Comhairle Cathrach
Bhaile Átha Cliath
Dublin City Council

Environment and Transportation Department,
Block 2, Floor 6,
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Dublin 8.

22 June 2016.

To Each Member of the
Environment Strategic Policy Committee

Dublin Waste to Energy (DWtE) Project

1. Construction Status

Construction remains on schedule for completion in Q3 2017.

1.1 Progress to Date

Progress in the key areas are summarised below:

Construction

- Construction is currently programmed on a 24/7 basis.
- Both the civil designer, PM Group Limited and the process system designer, Hitachi Zosen Inova (HZI) has reported that their design and procurement activities are now substantially complete and that all their key subcontractors are in place.
- PM Group Limited, the civil designer and construction manager continue to manage and monitor all construction activity on site.
    - The main focus of PM Group and their subcontractors remains:
        - the installation and fit out of the floors of the administration building,
        - works associated with the installation of the buildings' exterior cladding,
        - the installation of the ramp to the tipping hall.
- Hitachi Zosen Inova (HZI), the process systems designer continue to manage all process equipment installation and facility commissioning through to the commencement of operations
    - The main focus of HZI and their subcontractors activities are:
        - installation of both boiler lines of the facility,
        - installation of the process equipment,
        - inspection and review of process equipment manufacturing.

Site Aerial View Looking East May 2016 (Copyright PML)

Site Aerial View Looking Southeast May 2016 (Copyright PML)

2. Environmental Impact

Environmental monitoring and mitigation measures continued to be implemented during the construction phase of the DWtE facility and the construction phase environmental report for quarter 1 (January – March) 2016 is presented as Appendix 1 to this report.

All reports are also available for download at the Dublin Waste to Energy Website.

3. Community Liaison

The Community Gain Liaison Committee (CGLC) met in May and assessed the applications received for grants less that €100k from the DWtE Community Gain Fund (CGF).

The CGLC:

- has approved a number of grant applications,
- requested additional information from a number of applicants prior to finalising their decision, and
- deemed a number of applications to be unsuccessful.

The administrator to the CGLC is in the process of informing all applicants of the CGLC decisions.

The CGLC will meet again in July to commence assessment of applications received from applicants seeking grants in excess of €100k from the DWtE Community Gain fund.

4. Compliance with statutory consents

There are no non-compliance issues to report.

Declan Wallace
Director of Traffic

PM GROUP

COVANTA
Powering Today. Protecting Tomorrow

Dublin Waste to Energy

Issue date: 26 April 2016

PM GROUP

COVANTA
Powering Today. Protecting Tomorrow

Construction Phase Environmental Monitoring Report - Quarter 1 (January - March) 2016

Signoff	Originator	Checked	Approver	Date
Name	Ray Derrig	Paul O'Sullivan	Keith Elliott	26th April 2016

Contents

1 Introduction **4**

2 Local Environment **5**

3 Noise **6**

3.1 Noise Guidance & Standards 6

3.2 Measurement Parameters 6

3.3 Construction Noise Limits at Sensitive Locations 7

3.4 Noise Monitoring Results 7

3.5 Conclusion 8

4 Dust Deposition **10**

4.1 Monitoring Method 10

4.2 Monitoring Results 10

4.3 Conclusion 12

5 Surface Water **13**

5.1 Monitoring Method 13

5.2 Monitoring Results 13

5.3 Conclusion 15

Appendix A **16**

Noise Data 16

1 Introduction

An environmental monitoring programme has been implemented during the construction stage of the Dublin Waste to Energy (DWTE) Project. In conjunction with the monitoring, a number of controls and procedures have been implemented during construction activities to avoid, or minimise, potential adverse impacts to the environment and local community.

