

**APPENDIX 6**

**NOISE MONITORING REPORT & DATA**

ENVIRONMENTAL PROTECTION  
AGENCY WASTE LICENSING  
RECEIVED  
- 1 OCT 2004  
INITIALS.....

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

## Appendix 6 (A) Noise and Vibration Report

### 6.0 NOISE AND VIBRATION

The site is located in an area zoned for industrial use. To the north east of the site is the existing civil amenity landfill, the eastern boundary of the site forms part of the boundary of the Youghal Shipping facility. The south western boundary of the site connects with the National Car testing Centre site boundary. Derelict brownfield areas surround the site to the south and the east.

#### 6.1 Methodology

A baseline noise survey was conducted at the site of the proposed development, between the 8<sup>th</sup> to the 12<sup>th</sup> of March 2004 and over a 24 hour period on the 31<sup>st</sup> of August 2004. This was to assess the existing noise climate in the area. The potential impacts of the development are examined to ensure that adverse impacts are minimised and mitigation measures are proposed.

Monitoring was carried out at two locations; Location 1 was situated within the site in a clear unobstructed area of an open field. Location 2 was at the nearest noise sensitive location (a dwelling house) approximately 180m west of the proposed site boundary at the junction of the site access road and the R634 route (formerly the N25). These locations are illustrated in Figure 6.1 Noise Monitoring Locations.

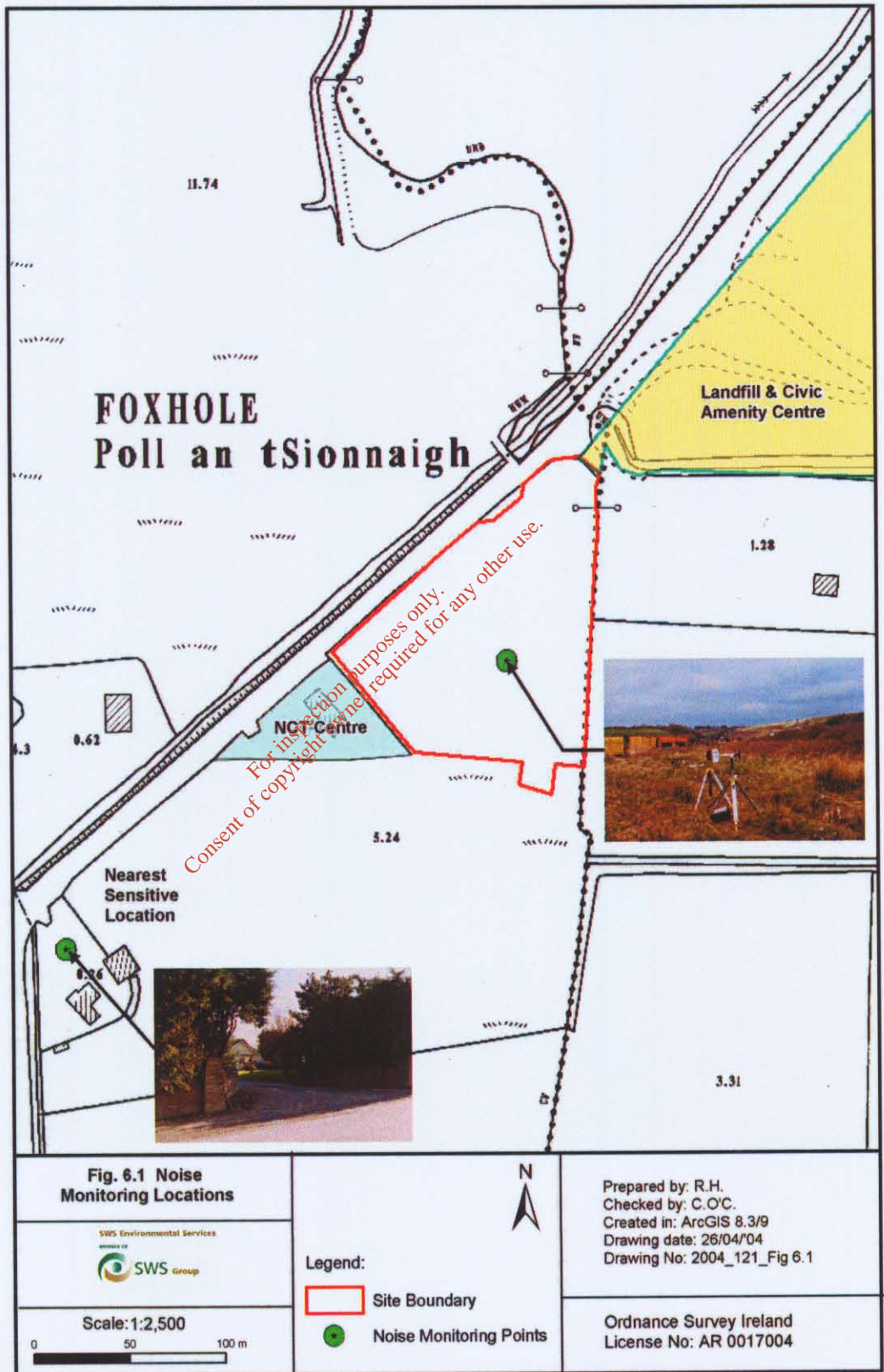
The Larson Davis 870 noise instrument was set up at Location 1 at 14:00hrs on Monday the 8<sup>th</sup> of March. The unit was set to run continuously until 16:00hrs on Friday the 12<sup>th</sup> of March for a total of 98hrs. Wind speeds recorded on site during this period ranged from 0 – 5 m/s. Short term day time noise monitoring was carried out at Location 2 for a period of 1hr, wind speeds recorded on site during this period ranged from 1.3 – 1.6 m/s. Night time monitoring was carried out on the 31st of August 2004 and wind speeds ranged from 0-1.5 m/s.

