connected to a number of air blowers which would be housed in acoustically insulated steel containers, together with associated infrastructure which will consist of a brick built building / kiosk to house stores, controls and electrical switchgear. The facility would be contained within a steel palisade fence approximately 2.75 m high and be located on a bunded, reinforced concrete slab.

The leachate is collected in a series of boreholes across the former landfill site and pumped or gravity fed into a collection chamber. From there the leachate is pumped into the series of MSP tanks. As the leachate flows through the tanks, the dissolved methane is stripped as a result of air being bubbled through the tank. The air / methane mix is then discharged to the atmosphere. The treated leachate, with the dissolved methane content below the 0.14 mg/l discharge consent level, is then discharge to sewer via an underground pipe.

The MSP facility would be fully automated on a Programmable Logic Controller (PLC) platform[1] with a Supervisory Control and Data Acquisition system and telemetry for remote monitoring and alarming. The motor control centre (MCC)[2], control and monitoring equipment will be located inside the purpose built brick building.

2.4 Volumes and Duration

The MSP facility design parameters for flow and final methane concentration are 1 000m^3/day and <0.14 mg/l respectively. This is in line with the maximum permissible limit as set out in the discharge consent for the site. From flow data provided by GMWDA, the maximum flow rate at the former Cringle Road landfill has been measured as 276 m^3/day.

It is expected that the facility will remain on site for some 25 years, after which time it would be removed from site, subject to the dissolved methane having been reduced to acceptable levels. It is possible that dissolved methane levels in the leachate could have reduced to levels that would not require treatment within a period of 10-15 years.

2.5 Hours of Operation

It is proposed that the MSP facility would be operational 24 hours with maintenance carried out as required and wherever possible during the day time.

[1] PLC platform is the hardware aspect of the control system for the MSP facility which contains the software programme that controls the operation of plant devices such as pumps, blowers, and automatic valves. The PLC also receives inputs to generate alarms.

[2] The MCC generally contains the motor starters and switchgear for the powered devices of the MSP facility.

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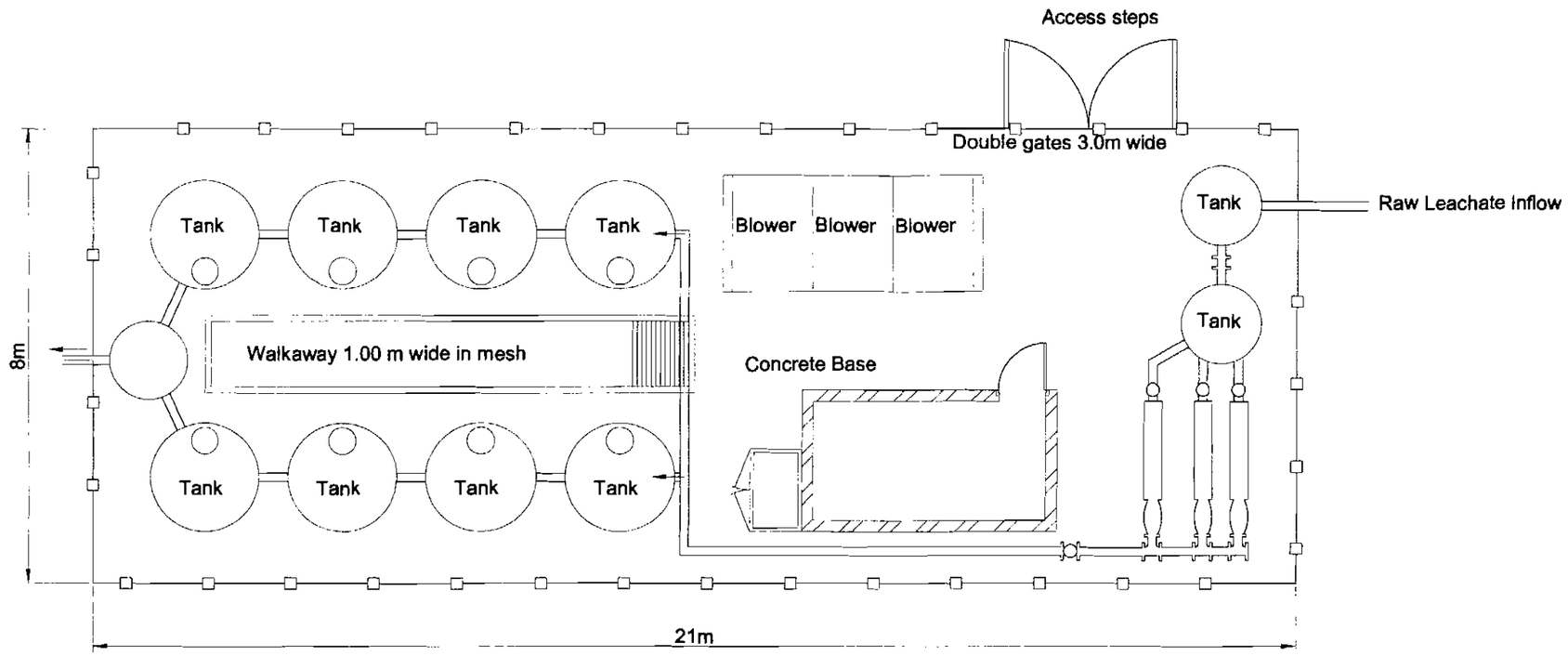
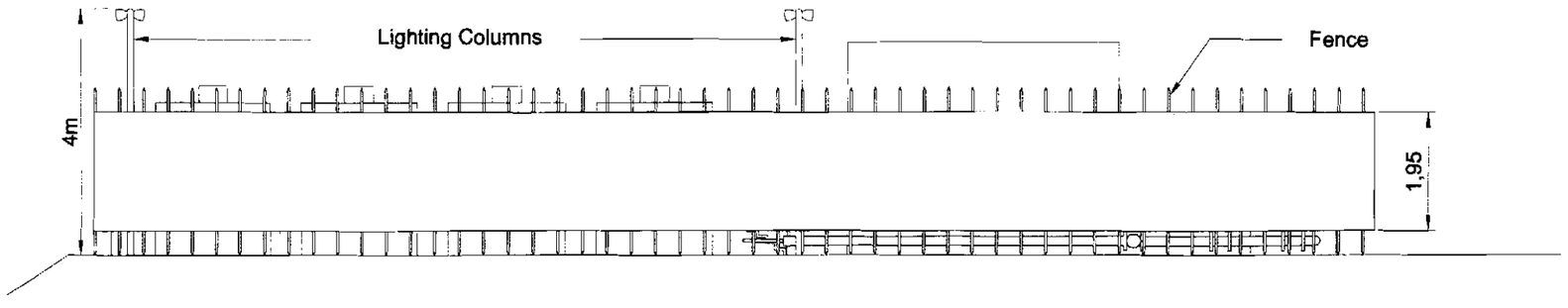


Methane Stripping Plant: Typical Plan



Methane Stripping Plant: Typical Elevation

0 m 5m

Scale 1:100 @ A3

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Figure 2.1
Indicative MSP Site Layout and Elevations

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3. Operational and Environmental Safeguards

3.1 Introduction

This section provides details on the operational and environmental safeguards that have been incorporated into the proposed development.

3.2 Odour

3.2.1 Introduction

The operation of the proposed MSP facility has the potential to cause an emission of odour which could have an effect in the vicinity of the proposed development, potentially affecting local receptors. An assessment of odours has been completed and is summarised below.

3.2.2 Scope of the Assessment

The potential for adverse effects at sensitive locations from increases in odour concentrations during the construction phase is very small and of only temporary duration. Therefore, no assessment is required relating to this scenario.