The monitoring programme assists in demonstrating compliance with the conditions and requirements laid out in An Bord Pleanala Order-29S.EF2022, Condition 13d; *"A scheme for monitoring noise, dust deposition and suspended solids in surface water run-offs and adjacent waters shall be prepared for the construction phase of the development. Details of the scheme shall be made available for inspection at the offices of Dublin City Council and at a local office in the Ringsend/Poolbeg area prior to the commencement of construction works. Monitoring shall be carried out during the construction phase and reports on the monitoring shall be made available for inspection at the offices in question on a 3 monthly basis. The reports shall compare monitored results with standards set out in the environmental impact statement or standards given in recognised national or international guidelines as relevant."*

Construction of the DWTE facility recommenced in October 2014 and an environmental monitoring programme in accordance with the 'Dublin Waste to Energy - Construction Phase Monitoring Scheme' September 2009 has been implemented. The 1st Quarterly Report 2016 on the Construction Phase Monitoring Scheme relates to environmental monitoring undertaken for the period of January to March 2016. The PM Group construction management team were present on site throughout the January to March 2016 monitoring period. The PM Group construction management team ensured construction works were undertaken to comply with environmental procedures for the site. Environmental monitoring with regards to noise, dust deposition and suspended solids in surface water commenced with construction works.

2 Local Environment

The main population centres of Ringsend, Irishtown and Sandymount are located approximately 1km from the boundary of the site.

The closest sensitive receptors to the site are the residential properties at Pigeon House Road which are located approximately 865m west of the site boundary. A map of sensitive locations and environmental monitoring points (noise, dust and surface water) are included in Figure 2.1.

The identified sensitive noise locations are N1 – N6 as follows:

- N1 - Rehab Institute
- N2 – Seafort Avenue
- N3 – Beach Avenue
- N4 – Leukos Road
- N5 – Pigeon House Road
- N6 – Walkway (Irishtown Nature Reserve)

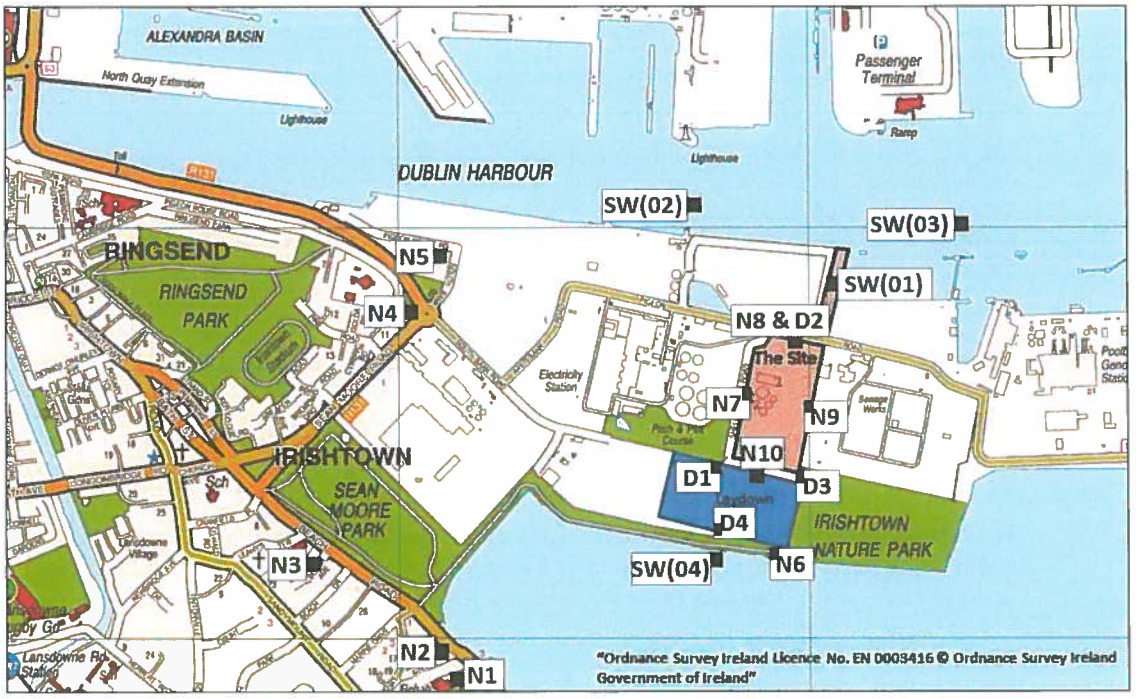

Figure 2.1: Environmental Monitoring Locations

3 Noise

Monitoring of noise levels at sensitive locations is required during construction to assess compliance with the requirements of the Environmental Impact Statement (EIS) and An Bord Pleanala Order-29S.EF2022, Condition 13d. Refer to Figure 2.1 in Section 2 for the monitoring locations.