Particular values recorded during the noise survey were the equivalent continuous sound level ( $L_{eq}$ ), maximum noise level ( $L_{max}$ ), the 10% ( $L_{10}$ ), and 90% ( $L_{90}$ ) percentile levels. The measurement time interval was set at 60 minutes for the control site Point 1 and 15 minutes for Point 2, the history period was one minute and history period units one second for all monitoring locations. The sound level meter set to frequency weighting "A" and detector response to "Fast".

Monitoring has been undertaken using state of the art 'real time' environmental noise instrumentation. Monitoring has been conducted in accordance with international noise

standards in particular ISO 1996 1982: Acoustic Description and Measurement of Environmental Noise and BS 4142 1997 Method of Rating Industrial Noise Affecting Mixed and Residential Areas.

*For inspection purposes only.  
Consent of copyright owner required for any other use.*



**Figure 6.1 Noise Monitoring Locations**



### Monitoring Instrumentation

- One Larson Davis 870 Precision Integrating Sound Level Analyser/Data logger with 902 Pre-amplifier and 1/2" GRAS Microphone Model 40AE and integrated wind speed monitor
- One Larson Davis 812 Precision Integrating Sound Level Analyser/Data logger -with 828 Pre-amplifier and 1/2" GRAS Microphone Model 40AE.
- Wind Shields Type: Larson Davis 2120 Windscreen.
- Calibration Type: Larson Davis Precision Acoustic Calibrator Model CA250.
- Elite Skywatch Handheld Wind omni-directional wind meter

### Instrument Calibration

All instruments were calibrated before and after monitoring and calibrated within specifications.

### Weather Conditions

Wind monitoring was undertaken to ensure compliance with EPA guidance notes on environmental noise measurements and ISO 1996 1982: Acoustic Description and Measurement of Environmental Noise. Weather conditions over the period of the survey varied with average wind speed of 3.0 m/sec recorded over the 98 hour period. The minimum average wind speed was 0m/s with a max average wind speed of 5.0m/sec. Wind direction varied but is predominantly from a south-easterly direction.

For inspection purposes only. Consent of copyright owner required for any other use.



## 6.2 Existing Environment

A summary of the noise monitoring results are included in Table 6.1 & 6.2. The data is divided into daytime and night-time periods. The more detailed noise monitoring results are available in Appendix 6 (B).

Monitoring Location 1									
Time		L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>	Time		L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>
		dB(A)	dB(A)	dB(A)			dB(A)	dB(A)	dB(A)
Day 1	Max	47	50	39	Night 1	Max	44	45	38
	Min	35	37	28		Min	31	33	26
	Average	41	42	35		Average	39	39	32
Day 2	Max	49	50	42	Night 2	Max	60	63	53
	Min	43	44	38		Min	52	53	43
	Average	46	47	40		Average	58	59	48
Day 3	Max	64	66	56	Night 3	Max	49	51	44
	Min	53	55	48		Min	32	35	25
	Average	61	62	53		Average	44	43	33
Day 4	Max	52	53	47					
	Min	45	48	40					
	Average	49	50	43					
Combined Noise Levels									
	Daytime	L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>		Night-time	L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>
	Max	64	66	56		Max	60	63	53
	Min	35	37	28		Min	31	33	25
	Average	54	48	41		Average	53	47	38

Table 6.1 Noise Monitoring Results at Location 1

Monitoring Location 2									
Combined Noise Levels									
	Daytime	L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>		Night-time	L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>
		dB(A)	dB(A)	dB(A)			dB(A)	dB(A)	dB(A)
	Max	68	69	46		Max	60	60	44
	Min	63.6	69	44		Min	30	32	26
	Average	66	69	45		Average	50	45	32