During the construction stage of the development there are likely to be minor emissions of dust associated with construction activities. It has been found that dust deposition on neighbouring receptors is unlikely to be significant at a distance of more than 100 m from the dust source, when there is no mitigation in place and when the receptor is in the path of the prevailing wind[3]. Given the limited scale of the proposed development and the uncertainties in modelling fugitive dust,, particularly arising from a variable source such as construction activities, it is not considered that a quantitative assessment would be appropriate and a qualitative, risk based approach to dust assessment and control is usually adopted. This takes the form of examining the types of activities planned to take place, evaluating the potential for dust to be generated and assessing the locations of sensitive receptors in relation to the site activities and the prevailing wind directions. Appropriate dust mitigation can be highly effective at reducing dust generation and minimising dust dispersion off the site. Due to the small scale of development it is considered unlikely that any significant dust effects will occur during the construction phase and so dust has been scoped out of the assessment.

It has been acknowledged that neither combustion techniques nor additional vehicle movements will be required for MSP operation. For this reason, vehicle related air quality pollutants have been scoped out of the assessment.

[3] DETR (2005) *Minerals Policy Statement 2: Controlling and Mitigating the Environment Effects of Mineral Extraction in England Annex 1:Dust*, London: HMSO.

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The assessment uses measurement and modelling techniques to predict the odour concentrations arising from the proposed MSP facility at the Cringle Road landfill. The potential odour effects of the proposals on local receptors have been considered by detailed dispersion modelling of the emissions from the MSP facility.

Potential receptors

The following section identifies potential receptors that could be significantly affected by odour during operation of the proposed MSP facility. The receptors locations chosen represent the residential properties where the odour effects of the MSP facility are likely to be at their greatest. Table 3.1 details the receptors selected for the assessment.

Table 3.1 Odour Receptor Locations

Reference	Location	Co-ordinates	
		x	y
1	School Playing Field	388055	393791
2	School Building	387982	393796
3	Broom Avenue A	388053	393704
4	Broom Avenue B	388007	393726
5	Milford Drive	388021	393487
6	Pullman Close	387977	393890
7	Ravenoak Avenue	388035	393924
8	Stanbrock Street	388113	393934
9	Highfield Road	388260	393989
10	Springside Road	388716	393473

Locations of the selected sensitive receptors are presented in **Figure 3.1**.

3.2.3 Assessment Methodology

Scope and Methodology

The assessment of odour effects was undertaken using the USEPA AERMOD dispersion model. This dispersion model has been extensively used to predict odour impacts both in the UK and overseas and, as such, was considered appropriate for the odour assessment. The proposed MSP buildings were included in the model to predict the impact of building downwash on odour concentrations at sensitive receptors. A terrain file is deemed necessary when the topography within the model has a gradient greater than 1 in 10. It has been concluded that the topography surrounding the site does not warrant the use of a terrain file in the dispersion model. The dispersion model was run using five years of meteorological data from Manchester Ringway Meteorological Station (2003-2007). It has been concluded that the Manchester Ringway dataset is most appropriate to represent the meteorological conditions at the former Cringle

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Road landfill. The worst case wind rose for Manchester Ringway, assessed as being 2003, is presented in **Figure 3.2**.

Emission rates for the assessment have been calculated conservatively to best represent the worst case emission rate from the MSP. MSP design has indicated that landfill leachate before treatment contains 16 mg/l of methane. It has been assumed that all methane is stripped from the leachate by the MSP process and is emitted to the atmosphere. Landfill gas (LFG) concentrations have been calculated using the assumption that LFG is composed of 55% methane by volume. This is considered to be a conservative assumption compared to the LFTGN 03[4] guidance which states a bulk methane composition of 63.8% by volume is considered typical for LFG. From Entec's experience of landfill odour emissions, an odour concentration of 250 000 $ou_E\ m^{-3}$ has been applied to LFG. The odour emission rate was doubled to represent the stripping of volatile compounds from the leachate itself Details of the gas calculations made are presented in Table 3.2.

Table 3.2 Gas Calculations

Gas Calculation	Value
Total Methane Removed *	16 mg/l
Leachate Flow *	42 m^3hr^{-1}
Methane Removal Rate	0.187 g s^{-1}
Volume of methane	$2.81*10^{-4}\ m^3\ s^{-1}$
Composition of LFG	55% by volume methane
Total LFG Volume	$5.10*10^{-4}\ m^3\ s^{-1}$
Odour concentration of Landfill Gas (including additional stripped odours from the leachate itself)	500,000 $ou_E\ m^{-3}$
Odour Emission Rate	127.57 $ou_E\ s^{-1}$

*As stated in the MSP facility design

Significance Evaluation Methodology

The issue of malodours from odour emitting activities has gained increased public recognition over the last 20 years, along with growing expectations of quality of life and a reduced tolerance towards adverse environmental effects of business and utilities upon public amenity.

Odours are not generally additive in the same way as other nuisance parameters such as decibels for noise[5]. This reflects the way in which the brain responds to odour. The human brain has a tendency to "screen out" those odours which are always present or those that are in context to their surroundings. For example, an individual is more likely to be tolerant of an odour from a factory in an industrial area than in the countryside. The human brain will also develop a form of acceptance to a constant background of local odours.

[4] Environment Agency (2004) LFTGN03, Guidance on the Management of Landfill Gas.

[5] Environment Agency (2002). DRAFT Horizontal Guidance for Odour Part 1- Regulation and Permitting

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Limited research is available into what constitutes an appropriate and workable odour standard. The Concise Guide[6] considers that odours at 5 times their detection threshold (effectively 5 $ou_E\ m^{-3}$) can be considered as having the potential to cause annoyance. Entec commonly uses the 5 $ou_E\ m^{-3}$ as the 98th percentile of hourly averages as the odour annoyance criterion for food preparation sites.

The assessment of significance of changes to odour levels with the proposed development has been evaluated in the context of the 5 $ou_E\ m^{-3}$ as the 98th percentile of hourly averages threshold. Odour levels above this threshold are considered to be significant, while those below are considered to be not significant.

3.2.4 Assessment of Odour Effects

The following section presents the results of the detailed odour dispersion modelling assessment of the Cringle Road landfill site.

The MSP facility was modelled in accordance with the proposed plan. The facility was modelled as having 8 release points each with a 0.5 m stack extension and a diameter 0.1 m. The release points were modelled as being capped stacks, 3 m above the ground, with an air flow rate of 65 $m^3\ hr^{-1}$ per tank as stated in the MSP design. The total odour emission rate from the MSP facility was calculated as 127.57 $ou_E\ s^{-1}$.

Table 3.3 details the predicted odour concentrations at sensitive receptors for the year of meteorological data giving the highest concentrations (2003).

Table 3.3 Predicted Odour Concentration

Receptor	Location	Odour Concentration - $ou_E\ m^{-3}$ as the 98th Percentile of Hourly Averages (2003)
1	School Playing Field	0.66
2	School Building	0.13
3	Broom Avenue A	0.24
4	Broom Avenue B	0.17
5	Milford Drive	0.03
6	Pullman Close	0.07
7	Ravenoak Avenue	0.08
8	Stanbrock Street	0.08
9	Highfield Road	0.03
10	Springside Road	0.01

[6] Valentin, F.H.H and North, A.A. (1980). Odour Control – a concise guide. Department of the Environment.

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The maximum odour concentration at a receptor location was predicted to be at the School Playing Field receptor with a concentration of 0.66 $ou_E\ m^{-3}$ as the 98th percentile of hourly averages. It was predicted that no receptor would be exposed to concentrations above the adopted 5 $ou_E\ m^{-3}$ as the 98th percentile of hourly averages odour annoyance criterion. **Figure 3.3** shows the predicted odour extent of emissions from the MSP facility. It was predicted that the 1 $ou_E\ m^{-3}$ as the 98th percentile of hourly averages odour contour extended approximately 25 m from the site boundary.

