

**ORAL HEARING INTO THE  
PROPOSED DUBLIN WASTE TO ENERGY FACILITY**

**PROOF OF EVIDENCE  
NOISE & VIBRATION**

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## 1.0 QUALIFICATIONS AND EXPERIENCE

1.1 My name is Jennifer Harmon. I hold an honours degree in Environmental Science from the University of Ulster at Coleraine and a Diploma in Acoustics and Noise Control awarded by the Institute of Acoustics. I am a member of the Institute of Acoustics, a requirement of membership being that I am active in the field of professional acoustics and satisfy the Institute's requirements with regard to level of qualifications and experience.

1.2 I have been active in the field of acoustics for 6 years, working as an Acoustic Consultant since 2001. I have considerable experience in the areas of planning with regard to noise, assessment of noise for complaint purposes and noise control in relation to both construction sites and operational developments.

Acoustics Projects with which I have been involved include:

- N6 GCOB Road Scheme
- N18 Gort to Crusheen Road Scheme;
- Kildare Route Rail Project
- Tynagh Power station;
- Monkstown Ring Road Scheme
- Waterford Outer Ring Road
- Atlas Ireland site expansion
- Aughinish Alumina mud stack extension
- Hillstreet Quarry site extension

1.3 I am currently employed as a Senior Acoustic Consultant with AWN Consulting.

## **2.0 INTRODUCTION**

- 2.1 Elsam Engineering prepared the main noise and vibration chapter presented in the EIS relating to the construction and operational phases of the development. AWN Consulting Limited was commissioned to conduct baseline noise and vibration monitoring along with a detailed appraisal of the noise and vibration impacts associated with road traffic during both the construction and operation of the proposed Dublin Waste to Energy development. The content of both these assessments will be reviewed in this brief of evidence.
- 2.2 The existing noise climate was quantified by means of a series of baseline noise surveys carried out both by Elsam Engineering and AWN Consulting.
- 2.3 Consideration was given to the typical sources of noise and vibration associated with the construction of such a development. A variety of practicable mitigation measures have been proposed.
- 2.4 The levels of noise associated with the new waste management facility, once operational, have been predicted using a proprietary software package. The results of this exercise have been compared with appropriate guidance in accordance with current best practice in Ireland.

## **3.0 SUMMARY OF ASSESSMENT**

### **3.1 Baseline Noise Survey**

3.1.1 The existing noise climate in the vicinity of the proposed development site was quantified by measurement during day and night periods in accordance with ISO 1996: *Acoustics – Description and measurement of environmental noise*.

3.1.2 A series of measurements were performed in the vicinity of noise sensitive locations close to the proposed facility and at a number of boundary locations. AWN conducted a series of long term and short term monitoring surveys at noise sensitive locations surrounding the development site. Elsam Engineering conducted a series of attended surveys at the site boundary and at Irishtown Nature Park.

3.1.3 The primary contributor to noise build-up was found to be road traffic. There were also contributions from plant and machinery operating in nearby industrial facilities and activities in the nearby port. The measured noise levels are typical of those encountered in this type of environment. No significant sources of vibration were observed.

### **3.2 Construction Phase**

3.2.1 During the construction phase, a variety of items of plant will be in use, such as dozers, piling equipment and dumper trucks. The most significant potential source of vibration at neighbouring buildings is associated with piling operations; the method of which will be selected and controlled to ensure that there is no occurrence of cosmetic or structural damage to existing neighbouring buildings and dwellings. Ground measurement of vibrations from impact hammer piling activities is generally undetectable beyond 100m. Typically vibration activities beyond 60m from source are within the recommended threshold limit of 2mm/s for buildings of architectural merit.

3.2.2 Vibration limits during the construction phase have been proposed to ensure that no damage to neighbouring buildings, noise sensitive receptors or sensitive equipment are affected during this phase. These values have been derived from the following standards; BS7385: *Evaluation and Measurement for vibration in buildings*. BS5228: *Noise Control on Construction and Open Sites Part 4: Code of Practice for noise and vibration control during piling*. These are detailed in Table 1:

Type of Structure	Frequency of Vibration		
	Less than 10Hz	10 to 50 Hz	50 to 100Hz (and above)
Particularly Sensitive/listed building	3mm/s	3 to 8 mm/s	8 to 10 mm/s
Dwellings	5mm/s	5 to 15mm/s	15 to 20 mm/s
Light & Flexible industrial/commercial	10mm/s	10 to 30 mm/s	30 to 40 mm/s
Heavy and Stiff Buildings	20mm/s	20 to 40 mm/s	40 to 50 mm/s

Table 1: Recommended Vibration Limits During Construction

3.2.3 Noise limits associated with construction activities have been proposed. These noise levels have been derived from the National Roads Authority (NRA) guidance document entitled *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*. While this document relates to noise from road schemes it is considered that the proposed construction noise limits are appropriate for a development of this nature. These construction noise limits are applicable to noise sensitive locations.