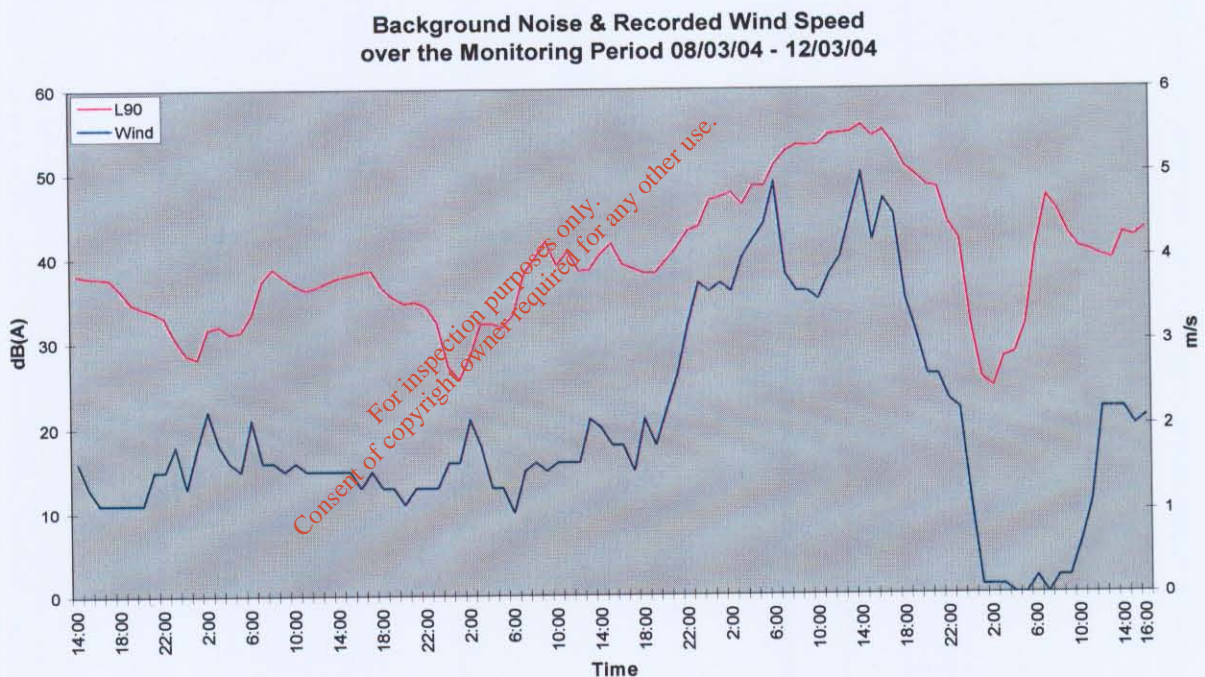
Table 6.2 Noise Monitoring Results at Location 2

The site is currently not in use and therefore there are no onsite noise sources present. The primary noise sources in the area are mobile vehicles including haulage vehicles and private cars utilising the civic amenity site and NCT centre. The noise environment would be typical for locations situated near major transport routes.

At Location 2 the noise environment is largely dominated by road traffic noise. This is highlighted by the large difference between the  $L_{10}$  (69 dB(A)) which is traffic noise and the background noise  $L_{90}$  of 45dB(A) which is less than half the noise level. Traffic noise at this location is audible from the R634 route as well as vehicles entering the landfill site.

Traffic from the R634 is less audible at Location 1, however traffic noise entering and leaving the landfill is evident in the  $L_{10}$  and  $L_{90}$  monitoring results.

The measurement data illustrates the impact of wind speed on environmental noise levels. Where the wind speeds increase above 2m/s to 5m/s, noise levels also increases to an  $L_{eq}$  of 60 dB(A) or higher and the  $L_{90}$  to > 50 dB(A). This is illustrated in Figure 6.2 Background Noise and Recorded Wind Speed over the Monitoring Period.



**Figure 6.2 Background Noise and Recorded Wind Speed over the Monitoring Period**

At the proposed development noise monitoring data show that in calm conditions (wind speeds < 2m/s) the  $L_{eq}$  recorded ranged from 35-49 dB(A)  $L_{A90}$  of 32-42 dB(A). Corresponding noise levels measured at Location 2 alongside the nearest sensitive resident recorded an  $L_{eq}$  of 64 dB(A) and an  $L_{90}$  of 45 dB(A).

Night time noise levels onsite for both  $L_{eq}$  and  $L_{90}$  of approximately 3 dB(A) lower than the observed daytime noise levels. Night time measurements recorded a  $L_{eq}$  of approximately 39-44 and an  $L_{90}$  of 32-38 dB(A).



Overall, the average daytime  $L_{eq}$  of 54dB(A) measured onsite was lower than the average daytime  $L_{eq}$  of 66dB(A) measured at the nearest noise sensitive resident. This is due to traffic noise and the close proximity of Location 2 to the R634. During night time hours the noise levels at Location 2 are reduced however levels are still quite elevated with an average  $L_{eq}$  of 50dB(A) due to traffic noise.

### 6.3 Impact Assessment

#### Characteristics of the Proposed Development

The examination of the proposed development is assessed during the Construction Phase and Operations Phase when considering the potential noise impacts of the activities at the site.

Recommendations from the Guidance Notes for Noise in Relation to Scheduled Activities, EPA, 1995 for the appropriate noise criteria relevant for a development of this type were used. This document specifies that to avoid disturbance at noise sensitive locations noise levels should be kept below 55dB  $L_{Aeq,1hr}$  for daytime hours (08:00 – 22:00hrs) and below 45dB  $L_{Aeq,1hr}$  for night time hours (22:00 – 08:00hrs).

#### 6.3.1 Impact of the Construction Phase

The construction of the development will necessitate the clearing of the site and the erection of all the buildings involved in the development. This will involve mechanical excavators, trucks and other associated equipment. Construction of the development will involve general construction equipment and tools, lifting equipment, compressors, generators etc. Noise levels will also be increased due to construction traffic with deliveries of construction materials and machinery.

Calculations of construction noise were made, following the procedures set out in BS 5228 Part 1:1997. The results are expressed as  $L_{Aeq}$  (12 hour) dB(A) equivalent continuous noise levels, which is a standard unit used to express construction noise.

The nearest dwelling (noise sensitive location) is over 180m from the site boundary. Noise levels at this distance were calculated from the sound power data assuming the plant would be operating at the nearest point of the boundary to the sensitive receivers. Construction equipment will not generally operate at the boundary of the site.