3.2.5 Significance Assessment of Odour Effects

Table 3.4 summarises the significance of the odour effects of the proposed MSP facility. The detailed modelling assessment for the worst case year, 2003, predicted that odour concentrations at receptor locations would not exceed the 5 $ou_E\ m^{-3}$ as the 98th percentile of hourly averages odour annoyance criterion. It was predicted that odour emission from the proposed MSP facility is considered to be not significant.

Table 3.4 Significance of Odour Effects

Receptor	Location	Significance of Effects
1	School Playing Field	Below 5 $ou_E\ m^{-3}$ criterion – Not Significant
2	School Building	Below 5 $ou_E\ m^{-3}$ criterion – Not Significant
3	Broom Avenue A	Below 5 $ou_E\ m^{-3}$ criterion – Not Significant
4	Broom Avenue B	Below 5 $ou_E\ m^{-3}$ criterion – Not Significant
5	Milford Drive	Below 5 $ou_E\ m^{-3}$ criterion – Not Significant
6	Pullman Close	Below 5 $ou_E\ m^{-3}$ criterion – Not Significant
7	Ravenoak Avenue	Below 5 $ou_E\ m^{-3}$ criterion – Not Significant
8	Stanbrock Street	Below 5 $ou_E\ m^{-3}$ criterion – Not Significant
9	Highfield Road	Below 5 $ou_E\ m^{-3}$ criterion – Not Significant
10	Springside Road	Below 5 $ou_E\ m^{-3}$ criterion – Not Significant

3.2.6 Conclusions

In summary it has been predicted that no residential receptor is to be exposed to odour concentrations above the 5 $ou_E\ m^{-3}$ as the 98th percentile of hourly averages adopted annoyance criterion. A maximum odour concentration of 0.66 $ou_E\ m^{-3}$ as the 98th percentile of hourly averages was predicted at receptor locations with no location outside the site boundary being exposed to odour concentrations above the 5 $ou_E\ m^{-3}$ annoyance criterion. In accordance with the significance criteria detailed in Section 3.2.3, the odour impact of the proposed MSP facility at the former Cringle Road landfill has been assessed as not being significant. It is concluded that an odour annoyance caused by the MSP facility is unlikely to be experienced at receptors close to the Cringle Road closed landfill site.

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3.3 Noise

3.3.1 Introduction

A background noise survey and noise assessment for the proposed MSP development has been completed. The purpose of the assessment is to predict the noise levels likely to be experienced at local sensitive receptors from the operation of the proposed MSP facility and to evaluate these noise effects against appropriate Standards and Government advice.

The main noise sources associated with the MSP facility are three air blowers located on concrete plinths located within a compound bounded by a palisade fence. The plant is located to the north of Broom Avenue and to the south of Stanbrook Street, as shown by **Figure 3.4**.

Noise Assessment Guidance

BS4142 '*Method for rating industrial noise affecting mixed residential and industrial areas*' (1997) contains guidance on the monitoring and assessment of industrial noise sources, and is particularly designed to assess noise from fixed plant which affects residential areas. The Standard provides a methodology for determining whether a new or existing noise source is likely to cause noise complaints by comparing the operational noise level with the background level (i.e. the level that would occur in the absence of the noise from the industrial development, in this case, the proposed MSP facility). If the industrial noise contains any annoying characteristics, such as hums, clanks or bangs, it is also subject to a 5dB rating penalty. A difference of +10dB or more means complaints are likely, whereas +5dB is of marginal significance. For differences of less than +5dB the likelihood of complaints reduces further.

Additional relevant guidance is presented in BS8233 *Sound Insulation and Noise Reduction for Dwellings* (1999), which presents design criteria for internal noise levels for different rooms within a dwelling. Compliance with these criteria should ensure that residents do not experience any significant disturbance by noise.

3.3.2 Noise Terminology

The ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. Because of the wide range a scale based on a logarithmic basis is used in noise level measurement. The scale used is the decibel (dB) scale whieh extends from 0 to 140 decibels (dB) corresponding to the intensity of the sound pressure level. The ear has the ability to recognise a particular sound depending on the pitch or frequencies found at the source. Microphones cannot differentiate noise in the same way as the ear; and to counter this weakness the noise-measuring instrument applies a correction to correspond more closely to the frequency response of the ear. The correction factor is called "A Weighting" and the resulting measurements are written as dB(A). "A Weighting" refers to the noise level that represents the human ear's response to sound. The dB(A) is internationally accepted and has been found to correspond well with people's subjective reaction to noise.

Typical dB(A) noise levels for familiar noises are given in Table 3.5.

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Table 3.5 Typical Noise Levels

Approximate Noise Level dB(A)	Example
0	Limit of hearing
30	Rural area at night, no wind or adverse weather conditions
40	Library
50	Quiet office without noisy machinery, such as typewriters
60	Normal conversation
70	In car noise without radio
80	Household vacuum cleaner
100	Pneumatic drill
140	Threshold of pain

Source : Entec

Noise levels vary over time depending on noise generating activities. The following indices are used to take account of these variations:

- SPL is the instantaneous sound pressure level; it is a measure of the noise level at a partieular point in space. The SPL of a noise source will vary with distance from the noise source;
- SWL is the instantaneous sound power level, it is a measure of the sound energy produced by a noise source;
- $L_{Aeq\ T}$ is the equivalent continuous sound level and is the sound level of a steady sound having the same energy as a fluctuating sound over the same period. It is possible to consider this level as the ambient noise encompassing all noise at a given time. $L_{Aeq\ T}$ is considered the best general purpose index for environmental noise;
- $L_{A90\ T}$ index represents the noise level exceeded for 90 percent of the measurement period and is used to indicate quieter times during the measurement period. It is usually referred to as the background noise level;
- L_{Amax} is the maximum recorded noise level during the measurement period.

3.3.3 Noise Montoring

Identification of Noise Sensitive Receptors

Background noise measurements have been undertaken at two of the nearest noise sensitive receptors to the proposed plant site, which generally comprise of residential properties.

The receptors selected for this assessment, as shown in Figure 3.4, are:

1 Housing to the north of the landfill boundary represented by Stanbrook Street; and

2 Housing to the west of the landfill boundary represented by Broom Avenue.

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Baseline Noise Levels

Noise monitoring was undertaken on 6 and 7 February 2008, using Rion NL-31 sound level meters (SLM) which conform to Class 1 as defined by BS EN 61672: Part1:2003 (*Electro acoustics, Sound Level Meters, Specifications*). Further details regarding the instrumentation used are provided in **Appendix B**.

The proposed MSP facility will operate throughout the day and night. Due to the sensitivity of the night-time period, baseline noise levels were measured only during the night-time hours to ensure a 'worst case' assessment. It is assumed that background noise levels during the daytime period are likely to be higher. Noise levels were recorded over consecutive 5 minute periods, and a total of approximately 1 hour's worth of data was obtained at each measurement position.

The measurement methodology was based on that contained within BS 7445:2003 *'Description and measurement of environmental noise – Part 1: Guide to quantities and procedures"*. The calibration levels of the SLM were checked before and after each set of measurements, with no significant drift in calibration recorded. Battery levels remained within acceptable limits throughout the measurements.

Weather conditions during the monitoring period were calm and dry. There were no significant precipitation or wind effects that impacted upon the noise levels measured.

The results of the baseline noise monitoring are summarised in Table 3.6 below. Full results are also presented in Appendix B.

Table 3.6 Baseline Noise Monitoring Results

Receptor	Sampling Period	$L_{Aeq, 1h}$ (dB)*	$L_{A90, 1h}$ (dB)*
Stanbrook Street to the north of the landfill boundary	23:03 – 00:03 hours	41.3	39.3
Broom Avenue to the west of the landfill boundary	23:07 – 00:07 hours	41.2	39.5

*Average of the 5 minute periods

At the two monitoring positions, the predominant noise sources throughout the monitoring period were road traffic on nearby roads and intermittent aircraft noise. On occasion, distant traffic was also audible as well as people talking nearby.