3.1 Noise Guidance & Standards

The noise monitoring was conducted in accordance with the following guidance:

- International Standard ISO 1996-1:2003 - Acoustics – Description, Measurement and assessment of Environmental Noise
- BS 4142:2014 - Methods for rating and assessing industrial and commercial sound
- BS 5228-1:2009 + A1:2014 – Code of practice for noise and vibration control on construction and open sites - Part 1: Noise.

3.2 Measurement Parameters

Noise is measured in terms of decibels (dB). The various measurement parameters and noise terminology are defined below.

- Decibel (dB)

Decibel (dB) is the standard unit for expressing the noise level (sound pressure level). It is calculated as a logarithm of the intensity of sound. It is derived from the logarithm of the ratio between the value of a quantity and a reference quantity. For sound pressure level the reference quantity is 20µPa which is the threshold of normal hearing and equates to 0dB. At the upper end of the scale 140dB is the threshold of pain.

- A-weighted Decibel (dBA)

Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sound of different frequency (pitch) in a similar way to the human ear. This takes account of the fact that the human ear has different sensitivities to sound at different frequencies.

- L_{Aeq}

The equivalent continuous sound level – the sound pressure level of a steady sound having the same energy as a fluctuating sound over a specified measuring period. It can be considered similar to an average level. The L_{Aeq} value is the A-weighted Leq.

- L_{A90} and L_{A10} Values

The L_{A90} and L_{A10} values represent the A-weighted sound pressure levels exceeded for a percentage of the instrument measuring time. The L_{A90} represents the sound pressure level exceeded for 90% of the monitoring period and is a good indicator of the background noise level excluding peak noise events. L_{A10} indicates the sound pressure level exceeded for 10% of the monitoring period and is a good parameter for expressing event noise such as passing traffic.

- L_{AMax} (dBA)

The maximum instantaneous value recorded over the monitoring period including A-weighting

- Measurement Time

The noise monitoring will be undertaken over a 30min time interval which is a sufficient time to establish that the measured noise adequately represents the subject source of the noise.

3.3 Construction Noise Limits at Sensitive Locations

Ambient noise levels at the nearest sensitive locations (Sandymount and Ringsend areas) to the site have being established based on review of the Environmental Impact Statement, Dublin City Noise Map model and preconstruction noise monitoring. These ambient measurements at the noise sensitive locations are compared against the values identified in "British Standard 5228-1:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Part 1:Noise " and maximum permissible noise levels at façade dwellings are recommended. The maximum noise levels are presented in Table 3.1 below.

Ambient noise level at sensitive locations is found to be similar or higher than those monitored at site boundary locations. The noise at sensitive receptors is affected by localised noise sources, mainly road traffic with any noise sources emitted from site difficult to define. For this reason site boundary noise monitoring will be the main noise source monitored as opposed to sensitive locations. The site boundary noise monitored is calculated to determine its contribution to local residential areas and compared to British Standard 5228-1:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Part 1:Noise "

Table 3.1: Maximum Permissible Noise Levels at the Facade of Dwellings during Construction

	Sensitive Locations					
	Rehab Institute	**Seafort Avenue**	**Beach Avenue**	**Leukos Road**	**Pigeon House Road**	**Walkway Irishtown Nature Park**
Daytime Monday - Friday 0700hrs to 1900hrs Rating level, L_{Aeq} (1hr)dBA	65	65	65	65	65	65
Evenings and Weekends 1900hrs to 1100hrs Rating level, L_{Aeq} (1hr)dBA	55	55	55	55	55	55
Night time 2300hrs to 0700hrs Rating level, L_{Aeq} (1hr)dBA	50	50	50	50	50	50

3.4 Noise Monitoring Results

Monitoring was undertaken at site boundaries and sensitive locations during construction works. The survey was carried out over the months January to March 2016. The surveys involved a 30 minute sample period taken at each of the noise monitoring locations.