Typical noise levels from representative pieces of equipment and calculated noise levels at the nearest sensitive location are summarised in Table 6.3 Noise from Construction Plant.

Item of Plant	Sound Power Levels (dB(A))	Percentage On-Time (%)	Distance from Site (m)	Sound Pressure at nearest noise sensitive location (L <sub>Aeq</sub> (12 h))
Compressor	102	100%	180	45
Welding Generators	70	66%	180	11
Pneumatic Breakers	109	33%	180	47
Cranes	102	50	180	42
Wheeled Loader	104	66%	180	45
Excavator	111	50%	180	51
Site Truck	110	50%	180	50
Bulldozer	112	50 %	180	52
Piling Rig	115	66 %	180	56
Truck Concrete Mixer	108	50%	180	48
Poker Vibrators	112	75%	180	54

**Table 6.3: Noise from Construction Plant**

It can be seen from above, that construction noise levels at any sensitive locations, 180 m or more from the site boundary, will remain below typical noise limits appropriate to such construction activities. These calculations were based on 'worse case scenario' as no absorption of sound between the site and the sensitive residence is taken into account.

Buildings located on the boundary of the site in direct line of sight of the nearest residential house will also result in some noise absorption therefore in reality lower noise levels than those calculated in Table 6.3 Noise from construction Plant will be experienced at the nearest residential house.

### 6.3.2 Impact of the Operation Phase

During the operation of the site there will be a number of distinct noise sources associated with proposed activity, these include:

- Waste Recovery/Transfer building,
- Sludge Drying Building,
- Waste Water Treatment Plant,
- Vehicular Movements.

### Waste Recovery/Transfer Building

Noise sources in this building will include both fixed equipment such as the picking station; overband magnet; conveyer belts and baler and mobile equipment such as the materials handling grab; tipper trucks; shredder and forklift. Typical noise levels associated with such equipment are given in Table 6.4 Noise Levels associated with Plant Items. The Waste Recovery and Transfer building will only operate between 8:00am and 9:00pm Mondays to Fridays, set-up and clean-up will take place between 7:00am and 8:00am and 9:00pm and 10:00pm Mondays to Fridays. On Saturdays operations will take place between 8:00am and 1:00pm, with set-up and clean-up between 7:00am and 8:00am and 1:00pm and 2:00pm.

Item	Noise Level dB
Baler	99
Forklift	104
Wood Shredder	100

**Table 6.4: Noise Levels associated with Plant Items**

The cumulative 'worse case scenario' noise level is estimated to be 102 dB(A) from this plant, assuming all plant equipment will be working continuously. However, in reality this will not occur as some equipment will only be used intermittently.

### Sludge Drying Facility

All electrical and mechanical equipment will be utilised in the operation of this facility will be housed in one building. Typical noise levels at 1m from the actual dryer derived from site measurements for similar facilities range from 89-92 dB(A). This facility will also run on a 24 hour basis, 7 days a week including holidays. It will be shut down for maintenance.

### Waste Water Treatment Plant

The majority of this equipment will be housed individually. The noisiest piece of equipment in this area will be the aeration tank blower, typical noise levels measured at similar type facilities produced a noise measurement of 75dB(A) at 1m. Attenuation from the building structures and the fact that the aeration tank will be hooded must also be taken into account.

### Vehicular Movements

Vehicular movements associated with the site include staff car parking, service access traffic and loading activities.

In relation to surface car parking areas noise levels measured 10m beyond the boundary of a busy car park during peak periods is typically in the order of 48 dB  $L_{Aeq, 1hr}$ . Taking into account the distance to the nearest noise sensitive location (180m), screening by the

proposed development and the existing NCT centre, noise levels will be well within daytime criterion of 55 dB  $L_{Aeq,1hr}$  for any car parking activities.

It is estimated that the maximum delivery in/out movements per day (i.e. service access traffic) associated with the proposed Waste Recovery/Transfer and Sludge Drying Facility will be 39 therefore, there will not be any significant noise impact at the nearest noise sensitive location and again noise levels will be well within daytime criterion of 55 dB  $L_{Aeq,1hr}$ .

Noise associated with loading activities include reversing vehicular movements which produce tonal noises, idling vehicles which produce continuous noises and loading activities which generate impulsive noises. The guidelines (Guidance Notes for Noise in Relation to Scheduled Activities, EPA, 1995) recommend a daytime criterion of 55 dB  $L_{Aeq,1hr}$ , taking into account screening, attenuation due to the 180m distance, the existing NCT Test Centre even adding a 5dBA penalty for bangs, whistles and whines the proposed activities will be within this daytime criterion. Therefore, there will not be any significant impact. Furthermore the majority of unloading activities will take place indoors e.g. the sludge reception building.

### Combined Impact of the Operation

The acoustic attenuation of Kingspan products or equivalent (Table 6.5) which will be used in the construction of both the Waste Recovery/Transfer and Sludge Drying Facility must be taken into account in the calculation of the combined impact of the operation (Table 6.6).