3.3.4 Plant Noise Predictions

Sound Power Levels

Measurements to characterise the noise emissions of an operating Methane Stripping Plant were provided to Entec staff by the Greater Manchester Waste Disposal Authority. Sound pressure levels for the Roots blowers within the plant were measured at a distance of 7 m. The data obtained is presented in Table 3.7 overleaf.

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Table 3.7 Sound Power Levels

Plant	Sound Pressure Level (dB(A))	Distance (m)	Sound Power Level (dB(A))	Data Source
MPS (Roots Blowers)	45	7	70	Greater Manchester Waste Disposal Authority

Plant Noise Predications

The prediction methods used in this assessment are based on those outlined in BS 5228:1997, which incorporates guidance on the attenuation of noise due to the effect of natural barriers, and the absorbing effect of soft ground lying between the noise source and the receptor. An allowance for ground absorption (assuming 100% soft ground intervening between site and receptors) has been included. In order to assess the likely noise effects of the simultaneous operation of several Roots blowers at the noise sensitive receptors, a series of predictions have been undertaken the results of which are tabulated below:

Table 3.8 Predicted Plant Noise Levels (Cringle Road)

Receptor	Operation of 1 No. Roots Blower only	Operation of 2 No. Roots Blowers	Operation of 3 No. Roots Blowers
Housing in Stanbrook Street to the north of the landfill boundary	17.0	20.0	22.0
Housing in Broom Avenue to the west of the landfill boundary	18.0	21.0	23.0

The worst case predicted noise levels, with all three root blowers operating, at the receptors are presented in Table 3.9.

Table 3.9 Predicted Worst Case Plant Noise Levels (3 No. Roots Blowers)

Receptor	Predicted Plant Noise Level $L_{Aeq,\,1h}$ (dB)	Rating Level $L_{Ar,T}$ (dB)
Housing in Stanbrook Street to the north of the landfill boundary	22.0	27.0
Housing in Broom Avenue to the west of the landfill boundary	23.0	28.0

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3.3.5 Assessment

BS4142 Assessment

The BS4142 methodology predicts the likelihood of complaints from local residents by comparing the predicted plant noise level with the existing measured background noise levels. The methodology allows for a rating penalty to be applied to any noise sources which exhibit tonal or intermittent characteristics. In order to provide the most robust assessment, the rating penalty of +5dB has been added to the predicted plant noise levels.

The resulting rating levels for the Methane Stripping Plant have been compared with the minimum measured background noise levels at the nearest properties to reinforce the worst case assessment and are shown in Table 3.10 below.

Table 3.10 BS4142 Assessment (Jenbacher 320)

Receptor	Rating Level $L_{Aeq,\ 1h}$ (dB)	Minimum Measured Background Level $L_{A90,\ 5mins}$ (dB)	Plant Noise Exceeds Minimum Background by (dB)	Likelihood of Complaint
Housing in Stanbrook Street to the north of the landfill boundary	27.0	38.0	-11	Unlikely
Housing in Broom Avenue to the west of the landfill boundary	28.0	38.0	-10	Unlikely

All noise levels rounded to nearest whole dB(A) in accordance with the standard

Table 3.10 shows that the predicted plant noise levels at the two locations are below the background levels by a considerable margin, therefore, it is considered that local residents are unlikely to complain. It is acknowledged that these rating levels are considered by BS4142:1997 to be 'very low' and may sometimes be considered outside the scope of the methodology. Therefore, an assessment of the internal noise levels within the closest receptors has also been undertaken the results of which appear in the next section.

BS8233 Assessment

The BS4142 methodology evaluates outdoor free-field noise levels; however at night-time in particular, internal noise levels are also of relevance. BS 8233:1999 *Sound Insulation and Noise Reduction for Buildings – Code of Practice,* gives recommended design criteria for internal noise levels for different types of rooms. The criteria for bedrooms and living rooms which have been set to avoid sleep disturbance and ensure suitable resting conditions are:

- Bedrooms
  - Good $L_{Aeq,T}$ 30dB;
  - Reasonable $L_{Aeq,T}$ 35dB.
- Living Rooms

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- Good $L_{Aeq,T}$ 30dB;
- Reasonable $L_{Aeq,T}$ 40dB.

Additionally, maximum noise levels should not exceed L_{Amax} 45dB in bedrooms at night. This information is based on World Health Organisation (WHO) Guidelines for Community Noise (1999). BS8233 states that the noise limits relate to steady intrusive noise such as that from fixed plant.

The residential buildings will provide some degree of attenuation of outdoor noise levels, which will affect the internal noise levels experienced by occupants. This attenuation will be at a minimum when windows are open in a façade of the occupied room. It is generally accepted that a façade with an open window will provide approximately 12-15 dB(A) attenuation. The internal noise levels due to noise from the proposed plant are presented in Table 3.11 below. It should be noted that the predicted plant noise levels are free-field levels and have therefore been corrected for the façade effect (+3dB) to facilitate the internal noise level prediction.

Table 3.11 BS8233 Assessment

Receptor	Predicted Facade Noise Level, $L_{Aeq,1h}$ (dB)	Façade Reduction, Open Windows (dB)	Internal Noise Level, $L_{Aeq,1h}$ (dB)	BS8233 Internal Noise Level Standard (Living Rooms & Bedrooms)
Housing in Stanbrook Street to the north of the landfill boundary	25.0*	-12	13.0	Good
Housing in Broom Avenue to the west of the landfill boundary	26.0*	-12	14.0	Good

***includes a +3dB correction to convert freefield to façade noise levels**

Table 3.11 indicates compliance with the "good" internal noise level criterion of $L_{Aeq,T}$ 30dB for bedrooms at night at all noise sensitive properties, even with the windows open. Based upon these levels, it is considered that even the simultaneous operation of all 3 of the Roots blowers would be almost inaudible indoors.

Note that predicted plant noise levels are considered to be continuous, and it is not anticipated that maximum levels, in terms of L_{Amax}, will exceed the predicted continuous average levels by a significant amount, at any of the noise sensitive receivers. Therefore, the plant will also easily comply with the internal maximum noise level limit of L_{Amax} 45dB.

Mitigation Measures

No mitigation measures would be required as the noise levels at the internal and external residential properties are within the acceptable noise limits.

3.3.6 Conclusions

The noise assessment concluded that the predicted plant noise levels at the two locations are below the background levels by a considerable margin; a worst case BS4142:1997 assessment

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considers that local residents are unlikely to complain. The internal noise levels resulting from the installation were assessed with respect to BS8233:1999 and it was found that, even with bedroom windows opened at night, the internal noise levels are significantly below the 'good' design criterion, at the noise sensitive receptors in the area. As such, the installation of the MSP facility at the former Cringle Road landfill site will not result in any significant noise effects at local sensitive receptors and, therefore, no additional mitigation measures would be required.

3.4 Landscape and Visual Amenity

3.4.1 Methodology

The methodology for the landscape and visual assessment is based on *The Guidelines for Landscape and Visual Impact Assessment: Second Edition*[7] (GLVIA), which is widely regarded by the landscape and planning professions as the 'industry standard'. Landscape effects and visual effects are defined as follows:

- Landscape effects: These consist of the changes in the fabric, character and quality of the landscape which it is predicted would result from the construction and operation of the proposed MSP facility;
- Visual effects: These are the predicted effects on views available to the public from publicly accessible areas and residential dwellings, i.e. visual receptors. Specific effects result from changing the constituent elements within an existing view. This may be caused by the construction of a feature, or the obstruction, or modification of an existing view. The overall effect upon visual amenity can range from degradation to enhancement.