3.2.4 Prediction calculations have been prepared in relation to a 'worst case' construction phase where piling operations are ongoing at a number of boundary and nearest noise sensitive locations. The predicted noise levels at noise sensitive locations are within relevant construction noise limits as detailed in Table 2.

Location	Predicted Specific Construction Level dB(A)*	Construction Noise Limit dB(A)**					
		Monday to Friday (07:00 to 19:00hrs)		Monday to Friday (19:00 to 22:00hrs)		Saturday (08:00 to 16:30hrs)	
		Limit	Complies	Limit	Complies	Limit	Complies
NI06	46	70	π	60	π	65	π
NI07	50		π		π		
NI08	43		π		π		
NI09	36		π		π		
NI10	38		π		π		

**Table 2** Review of Predicted Construction Noise Level against Adopted Noise Limits

Note \* Detailed in Figure 9.19 Page 9 – 20 of EIS.

Note \*\* Detailed in Section 9.3.17, Page 9 – 11 of EIS.

3.2.5 It is proposed to conduct construction activities on a 24 hour basis. During weekday night time hours (i.e. 22:00 to 07:00hrs), and the hours of 16:30 to 08:00hrs on Saturdays, Sundays and Bank Holidays it is proposed to implement a construction noise criterion of 45dB  $L_{Aeq}$  at noise sensitive locations.

3.2.6 It is stated within the EIS that piling activities will take place during night time hours (e.g. 22:00 to 07:00hrs). On consideration it is now proposed that piling operations will only take place during daytime hours (i.e. 07:00 to 22:00hrs). Omitting piling activities from night time construction works will eliminate impulsive noise sources during this time period. Removing this activity during night time construction hours will also ensure noise levels will be within the night time guidance limit of 45dB(A) as detailed in Table 3.

Location	Predicted Specific Construction Level without piling activities dB(A)	Construction Noise Limit dB(A)	
		Night time level (22:00 to 07:00 hrs)	
		Limit	Complies
NI06	38	45	π
NI07	44		π
NI08	38		π
NI09	31		π
NI10	38		π

**Table 3:** Review of Night time Predicted Construction Noise Level against Adopted Noise Limits

3.2.7 Notwithstanding that predicted construction noise levels are within the adopted noise criteria at noise sensitive locations, guidance on practicable control measures will be taken from BS5228: *Noise and vibration control on*

*construction and open sites, Part 1: Code of practice for basic information and procedures for noise and vibration control (1997)*. Where applicable, reference will also be made to the *European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001*.

3.2.8 It is proposed that various practices be adopted during construction, including:

- ◆ Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;
- ◆ Establishing channels of communication between the contractor, developer, Local Authority and residents;
- ◆ Appointing a site representative responsible for matters relating to noise and vibration;
- ◆ Monitoring typical levels of noise and vibration during critical periods and at sensitive locations.

Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These may include:

- ◆ Selection of plant with low inherent potential for generation of noise and/or vibration;
- ◆ Erection of barriers as necessary around items such as generators or high duty compressors;
- ◆ Situate noisy/vibratory plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary;

The noise impact from construction activities on areas of ecological significance has been assessed by ecological consultants and mitigation measures have been included to reduce any adverse impact on this environment. This topic is therefore not addressed within this proof of evidence.

In summary, the noise and vibration limits proposed in addition to the proposed mitigation measures outlined above, will ensure the impact during

the construction phase will not cause a significant impact on the surrounding environment.

### **3.3 Operational Phase**

3.3.1 Noise predictions due to process and building services plant associated with the proposed development have been conducted using a proprietary software package, i.e. *SoundPlan*. In this instance the software calculated noise levels in accordance with “*Environmental Noise from Industrial Plants – General Prediction Method*”.

3.3.2 The modelling was undertaken utilising noise levels measured for similar items of plant from comparable facilities and standard values taken from acoustic tables.

3.3.3 Noise levels have been predicted at a total of 10 locations, five of these being representative of the closest noise sensitive locations and the other five being representative of the site boundary of the proposed development.