Frequency (Hz)	31.5	63	125	250	500	1k	2k	4k	8k	Rw
SRI dB	10	14	14	19	24	27	34	43	52	27

**Table 6.5: Octave Band Sound Reduction Indices of Kingspan Panelling.**

Elements of the Facility	Noise Source Level (dB)	External Source Noise Level taking into account Kingspan reduction of 27 dB (dB)	Distance to nearest noise sensitive resident (m)	Calculated Noise level at nearest noise sensitive resident (dB(A))
Waste Recovery/Transfer building	102	79	180	30
Sludge Drying Facility	92	65	290	16
Waste water treatment Plant	75	75	350	24
Traffic	48	-	180	3
Overall Noise contribution of the facility at the nearest noise sensitive resident				25

**Table 6.6: Calculation of the noise contribution of the facility at the nearest sensitive resident.**

The noise contribution from the facility at the nearest noise sensitive location can be obtained by summing the individual noise contributions from the above elements. The increase in noise level from the facility is 25 dB(A) during daytime and 22dB(A) during night time.

The overall noise level at the noise sensitive location can be predicted using the noise level contribution from the facility and the measured ambient noise levels.

Time	Ambient Noise Levels at the Nearest Noise sensitive location (dB(A))	Noise contribution associated with the facility (dB(A))	Difference (dB(A))
Daytime	66	25	-41
Night Time	50	22	-28

**Table 6.7: Predicted overall noise levels at the nearest noise sensitive resident.**

The noise generated by the proposed development at the nearest dwelling house is predicted to be more than 10dB(A) below the existing ambient noise levels; therefore there will not be any significant impact at the nearest noise sensitive location.

These calculations have only taken into account the reduction of noise breakout due to Kingspan or similar type building cladding material and the distance from the noise sources to the receiver. Further noise reduction will be attained by:

- The building layout, in the direct line of site, acting as noise barrier,



- The presence of a concrete block work wall running adjacent to the Waste Recovery/Transfer Building,
- Ground attenuation,
- Atmospheric absorption,
- Meteorological effects,
- Landscaping.

As illustrated by the above calculations, modelling the combined noise levels from the plant over distance (including some building insulation factors) and taking into account no other noise attenuation factor, the noise levels at the nearest sensitive location are 10dB(A) or more, below the existing ambient noise levels. Therefore, it was decided that further detailed noise modelling would be unnecessary.

*For inspection purposes only.  
Consent of copyright owner required for any other use.*



## 6.4 Mitigation Measures

### 6.4.1 Construction Noise

The “best practical means” to minimise noise on site during the construction phase should be used and contractors should adopt the recommendations of BS 5228 Noise Control on Construction and Demolition Sites where practicable. In particular it is recommended that the following mitigation measures be implemented:

- Limiting and scheduling the hours of construction activity to avoid unsociable hours,
- Establishing communication links between the developer, contractor, Local Authority and local residents,
- Selecting plant and equipment with low inherent potential for generation of noise,
- Proper use and maintenance of plant and equipment,
- Locating pumps and generators in positions that cause the least noise disturbance.

### 6.4.2 Management of Operational Noise

Noise mitigation measures are incorporated into the site design and layout in order to minimise the impact of noise on the surrounding environment. This includes the enclosure of all equipment in buildings as far as possible, good siting of the buildings, selection of plant and equipment with low inherent potential for generation of noise and the proper use and maintenance of all operational plant and equipment.

There will also be a concrete block wall running adjacent to the Waste Recovery and Transfer building and planting buffer zone approximately 2m wide surrounding the majority of the rest of the site acting as noise barriers.

Site personnel will be trained to use all equipment and plant on site so that noise is minimised

#### **Waste Recovery/Transfer Building**

The equipment in this facility will be enclosed and will be constructed using Kingspan panelling or equivalent. Loading and unloading doors are located on the northeast and south side of the building, facing away from the noise sensitive locations and away the prevailing

wind. Silencers will be fitted to all air handling equipment. Splitter attenuators, acoustic louvers or similar will be installed in the ventilation system.

This facility will be limited to daytime hours and thus will avoid noise nuisance during night time hours.

### **Sludge Drying**

The sludge drying and reception areas will be enclosed within a building constructed of adequate acoustic performance cladding for example, Kingspan or similar. Silencers will be fitted to all air handling equipment and splitter attenuators or acoustic louvers will be installed in the ventilation systems as necessary.

### **Waste Water Treatment Plant**

This facility is also located at the furthest distance away from the noise sensitive location. Each piece of equipment that can generate noise will be covered to ensure that noise limits are met.

### **Vehicular Movements**

Loading and unloading activities on site will be confined to the daytime operating period. When not in operation, vehicles will be switched off to prevent any unnecessary noise from idling vehicles. Reversing sirens on all vehicles, which are vital for safety, can generate significant noise. However, 'smart' reversing alarms, if available will be used, these can adjust the noise level volume in accordance with the background noise level of the site and or use movement sensors and lights.

### **Combined Impact of the Operation**

Overall, the proposed development will have a marginal impact on the existing environment.

During construction phase there will be an increase in noise levels at the site. The impact of construction at the nearest noise sensitive location was evaluated and is not considered significant.

The noise generated by the proposed development at the nearest dwelling house is predicted to be more than 10dB(A) below the existing ambient noise levels; therefore there will not be any significantly impact at the nearest sensitive location.