3.4.2 Desktop Study and Site Survey

For the purpose of this appraisal the wider study area extends approximately 2 km beyond the boundaries of the site in order to place the development within a local context. The landscape and visual baseline has been established through both a desktop study and site survey. The desktop study involved a review of existing information whilst the site survey entailed a more detailed information gathering exercise. Preliminary data collection was carried out in April 2008 and began with some initial desk research, followed by a site visit, walkover and driving tour of the study area. This work had the objective of provisionally identifying the extent to which the site would be visible from adjacent land within the visual study area.

Information on the existing baseline has been collected by reference to the following documents and sources of information:

- The Manchester Plan UDP, Manchester City Council (Adopted 1995);
- The Multi-Agency Geographic Information for the Countryside website www.magic.gov.uk;

[7] The Guidelines for Landscape and Visual Impact Assessment Second Edition The Landscape Institute and the Institute of Environmental Management and Assessment 2002

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- OS Mapping (OS Explorer 277, 1:25,000).

3.4.3 Site Context

Site Description

The proposed site for the MSP lies within the northern part of a former landfill which is located to the south of Levenshulme, in the Cringle Road area. The restored landfill site is located between the Metropolitan District boundary with Stockport and St Andrews C of E Primary School (see **Figure 3.5**). There is currently an existing smaller compound on the site (a leachate pumping station) located within the northeastern part of the proposed MSP facility footprint. The existing compound is fenced with dark green steel palisade fencing, accessed by a hard surfaced route from Broom Avenue; the existing access would be utilised to access the proposed facility. The former landfill site is currently characterised by rough grassland with areas of invasive scrubby woodland.

Site Context

The proposed MSP facility is located at an elevation of approximately 60 m AOD. The landfill site is relatively flat; to the east and south the landform gradually rises to around 65 m AOD. The predominant land use surrounding the site is residential interspersed with green spaces, including golf courses, parks, recreation grounds and playing fields. With regard to settlement pattern, the area forms part of the Manchester conurbation, with the urban area of Levenshulme to the north and Heaton Chapel to the south. Housing is traditionally terraced in a grid layout, with more recent developments in a less linear network of avenues and drives.

A local Public Right of Way (PRoW) skirts the northern boundary of the former landfill site, a second follows Fallowfield Brook further to the north and several desire lines cross the restored site. Furthermore, Sustrans Cycle Route 6 follows the disused railway which runs just to the north of the site.

Visual Context

The site is well screened to all aspects by deciduous trees, except to the southwest where views are available along the access track towards the housing on Broom Avenue (see **Figure 3.6**). There are few views out of the site past the immediate area with only one view out towards the top of a neighbouring tower block.

Landscape Character

At a strategic level, the site is located within the Manchester Conurbation Joint Character Area (JCA 55) as classified in the Countryside Character Assessment published by the (then) Countryside Agency in 1999. The assessment cites the following as key characteristics of the Manchester Conurbation JCA:

- Countryside extends throughout the Manchester Conurbation following the network of corridors formed by the numerous rivers, and to a lesser extent canals, railways and roads which thread through the urban fabric;
- Typical land uses include playing fields, numerous golf courses and water treatment works set within an overall managed countryside. These, together with heavy recreational demands and frequent major road crossings, produce a suburban character to the countryside areas;

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- There is an ongoing pressure for development, including landfill, housing expansion from adjoining urban areas, business park developments particularly associated with key road intersections, expansion of water treatment facilities, related to major development sites and infrastructure projects;
- Woodland expansion in the Red Rose Community Forest is likely to bring about changes to the character of the valley landscapes though is likely to be directed toward the poor quality amenity grassland and not at the expense of semi natural habitats.

There is no local level Landscape Character Assessment covering the City of Manchester.

Landscape Designations

Landscape planning designations and polieies are used to provide an indication of the value attributed to the landscape/ townscape resource by national and local government and can, therefore, be considered in the determination of the sensitivity of the landscape.

There are no statutory national landscape designations within 2 km of the proposed MSP but the site is located within the non-statutory Red Rose Community Forest designation. The Forest is a partnership between local authorities, the Forestry Commission, the Countryside Agency and other local and national organisations who together define a 30-year vision of landscape-scale improvement across the area[8].

There are no Registered Parks and Gardens or Conservation Areas within 2 km of the proposed MSP facility.

3.4.4 Assessment of Impacts

Landscape

The introduction and subsequent operation of the new MSP facility including hardstanding, 3.5 m high kiosk, 4 m tall lighting columns and fencing will represent the expansion of an existing landscape element. Whilst this would not be in keeping with the other established landscape elements across the restored landfill site, namely the self sown vegetation, the consequent magnitude of landscape change would be insufficient to generate any discernible changes to the existing largely urban landscape character.

In this respect the perception or experience of the landscape in the immediate vicinity of the Site would be retained. This retention would primarily be facilitated by the fact that the well-established tree cover and scrub located within the wider landfill site will not be affected by the proposal. As such, the aims of the Red Rose Community Forest designation would not be undermined as a result of the proposal.

Visual

Due to the scale of the proposed MSP facility it would not be visible above the adjoining tree cover. Users on PRoWs or Sustrans Cycle Route 6 within the study area would not have any visibility of the MSP due to the existing woodland on the former landfill site. Views would,

[8] http://www.communityforest.org.uk/aboutenglandsforests.htm

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therefore, be restricted to any filtered views that could be available through the surrounding tree cover or along the access track to Broom Avenue. The density of tree cover in this direction is assessed as possessing the capability to effectively filter the majority of the potential views available to visual receptors, although there would be glimpsed views available from the upper storeys of properties no. 78, 80, 82 and 84. Primarily the MSP facility would be noticeable due to the effect of the lighting columns, and the increased height of the facility which would be almost double that of the existing compound. This would generally have a negligible to moderate effect on residential receptors which would be 'not significant'.

Other receptors that would have views of the MSP facility are recreational users including dog walkers who cross the site on a number of informal paths and desire lines. The lighting columns may be a positive addition to their experience of the area adding to a sense of safety. The increased scale of the MSP facility when compared to the existing compound would be a notable ehange in views although these receptors would be habituated to the use of this part of the former landfill site as a fenced compound.

Beyond the immediate environs of the landfill site any visual effects would be negligible whilst the magnitude of visual change in the views available to the limited number of visual receptors, including residents of Broom Avenue, and recreational users would be restricted to moderate.

3.4.5 Mitigation Recommendations

There is a recommendation for the proposed design/ construction of development to retain the existing wooded areas around the proposed MSP site in order to continue to screen the development and to preserve the landscape characteristics which are contributing to the Red Rose Community Forest.

Any proposed sources of light required for the MSP facility should be carefully designed to reduce potential light spill, glare and sky glow following the 'Guidance Notes for the Reduction of Obtrusive Light' published by The Institution of Lighting Engineers (2005).

3.4.6 Summary and Conclusions

The proposed works would be consistent with the existing land use of the site and immediate local landscape context which is defined by the sites history as a landfill. The proposal is considered to be largely consistent with the type and scale of development currently evident on site; therefore, it is unlikely that there would be any incremental weakening of the open character of the area. Furthermore, the presence of the perimeter tree belts ensure that there is limited intervisibility with the wider residential area (with the exception of Broom Avenue) or the recreational routes which pass through the study area.

3.5 Biodiversity

3.5.1 Introduction

This section summarises the findings of an Extended Phase 1 Habitat Survey and desk study of the terrestrial habitats and species that may be affected by construction and operation of the proposed MSP facility at the former Cringle Road landfill, and provides a brief appraisal of the nature conservation features of the site. The likely effects of the proposed development on the nature conservation value of the site are also considered.