3.3.4 The noise model has incorporated various noise mitigation measures into its design to ensure the operational noise impact will be reduced. These include:

- An enclosed waste reception hall with sound damping cladding on internal walls
- Site entrance relocated to Pigeon House Road to shield the majority of noise sensitive areas located south of the site.
- Silencer will be installed beyond the fans of the stacks to reduce noise emissions from this source.
- ID fans will be housed inside the building and therefore will not emit noise to the surrounding environment.
- All other activities relating to the operation e.g. collection of bottom ash etc will take place inside the building.

3.3.5 Operational noise criteria have been adopted considering guidance contained within the following documents:

- ◆ Environmental Protection Agency: *Guidance Note in Relation To Scheduled Activities*;
- ◆ Environmental Protection Agency: *Guidance Notes for Noise*;
- ◆ World Health Organisation: *Guidelines for Community Noise*.

3.3.6 The EIS recommends a daytime noise limit of 50dB  $L_{Aeq}$  with daytime defined as between 08.00 and 22.00hrs. This EIS also recommends a night time noise limit of 40dB  $L_{Aeq}$  with night time being defined as between 22.00 and 08.00hrs. These limits apply to the nearest noise sensitive locations.

3.3.7 The predicted noise levels at the five noise sensitive receiver locations range from 24 to 31dB  $L_{Aeq}$  during daytime periods. These values are well within the daytime criterion of 50dB  $L_{Aeq}$ .

3.3.8 The predicted noise levels at the five noise sensitive receiver locations range from 22 to 28dB  $L_{Aeq}$  during night time periods. These values are well within the night time criterion of 40dB  $L_{Aeq}$ .

3.3.9 The predicted values at the boundary locations immediately adjacent to the site range from 50 to 71dB  $L_{Aeq}$  during daytime periods and 50 to 68dB  $L_{Aeq}$  during night time periods. The noise criteria referred to above are not applicable at these locations.

3.3.10 Predicted traffic flows have been used to determine the change in noise levels in the vicinity of a number of roads and junctions in the area surrounding the development. For the purposes of assessing potential noise impact, it is appropriate to consider traffic movements with and without the development.

3.3.11 The maximum predicted increase in traffic noise in the vicinity of the proposed site in the opening year (2012) is less than 1dB at all locations assessed. An increase of this magnitude is imperceptible and the associated noise impact is negligible.

3.3.12 The maximum predicted increase in traffic noise in the vicinity of the proposed site in the design year (2027) is less than 1dB at all locations

assessed. An increase of this magnitude is imperceptible and the associated noise impact is negligible.

3.3.13 In summary, the operational phase of the facility combined with the various incorporated mitigation measures will be of minor noise impact at the nearest noise sensitive locations to the facility.

#### 4.0 CUMULATIVE IMPACTS

4.1 The cumulative impacts of the development are those which combine existing noise in the environment with that proposed during the operation of the development.

4.2 The predicted noise levels from the operation of the facility are presented in Figure 9.17 and 9.18 of the EIS. These levels consider all significant noise generating activities proposed for the site and range between 24 to 31 dB during daytime periods and between 22 to 28dB during night time periods.

4.3 Predicted levels are of the order of magnitude that it would not be expected that existing ambient or background noise levels in the vicinity of the nearest noise sensitive locations would increase as a result of development. Table 4 summarises the cumulative impact at three noise sensitive locations where baseline levels have been measured.

Location	Baseline Noise- Night time, dB L <sub>Aeq</sub>	Predicted operational noise- Daytime, dB (A)	Increased traffic noise	Combined Noise Level, dB(A)	Cumulative Impact
N106 (Irishtown nature park)	44.8	25.8	0.1	45.0	Imperceptible
N107 (Seafort Avenue)	56.8	27.8	0.1	56.9	Imperceptible
N109 (St. Lukes Road)	59.5	23	0.1	59.6	Imperceptible

Table 4: Summary of Cumulative Impact During Operation

## **5.0 CONCLUSIONS**

- 5.1 During the construction phase of the project, there will be some small impact on nearby residential properties due to noise emissions from site activities. The application of binding noise limits and hours of operation, along with implementation of appropriate noise control measures, will ensure that noise impact is kept to a minimum.
- 5.2 It is not envisaged that vibration during construction will be significant considering the distance between the site boundary and the nearest sensitive buildings.
- 5.3 The predicted operational plant noise levels at noise sensitive locations are below measured baseline levels and are well within the relevant EPA emission limits.
- 5.4 It is not envisaged that vibration will be of significance once the scheme is operational.