## Appendix 6 (B) Noise Results

Point 1								
		Leq	Lmax	L10	L90	Wind Avg	Wind Max	Wind Dir
Date	Time	dBA	dBA	dBA	dBA	m/s	m/s	
8-Mar-04	14:00:00	43.7	65.9	46.3	38.1	1.6	6.2	SSE
8-Mar-04	15:00:00	43.6	60.3	46.7	37.8	1.3	4.7	ESE
8-Mar-04	16:00:00	41.8	61.3	44.5	37.7	1.1	4.7	SE
8-Mar-04	17:00:00	40.8	56.5	43	37.6	1.1	4.4	E
8-Mar-04	18:00:00	40.2	59.1	42.2	36.3	1.1	4.2	S
8-Mar-04	19:00:00	38.7	50.7	41.3	34.7	1.1	3.7	SSE
8-Mar-04	20:00:00	38.1	60.7	40.2	34.1	1.1	5.7	E
8-Mar-04	21:00:00	38.7	60.6	41.2	33.7	1.5	4.7	SSE
8-Mar-04	22:00:00	38.1	61	40.5	33	1.5	5.5	SE
8-Mar-04	23:00:00	36.7	60.8	38.5	30.6	1.8	5.7	SE
9-Mar-04	0:00:00	34.6	58.1	36.8	28.6	1.3	5.2	SSE
9-Mar-04	1:00:00	38	62.5	38.3	28.1	1.8	6.5	S
9-Mar-04	2:00:00	38.6	66.4	38.7	31.6	2.2	6.5	S
9-Mar-04	3:00:00	39.2	64.2	39.2	32	1.8	6.5	SE
9-Mar-04	4:00:00	36.5	62	37.2	31.1	1.6	5.5	S
9-Mar-04	5:00:00	36	62.5	37.7	31.3	1.5	4.9	SE
9-Mar-04	6:00:00	43.3	63.1	46.3	33.3	2.1	6	SSE
9-Mar-04	7:00:00	43.1	63.7	45.2	37.3	1.6	5.7	S
9-Mar-04	8:00:00	43.3	67.8	45.7	38.8	1.6	5	S
9-Mar-04	9:00:00	41.5	62.8	43.2	37.7	1.5	5	SE
9-Mar-04	10:00:00	41.2	62.8	43.5	36.8	1.6	5	SE
9-Mar-04	11:00:00	44	77.2	42.7	36.2	1.5	5.7	SE
9-Mar-04	12:00:00	41.6	67	43.1	36.6	1.5	5.5	SSE
9-Mar-04	13:00:00	43	68.2	43.3	37.2	1.5	6.2	E
9-Mar-04	14:00:00	42	63.7	43	37.7	1.5	6.2	SE
9-Mar-04	15:00:00	41.7	65	43.1	38	1.5	5.5	ESE
9-Mar-04	16:00:00	46.8	63.6	50.2	38.3	1.3	4.7	SE
9-Mar-04	17:00:00	44	68.7	45.2	38.6	1.5	5.5	E
9-Mar-04	18:00:00	40.2	61.3	41.7	36.5	1.3	5.5	SE
9-Mar-04	19:00:00	38.1	60.2	39.3	35.3	1.3	5	S
9-Mar-04	20:00:00	37.5	55.7	39	34.6	1.1	4.5	ESE
9-Mar-04	21:00:00	39.2	61.7	40.7	34.8	1.3	5	SSE
9-Mar-04	22:00:00	39.2	62.2	40.7	34.3	1.3	6.2	SSW
9-Mar-04	23:00:00	37	61.7	38.7	32.3	1.3	5	SE
10-Mar-04	0:00:00	33.7	58.7	36.1	27.1	1.6	6	SSE
10-Mar-04	1:00:00	31	57.2	32.6	25.6	1.6	5.2	SSE
10-Mar-04	2:00:00	34.2	58.8	35.6	28.5	2.1	5.7	SSW
10-Mar-04	3:00:00	38.7	62.1	39.2	32.2	1.8	6.4	SSE
10-Mar-04	4:00:00	35.5	58.7	36.7	32.2	1.3	4.7	SE
10-Mar-04	5:00:00	36	60.7	37.7	31.8	1.3	4.9	SSE
10-Mar-04	6:00:00	42.1	65.7	43.7	33.3	1	4.2	SSE
10-Mar-04	7:00:00	43.7	66.5	45.2	38.2	1.5	6	SE