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3.5.2 Methods

Desk Study

The desk study followed the guidelines for assessing the nature conservation value of sites set out by the *Institute of Environmental Assessment*[9] and the *Institute of Ecology and Environmental Management*[10]. Ecological data held by Natural England (NE), the Environment Agency (EA), MAGIC (the government environmental information partnership project), and the Greater Manchester Ecology Unit (GMEU) were consulted to identify possible ecological receptors for the proposed development, including:

- Statutory[11] and non-statutory[12] nature conservation sites within 2 km / 1 km respectively (or statutory sites beyond this distance linked by a clear impact pathway - e.g. rivers);
- Protected[13], Biodiversity Action Plan (BAP) or conservation notable species recorded within 500 m.

The geographical context of the proposed development was examined using the relevant Ordnance Survey 1:25 000 and 1:10 000 scale maps, and web-based aerial photographs, to identify key landscape features that may be important for protected, BAP or conservation notable species (such as potential migration or dispersal routes) or any potential receptors of site-derived pollutants in the wider landscape.

Extended Phase 1 Habitat Survey

The Phase 1 Habitat survey was based on with the methods detailed in the *Handbook for Phase 1 Habitat Survey*[14] Distinct habitats were identified and any features of nature conservation interest were subject to a more detailed description in a Target Note (Table 3.13).

The survey included land within 50 m of the proposed development (where access was permitted and possible) to enable the identification of any habitats or species that could be indirectly affected by the development. As the standard Phase 1 Habitat survey methodology is largely concerned with vegetation communities only, the survey was 'extended' (IEA 1995) to

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[9] Institute of Environmental Assessment (1995) *Institute of Environmental Assessment: Guidelines for Baseline Ecological Assessment*, E & FN Spon, London.

[10] Institute of Ecology and Environmental Management (2006) *Guidelines for Ecological Impact Assessment in the United Kingdom* (version 7 July 2006). http://www.ieem.org.uk/ecia/index.html.

[11] Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar wetland sites (designated by Natural England), National and Local Nature Reserves etc (NNR & LNR).

[12] County-level wildlife sites (Sites of Biological Interest (SBIs) in Greater Manchester).

[13] For the purposes of this study, legal protection refers to: species included on Schedules 2 and 4 of *The Conservation (Natural Habitats, &c.) Regulations 1994* and Schedules 1, 5 and 8 of the *Wildlife and Countryside Act 1981* (as amended), excluding species that are only protected in relation to their sale (Section 9[5] and 13[2]); and badgers, which are protected under the *Protection of Badgers Act 1992*.

[14] JNCC (2003) *Handbook for Phase 1 Habitat Survey*, Joint Nature Conservation Committee, Peterborough.

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identify the presence/potential presence of other nature conservation features such as legally protected species. The methodologies used to establish the presence or potential presence of species and species groups are summarised in Table 3.12.

There were no significant constraints on the survey, although some areas of the woodland within to the site were inaccessible due to dense bramble scrub. However, it is considered that the surveys were sufficient to enable a full assessment of the nature conservation value of the site and its natural features.

Table 3.12 Summary of Methods Used to Identify the Possible Presence of Nature Conservation Interest Features during the Extended Phase 1 Habitat Survey

Feature	Summary of Methods
Bats (all species)	Trees and structures on the site were assessed for their potential to support roosting or hibernating bats. This assessment primarily focused on trees deemed to be suitable as bat roosts, such as older trees with cavities, splits, cracks, holes or loose bark, or trees with a dense covering of ivy *Hedera helix*. The trees were inspected using binoculars and any accessible crevices were examined for evidence of bat activity, such as scratch marks and staining. Potential bat foraging habitat was also noted. The screening survey cannot conclusively determine the absence of bats from suitable roost sites, but can be used to identify likely bat roost sites and/or direct future survey requirements.
Badger (*Meles meles*)	The development site and surrounding land within 30 m of the site boundary was searched for evidence of badger activity including setts, badger paths, foraging marks, dung pits and hair, wherever access was permitted and possible.
Breeding Birds (All Species)	The habitats on the development site and the surrounding land within 50 m of the site boundary were assessed for their suitability for nesting birds, particularly conservation notable species or birds listed on Schedule 1 of the Wildlife & Countryside Act (1981)(as amended). Schedule 1 birds are generally uncommon or behaviourally vulnerable species that receive additional protection over that afforded to all nesting birds.
Great Crested Newt (*Triturus cristatus*)	The proposed development was screened against the quality of on-site habitat (inside the development site boundary) to be temporarily or permanently taken, together with the proximity, quality and accessibility of ponds and surrounding terrestrial habitats within 500 m of the site boundary. Where accessible, ponds or lagoons within 500 m of the development site were inspected and their potential as great crested newt breeding sites assessed. A pond may have reduced potential to support a breeding population of great crested newts if (for example) it supports a very large fish or wildfowl population, or does not hold sufficient water. In addition, the likelihood of great crested newts (if they occur in ponds within 500 m of the site) accessing or utilising the on-site terrestrial habitat was assessed; the significance of ponds to the development proposals might be reduced where: • There are no suitable habitats, or habitat corridors (such as hedgerows or ditches), linking the potential breeding pond to the development site, such that the site is effectively isolated by sub-optimal great crested newt habitat; • There are major boundaries to dispersal between the breeding habitat/ water bodies and the site, such as roads with long stretches of kerb, urban or extensively developed areas or major railway lines (main line routes with no culverts); • Habitat linkages between the pond(s) and the site are poor (e.g. long gaps in hedgerows) and the pond occurs more than 250 m from the site[†]; • The pond is more than 250 m from the site and there are areas of suitable terrestrial habitat nearer the pond that are likely to be used preferentially over habitats on or near the development site.

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Table 3.12 (continued) Summary of Methods Used to Identify the Possible Presence of Nature Conservation Interest Features during the Extended Phase 1 Habitat Survey

Feature	Summary of Methods
Reptiles (all species)	The site's potential to support reptiles was assessed. Direct observation surveys for basking reptiles were undertaken during the Extended Phase 1 Habitat Survey in accordance with current guidelines (Froglife 1999), with particular emphasis on the inspection of embankments, slopes, potential natural and artificial refugia, interface or edge habitats, and shade free areas near dense vegetation. Possible refugia such as boards or logs were also examined.
Other Species	Habitats on the site that were deemed to have the potential to support other species of nature conservation importance, particularly those occurring on the Greater Manchester BAP, were also recorded.

Notes: † - 250 m is towards the upper limit of the distance most great crested newts typically disperse (Langton *et al.* 2001)

3.5.3 Results

Desk Study

Designated Species

There are no statutory designated sites within 2 km of the site. However, Highfield Country Park (see **Figure 3.7**) also covers the entire former landfill site, and this park was recently designated as an LNR by Manchester City Council (November 2007).

Species Records

There are no species records for the proposed development area or the surrounding 500 m.

Extended Phase 1 Habitat Survey

The results of the Extended Phase 1 Habitat Survey, including the numbered target note (TN) locations, are illustrated on **Figure 3.8** and described below; the target notes are detailed in Table 3.13.

Habitats

Development Area

The area of the proposed development comprises hardstanding and an access track associated with the existing leachate pumping station (see Figure 3.8), surrounded by a small area of poor semi-improved grassland and bare ground within a small clearing between broadleaved woodland blocks. The woodland blocks are outside the proposed development area to the north and south, although some immature and semi-mature trees (mainly ash *Fraxinus excelsior*) and scattered scrub on the woodland margins may require lopping or removal for the development.

Wider Site

The former landfill at Cringle Road is located within an urban area and is dominated by poor semi-improved grassland with large blocks of broadleaved semi-natural woodland and

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plantation woodland[15]. Many of the woodland blocks have bands of dense scrub along their margins. The former landfill site is forms part of the Highfield Country Park, which extends to the north, and the site habitats (woodland / grassland) are contiguous with this.

Species

Development Area

No evidence of protected or conservation notable species was found in the development area or within 50 m. The development area itself is mainly hardstanding, bare ground and grassland, and habitat opportunities for protected or conservation notable species are very limited.

Wider Site

The site is located within a heavily urbanised area which will restrict both habitat opportunities and species colonisation, although the site is fairly large.

No evidence of protected or conservation notable species was found across the wider site. However, the woodland and scrub will provide nesting opportunities for some birds, potentially including some species on the Greater Manchester BAP such as the tree sparrow *Passer montanus*.

The woodland is relatively young and the vast majority of the trees consequently do not provide roosting opportunities for bats (e.g. split limbs, rot holes etc.); none of the trees within 50 m of the proposed development have features are suitable for roosting bats. It is likely that bats forage along the woodland margins, although usage will depend on the availability of off-site roosting opportunities, for example in surrounding buildings.

Similarly, the habitats on site are arguably suitable for reptiles, although the isolation of the site by urban development makes their presence unlikely. Overall, the site is unlikely to support significant populations of protected or conservation notable species.

However, the site does contain non-native invasive species, notably stands of Japanese knotweed *Fallopia japonica* at several locations within the site boundary (TN1), including a stand within 10 m of the proposed development area (TN2).

Target Notes

Table 3.13 Target Notes to Figure 3.8

Target Note	Details
1	Stands of Japanese knotweed around site, with particularly large / dominant stands near the eastern boundary of the landfill site.
2	Small stand of Japanese knotweed within 10 m of the proposed development area.

[15] Most of the woodland was established following completion of capping activities in 1982, and its structure is more similar to semi-natural broadleaved woodland rather than typical plantation woodland; the exception is the regular stands of aspen *Populus tremula* and white poplar *Populus alba* in the south-east corner.

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3.5.4 Evaluation and Assessment of Effects

Nature Conservation Evaluation

The information obtained through the desk study and site surveys is used to assess the current biodiversity and nature conservation value of the site. The current guidelines on ecological impact assessment[16] note that an appropriate ecological assessment cannot consider every individual species or habitat that may potentially be affected by a development, but should focus on 'valued ecological receptors' (which may include legally protected species). Valued ecological receptors are species and habitats that are indicative of the ecological quality of the site and which could be affected by the proposed development.

The biodiversity conservation value of species populations and habitats are consequently classified using the following scale:

Table 3.14 Receptor Importance / Value

Importance	Definition	Value
International	Of UK, European or greater importance (e.g. SAC, SPA, Ramsar)	High
National	Important in England (e.g. SSSI)	High
Regional	Important within the North-West (e.g. SSSI)	Medium
County	Important within Greater Manchester (e.g. SBI)	Low / Medium
District	Important in the Manchester City Council area (e.g. LNR, BAP habitats)	Low
Local	Important in the Levenshulme area	Low
Less than local	Important at the site level	Negligible

The habitats on the former landfill, including the woodland blocks, are not especially exceptional and the intrinsic nature conservation value of the habitats on site is 'local' only. However, 'managed greenspace' and 'lowland broadleaved woodland' are Greater Manchester BAP habitats and the location of the site (within urban Manchester) does increase the contextual value of the site as a whole, such that the site could be considered of 'district' value since green space is at a premium within the city. This supports the site's recent designation as an LNR.

Although some of the habitats on the site could arguably provide foraging or refuge for conservation notable species (e.g. local BAP species), it is unlikely that any populations using the landfill site are significant due to the high levels of recreational disturbance. Furthermore, the area to be affected by the proposed development is primarily hardstanding, bare ground and grassland, and thus the value of the development area for conservation notable species is considered 'less than local'.

[16] Institute of Ecology and Environmental Management (2006) *Guidelines for Ecological Impact Assessment in the United Kingdom* (version 7 July 2006), http://www.ieem.org.uk/ecia/index.html.

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Assessment of Effects

The proposed MSP facility will occupy a very small area of the former landfill site (~0.03 ha, or ~0.1%) on and immediately adjacent to the existing leachate pumping station, although the temporary footprint during the construction period may extend marginally beyond the development area boundaries.

However, although the former landfill (including the development area) is part of Highfield Park LNR, the habitats temporarily or permanently lost to the proposed development are of 'less than local' value only (hardstanding, bare ground and poor semi-improved grassland), and any effects on the nature conservation value of the site as a whole will be negligible due to the small scale of the proposals. Some semi-mature trees may be removed or lopped but these are of 'less than local' value also.

Any effects on species using the development area will be negligible, although ideally vegetation clearance should be undertaken outside of the bird-nesting season[17]. The trees that may be removed do not provide roosting opportunities for bats.

The nearest pond to the development area is approximately 400 m away and although this has not been surveyed for the presence of great crested newts it is considered that the absence of any records, the distance to the development area and the low suitability of the habitats within the development area ensure that the likelihood of encountering or affecting great crested newts as a result of this development is negligible. Similarly, although the wider landfill site provides habitat opportunities for reptiles the development area has limited value in this respect and the development will have no measurable effect on any reptile populations that may be present.

Impacts on species using the wider site as a result of the construction will also be negligible, and possible pollutant outputs from the operation of the plant (e.g. noise, odour, emissions) will not have any significant effects on the nature conservation value of the former landfill site or the surrounding area.

It is possible that the proposed development area could encroach on a small stand of Japanese knotweed, depending on the precise orientation and future growth of the stand. This would need to be managed or disposed of in accordance with standard Environment Agency guidance[18] to prevent any future spread resulting from the construction works.

3.5.5 Conclusions

Although urban managed greenspace and broadleaved woodland are Greater Manchester BAP habitats, and the former landfill forms part of the Highfield Park LNR, the construction and operation of the proposed methane stripping plant will have no significant effect on the nature conservation value of this site due to the small scale of the works and the low value of the habitats directly affected. Construction mitigation to prevent the spread of Japanese knotweed may have to be implemented although additional 'designed-in' mitigation will not be essential to prevent or offset any effects on habitats or species. The operation of the plant will not significantly affect any conservation notable species using the site, and it is very unlikely that protected species will be encountered or affected by construction or operation of the plant.

[17] Broadly, March to August inclusive.

[18] Environment Agency (2007) *The Knotweed Code of Practice: Managing Japanese Knotweed on Development Sites*, Environment Agency, Bristol

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3.6 Surface Water and Groundwater

3.6.1 Introduction

This section describes the characteristics of the existing surface water and groundwater environment at former Cringle Road landfill site and the approach to any surface water or groundwater management that may be required during the construction and operation of the proposed MSP facility.

3.6.2 Context

The surface water hydrology needs to be considered in development proposals because of the potential changes that could occur to the characteristics of the ground surface. At Cringle Road, a small area of open ground which forms part of the cover of a closed landfill site, will be developed into a built environment which has the potential to interrupt the natural hydrological cycle at the site, preventing water from draining naturally into the ground. Incident rainfall will be intercepted and will become runoff. The implications of this will be considered in this assessment, and protection of any receiving waters in terms of quantity and quality will be considered where appropriate.

Similarly for groundwater, disturbance of the ground during construction has the potential to allow increased infiltration to the underlying strata. In the event that the ground proposed for development is contaminated, the temporary storage and replacement of such materials can have implications for local surface water and groundwater quality.

The approach undertaken for this assessment has involved use of data that was acquired during an environmental audit of the site (Entec, 2007). Information included data held by the Environment Agency and the site owners, GMWDA.

3.6.3 Assessment Approach

The assessment has relied heavily on information collected and interpreted for an audit of the closed landfill site carried out in 2007. A qualitative approach has been adopted in view of the limited footprint area of the proposed treatment facility and its proposed location above waste deposits and adjacent to the existing leachate extraction and disposal facilities.