Point 1								
		Leq	Lmax	L10	L90	Wind	Wind	Wind
Date	Time	dBA	dBA	dBA	dBA	Avg	Max	Dir
						m/s	m/s	
10-Mar-04	8:00:00	44.8	66	46.8	40	1.6	5.9	SE
10-Mar-04	9:00:00	46.7	70	49.1	42	1.5	5.2	SSE
10-Mar-04	10:00:00	45.1	65.5	47.7	39.1	1.6	4.9	S
10-Mar-04	11:00:00	46.3	64.5	48.7	40.8	1.6	5.5	SSE
10-Mar-04	12:00:00	44.7	65	47.8	38.5	1.6	6	SSW
10-Mar-04	13:00:00	46	70.2	47.6	38.6	2.1	6.2	S
10-Mar-04	14:00:00	46.2	68.9	48.6	40.5	2	6.4	S
10-Mar-04	15:00:00	46.2	65	48.5	41.7	1.8	5.7	SW
10-Mar-04	16:00:00	43.5	69	45.5	39.2	1.8	6	SE
10-Mar-04	17:00:00	42.7	63.8	44.6	38.7	1.5	5.4	SSE
10-Mar-04	18:00:00	43.1	61.5	45.1	38.2	2.1	6	S
10-Mar-04	19:00:00	42.7	66.7	44.1	38.2	1.8	6.4	SSE
10-Mar-04	20:00:00	45.7	69.9	46.7	39.6	2.2	7.2	SSE
10-Mar-04	21:00:00	48.8	74.2	49.5	41.2	2.6	7.5	SSE
10-Mar-04	22:00:00	51.5	73.2	53	43.2	3.2	8.8	SSE
10-Mar-04	23:00:00	53.3	74.7	55.6	43.7	3.7	8.9	ESE
11-Mar-04	0:00:00	56	77.7	58.6	46.8	3.6	10	SSE
11-Mar-04	1:00:00	56.3	78.7	59.7	47.2	3.7	10	S
11-Mar-04	2:00:00	56.8	82.5	59.2	47.7	3.6	9.8	S
11-Mar-04	3:00:00	56.5	79.2	59	46.3	4	11.5	S
11-Mar-04	4:00:00	58.5	81.7	61.2	48.5	4.2	10.4	S
11-Mar-04	5:00:00	59.6	82.2	62.2	48.5	4.4	12.3	SSW
11-Mar-04	6:00:00	60.2	78.5	63.2	51	4.9	14.5	S
11-Mar-04	7:00:00	59.9	80.4	61.5	52.5	3.8	13.1	S
11-Mar-04	8:00:00	59.7	80.4	62	53.3	3.6	11.3	SSE
11-Mar-04	9:00:00	59.6	79.7	61.7	53.2	3.6	11.1	SSE
11-Mar-04	10:00:00	60.3	80.5	62.6	53.3	3.5	13	SSE
11-Mar-04	11:00:00	61.7	83.9	63.7	54.5	3.8	11.6	SE
11-Mar-04	12:00:00	62.2	82	64.7	54.6	4	12.3	SSW
11-Mar-04	13:00:00	63.3	85.5	66	54.8	4.5	15.5	S
11-Mar-04	14:00:00	63.6	86.7	66.2	55.6	5	13.4	SSE
11-Mar-04	15:00:00	61.7	81.9	63.7	54.3	4.2	12.1	S
11-Mar-04	16:00:00	63.7	84.9	66	55	4.7	13.4	S
11-Mar-04	17:00:00	62.5	82.2	65.2	53.3	4.5	12.3	SSW
11-Mar-04	18:00:00	58.3	80.4	60.3	50.7	3.5	11.3	SSW
11-Mar-04	19:00:00	56.2	79.2	58	49.7	3.1	9.6	SE
11-Mar-04	20:00:00	53.2	72.5	55.2	48.5	2.6	8.5	SSE
11-Mar-04	21:00:00	53.7	75.5	55.7	48.2	2.6	9.5	S
11-Mar-04	22:00:00	49	67	51	44	2.3	7	S
11-Mar-04	23:00:00	45.7	64.5	47.7	42.1	2.2	7	SSE
12-Mar-04	0:00:00	40.5	59	44.8	32	1.1	4.2	S
12-Mar-04	1:00:00	36.7	63	40.1	25.5	0.1	0.9	NW
12-Mar-04	2:00:00	32.1	52.2	35.2	24.5	0.1	1.1	NW
12-Mar-04	3:00:00	33.2	53.7	35.2	28	0.1	0.9	NW

Point 1								
						Wind	Wind	Wind
		Leq	Lmax	L10	L90	Avg	Max	Dir
Date	Time	dBA	dBA	dBA	dBA	m/s	m/s	
12-Mar-04	4:00:00	36.2	55.7	39.2	28.5	0	0.6	WNW
12-Mar-04	5:00:00	40.8	55.5	44.5	31.8	0	0.6	N
12-Mar-04	6:00:00	48.2	63.7	50.8	41.2	0.2	1.5	NNW
12-Mar-04	7:00:00	50.5	67.9	52.5	47.2	0	0.6	WNW
12-Mar-04	8:00:00	52.3	78.5	52	45.5	0.2	1.1	NNW
12-Mar-04	9:00:00	49.6	67	52.7	42.7	0.2	1.3	SE
12-Mar-04	10:00:00	48	72.2	49.3	41	0.6	2.3	S
12-Mar-04	11:00:00	45.8	66.9	48	40.6	1.1	5	S
12-Mar-04	12:00:00	44.8	63.6	47.6	40	2.2	4.9	S
12-Mar-04	13:00:00	46.2	70.5	48.2	39.6	2.2	5	S
12-Mar-04	14:00:00	48.1	65.5	50.7	42.7	2.2	5.2	SSW
12-Mar-04	15:00:00	46.7	66.2	49.2	42.3	2	4.5	SW
12-Mar-04	16:00:00	47.8	66	49.8	43.2	2.1	4	SSW

For inspection purposes only.  
 Consent of copyright owner required for any other use.