3.6.4 Proposed Mitigation

It is considered that there are no sensitive surface water or groundwater bodies in proximity to the proposed treatment plant and hence mitigation is not required. However, as with similar types of construction, there will be plant and machinery required on site. As a result, the operations will adopt best working practices and measures to protect the water environment by following recommendations set out in the Environment Agency's Pollution Prevention Guidance Notes.

Appropriate bunding will be incorporated around areas of the plant where there is any risk of leakage. Liquid collected within the bund will be discharged to the leachate collection well and hence it will mix with the leachate prior to treatment and disposal to sewer. During operation of the site, runoff from non-bunded areas of the concrete pad will drain into the surrounding ground, as currently takes place.

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3.6.5 Assessment of Effects: Surface Water

Significance Evaluation Methodology

The valuation of significance is inappropriate in this case, since any impact on local surface water will be negligible. There will be no significant increase or decrease in flows in local watercourses as a result of the proposed development. Discharges from the site to surface water will be unaffected. The proposed treatment plant will improve the quality of the leachate that is discharged to sewer.

Baseline Conditions

Local Surface Water Features

Fallowfield Brook drains westwards to the north of the site. It is within 50 m of the northern edge of the GMWDA landholding at its nearest point. Additional areas of old wastes are present further to the north and north-east of the GMWDA site and the brook is culverted beneath these areas (see Figure 3.8).

Cringle Brook is located approximately 300 m south-west of the site and is culverted prior to its discharge into Black Brook. Black Brook drains north-eastwards and is within approximately 100 m of the site at its closest point.

The Environment agency website indicates that the site does not lie within a flood risk area.

Site Development

The site was used as a landfill to infill worked out clay pits that had been used to supply materials to nearby brickworks. The site was already in use for waste disposal by Manchester City Council when it was taken over by GMWDA in 1974. Waste disposal ceased in mid 1979 and restoration of the site was carried out in 1981 and 1982. The site has been estimated by GMWDA to have a volume of 0.5 million m^3 of wastes.

The site was not engineered to provide waste and leachate containment, however the local clay strata are likely to provide some form of natural containment for the base and sides. The wastes were covered with an informal cap comprising a variable thickness of clay which is likely to restrict infiltration. This capping supports open grassland and mature wooded vegetation, which are open to the public.

Formal surface water drainage at the site comprises a 225 mm diameter French drain which runs along the eastern and north-eastern edges of the site and an older drain along the western boundary. The drains are linked to manholes and the leachate drainage system in the northern area of the site. The surface of the landfill is fairly flat. Such site topography, in conjunction with non-engineered capping, is likely to allow infiltration of a major proportion of rainfall into the wastes.

The design of the site incorporated a leachate drainage system and associated manholes for the collection of leachate. Leachate is drained to a collection chamber in the north-western corner of the site, from where it is pumped untreated to foul sewer. The proposed methane stripping plant will be located in close proximity to the existing pumping station and provide treatment of the leachate prior to discharge to sewer.

Currently, rainfall incident on the area proposed for the treatment plant is likely to infiltrate into the wastes and contribute to leachate generation. The proposed footprint of the plant will cover

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an area of approximately 8 m by 21 m. At Cringle Road, the concrete pad proposed for the methane stripping plant will abut an existing small hardstanding that accommodates the existing leachate pumping station.

Predicted Effects and their Significance

The proposed treatment plant will be constructed on landfilled wastes, incorporating a concrete base on which the treatment facilities will be sited. No large excavations or foundation works will be required. The concrete base will provide a barrier to infiltration. In view of the small footprint area of the plant, and the small volumes of runoff associated with this, no specific measures are proposed for surface water management.

A large proportion of the plant will be bunded to reduce the risk of any contaminant runoff as a result of leaks. Drainage from bunded areas will be discharged into the leachate collection system and discharged to sewer. Run-off from non-bunded areas produced during wet periods will drain from the concrete surface and infiltrate the ground. In effect, this will be a continuation of the current arrangements, with a minor redistribution of water infiltrating the ground and contributing to leachate generation.

In these circumstances, there is no increased contribution of water to surface watercourses in the area and no increased risk of contamination of local surface waters.

3.6.6 Assessment of Effects: Groundwater

Significance Evaluation Methodology

The valuation of significance is inappropriate in this case, since any impact on local groundwater will be negligible. There will be no significant change in existing conditions at the site, or in the relationship between leachate and groundwater as a result of the proposed development. Discharges from the site to groundwater will be unaffected. The proposed treatment plant will improve the quality of the leachate that is discharged to sewer but not alter the local hydrogeological regime.

Baseline Conditions

Geology

Cringle Road landfill site lies in an area underlain by a solid geology comprising Permian and Triassic sandstones. The published geological sheet covering the area (Sheet 98, Stockport) indicates that the solid strata are overlain by drift deposits of Boulder Clay. Historical maps of the site show evidence of extensive excavations identified as a clay pit.

No site specific data are available for the nature of the materials underlying the wastes, but it is anticipated to comprise glacial clays. Glacial tills in the area are typically poorly sorted clay to boulder size fractions, with fine grained materials dominating. The generally low permeability clays can contain lenses or bands of sands and gravels.

In light of the solid geology beneath the site, it is not located within a coal mining affected area.

Hydrogeology

The published groundwater vulnerability map covering the area indicates that the site is underlain by a Major Aquifer, associated with the Triassic sandstone strata. These typically represent highly permeable strata which are capable of storing and transmitting large volumes of

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water. Major aquifers are highly productive and can be used for potable supply on a regional scale. The site does not lie within a groundwater Source Protection Zone (SPZ).

The Triassic sandstones are overlain by drift deposits. At Cringle Road, prior to excavation, these comprised mainly low permeability Boulder Clay deposits. These superficial deposits are classified as a Non Aquifer, typically considered as containing insignificant quantities of groundwater.

Water levels are measured in perimeter boreholes. These boreholes were drilled to depths of approximately 10.5 m. Data collected indicate variable water level around the site, with some of the boreholes dry and some recording water levels near to ground level. Such data are likely to reflect the variable nature of the drift deposits around the site.

Details of the site development have been provided in Section 3.6.2. Landfill leachate formed within the site by the interaction of the wastes with infiltrating rainfall and groundwater ingress represents a potential source of contamination, which, if uncontrolled, can cause significant deterioration in groundwater quality. Leachate quality is monitored at the existing leachate pumping station. The extraction of leachate from the wastes provides some control of leachate levels within the wastes and reduces the risk of off site migration. A new leachate pumping station was installed at the site in October 2005 to improve leachate control. The pumping station has two pumps which operate 24 hours a day, and a telemetry system which monitors leachate levels.

Monitoring data indicate that leachate quality at the site is relatively weak, suggesting that the landfill has already undergone considerable degradation. However, concentrations of dissolved methane are on occasions in excess of the discharge consent limit of 0.14 mg/l for disposal to sewer.

Predicted Effects and their Significance

Construction of the proposed methane stripping plant will be above ground, on a concrete pad. Consequently, there will be no impact on local groundwater quality or quantity. A minor redistribution of surface drainage as a result of the interception of incident rainfall will have no overall impact on leachate generation, since it will continue to infiltrate into the wastes or drain from the ground surface as currently. A proportion of incident rainfall, which falls upon bunded areas of the plant, will be collected and discharged into the nearby leachate collection system.

Leachate will continue to be pumped from the wastes. The treatment plant will reduce dissolved methane concentrations and dispose of the leachate to sewer, under consent, as currently.

3.7 Conclusions

The proposed MSP facility will ensure that the levels of methane within the leachate do not exceed those permitted by the discharge consent. The operational controls and environmental safeguards would ensure that the facility is effectively managed. There would be no environmentally unacceptable impacts arising from the proposals.

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