Monitoring Location 2								
Daytime		Leq	Lmax	L10	L90	Wind Avg	Wind Max	WindDir
Date	Time	dBA	dBA	dBA	dBA	m/s	m/s	@ Max
8-Mar-04	13:45:00	66	93	69	46			
8-Mar-04	14:00:00	64	83	69	44			
8-Mar-04	14:15:00	64	78	69	45			
8-Mar-04	14:30:00	68	90	69	43			
<b>Night Time</b>								
31Aug2004	22:00:00	49	60	53	39	0.1	0.8	NW
31Aug2004	22:15:00	49	59	53	39	0.1	1.1	WNW
31Aug2004	22:30:00	49	62	53	39	0.1	0.8	WNW
31Aug2004	22:45:00	48	60	52	36	0	0	N
31Aug2004	23:00:00	48	66	51	36	0	0	N
31Aug2004	23:15:00	45	59	50	34	0	0	N
31Aug2004	23:30:00	44	58	48	31	0	0	N
31Aug2004	23:45:00	40	57	42	29	0	0	N
01Sep2004	0:00:00	53	76	50	32	0.1	0.5	NNW
01Sep2004	0:15:00	43	61	46	32	0.1	0.6	NW
01Sep2004	0:30:00	41	58	43	29	0.1	0.5	NNW
01Sep2004	0:45:00	44	60	48	29	0.2	0.8	NW
01Sep2004	1:00:00	39	56	41	28	0	0.1	WNW
01Sep2004	1:15:00	40	59	40	27	0	0.5	NW
01Sep2004	1:30:00	39	60	32	26	0	0.5	WNW
01Sep2004	1:45:00	35	54	37	27	0.1	1	NNE
01Sep2004	2:00:00	36	56	36	29	0	0.5	NW
01Sep2004	2:15:00	54	76	36	27	0.2	0.8	NNW
01Sep2004	2:30:00	59	87	38	27	0	0.5	NW
01Sep2004	2:45:00	34	52	36	29	0	0	N
01Sep2004	3:00:00	35	55	35	28	0.2	0.9	NNW
01Sep2004	3:15:00	37	55	39	29	0.2	0.6	NNW
01Sep2004	3:30:00	30	39	32	27	0.1	0.5	E
01Sep2004	3:45:00	40	60	42	30	0	0	N
01Sep2004	4:00:00	40	60	39	31	0	0	N
01Sep2004	4:15:00	38	55	40	32	0.1	0.6	NW
01Sep2004	4:30:00	36	49	39	28	0.2	2.2	W
01Sep2004	4:45:00	32	45	35	28	1.5	4.7	W
01Sep2004	5:00:00	60	79	60	27	0.6	1.8	WSW
01Sep2004	5:15:00	47	65	50	27	0.5	1.8	WNW
01Sep2004	5:30:00	42	61	42	27	0.5	1.1	WNW
01Sep2004	5:45:00	48	64	52	30	0.2	1.5	WNW
01Sep2004	6:00:00	41	64	42	26	0.4	1.3	NW
01Sep2004	6:15:00	48	65	52	32	0.2	2.1	WNW
01Sep2004	6:30:00	47	62	51	38	0	0.1	NNW
01Sep2004	6:45:00	48	63	52	40	0	0.2	ESE
01Sep2004	7:00:00	51	66	55	40	0.1	0.9	W
01Sep2004	7:15:00	51	64	54	43	0	0.5	SSW
01Sep2004	7:30:00	53	63	57	44	0.2	1.5	W
01Sep2004	7:45:00	54	64	58	43	1.3	3.2	WNW
01Sep2004	8:00:00	51	63	56	40	1	2.5	WNW

## APPENDIX 6 (C)

### EU Directives on Construction Plant Equipment in Force July 1999:

- Council Directive 79/113/EEC of 19 December 1978, a directive on the approximation of the laws of Member States relating to the determination of the noise of construction plant and equipment (amended by 81/105 1/EEC and 85/405/EEC).
  - Council Directive 84/532/EEC of 17 September 1984, a Framework Directive on the approximation of the laws of Member States relating to common provisions for construction plant and equipment.
  - Council Directive 84/533/EEC of 17 September 1994 on the approximation of the laws of Member States relating to the permissible sound power level of compressors (amended by 85/406/EEC).
  - Council Directive 84/534/EEC of 17 September 1994 on the approximation of the laws of Member States relating to the permissible sound power level of tower cranes (amended by 87/405/EEC).
  - Council Directive 84/535/EEC of 17 September 1994 on the approximation of the laws of Member States relating to the permissible sound power level of welding generators (amended by 85/407/EEC).
  - Council Directive 84/536/EEC of 17 September 1994 on the approximation of the laws of Member States relating to the permissible sound power level of power generators (amended by 85/408/EEC).
  - Council Directive 84/537/EEC of 17 September 1994 on the approximation of the laws of Member States relating to the permissible sound power level of powered hand-held concrete-breakers and picks (amended by 85/409/EEC).
  - Council Directive 84/538/EEC of 17 September 1994 on the approximation of the laws of Member States relating to the permissible sound power level of lawnmowers (amended by 87/252/EEC, 88/1 80/EEC, 88/181/EEC).
  - Council Directive 86/662/EEC of 22 December 1986 on the limitation of noise emitted by hydraulic excavators, rope-operated excavators, loaders and excavator-loaders (amended by 89/5 14/EEC and 95/27/EEC).

## APPENDIX 6 (D)

### On Site Calibration Record

Instrument ID	Pre-Calibration Level	Calibration Level	Post-Calibration Level
LD 870	93.8	94.0	93.7
LD 812	94.2	94.0	94.2

*For inspection purposes only.  
Consent of copyright owner required for any other use.*