3.4.1 Noise Calculations from Boundary Sampling Locations

Noise levels were monitored at the site boundary locations to enable the contribution of the January to March 2016 DWTE site activities to the noise levels at the sensitive receptors to be calculated (using the 'British Standard 5228-1:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Part 1: Noise"). The calculated contribution was then compared to the noise levels monitored at the sensitive receptors to establish whether site activities were likely to be causing a significant negative impact at the sensitive receptors.

Monitored noise levels at the western and southern boundaries, as the closest boundaries to the sensitive receptors, were selected to be used in the calculation of noise levels at the sensitive receptors. On this basis, when both are available, the southern boundary is used to calculate the noise level contributions at the Rehab Institute, Seafort Avenue, Beach Avenue and Irishtown Nature Park with the western boundary used to calculate the noise level contributions at the Pigeon House Road and Leukos Road.

Using the BS 5228 Standard calculation, the highest contribution of noise calculated for the months of January to March 2016 at each of the sensitive locations are presented in Table 3.2.

Table 3.2: The Contribution of the DWTE Site Activities to Noise Levels at Sensitive Receptors

		Sensitive Locations					
Time	**Month**	**Rehab Institute N1**	**Seafort Avenue N2**	**Beach Avenue N3**	**Leukos Road N4**	**Pigeon House Road N5**	**Irishtown Nature Park N6**
Daytime Results level, L_{Aeq}(30 min)dBA	January	35	34	32	36	37	48
	February	38	37	36	36	36	51
	March	36	36	34	33	34	50
Evening Time Results level, L_{Aeq}(30 min)dBA	January	32	31	29	25	25	45
	February	25	24	23	24	25	38
	March	30	30	28	29	30	44
Nightime Results level, L_{Aeq}(30 min)dBA	January	25	24	23	28	28	38
	February	22	21	20	21	21	35
	March	25	24	23	24	24	38

3.5 Conclusion

As noise readings at sensitive locations are affected by local noise sources, the most accurate way to determine if noise is impacting the local residential areas is to use site boundary monitoring readings and calculate the contribution of this noise to the closest sensitive receptors. Noise levels at the western and southern site boundaries were monitored during the January to March 2016 period and their contribution to the closest residential sensitive receptors calculated. Most construction works occur during the daytime hours with limited construction occurring thereafter. Noise monitoring was undertaken at sensitive receptors (Sandymount and Ringsend areas) and site boundaries on similar days to allow comparison over the quarterly monitoring period.

Maximum permissible noise levels during construction are detailed in Table 3.1.

The sensitive locations are situated up to 1km away from site boundaries and noise contributions from site to local residential areas were calculated with the results provided in Table 3.2. The calculated noise level contributions are significantly lower than the maximum permissible noise levels. The greatest daytime noise level contribution from site activities at a residential sensitive receptor was 38dBA at Rehab Institute, with the greatest daytime noise level contribution at Irishtown Nature Park calculated to be 51dBA. The greatest evening time noise level contribution at a residential sensitive receptor was 32dBA at Rehab Institute, with the greatest evening time noise level contribution at Irishtown Nature Park calculated to be 45dBA. The greatest night-time time noise level contribution at a residential sensitive receptor was 28dBA at Leukos Road, with the greatest night-time noise level contribution at Irishtown Nature Park was calculated to be 38dBA.

Ambient noise levels at sensitive locations were found to be similar or higher than those monitored at site boundary locations. The highest noise level of 73.9dBA (Appendix A -Table 1.2) was monitored at Beech Avenue (N3) sensitive receptor during this reporting period. This is higher than the closest boundary location to this location (southern) which had lower readings at similar times. This indicates that noise levels at the sensitive receptors assessed during the January – March 2016 construction period are predominantly affected by localised noise sources, mainly road traffic.

On this basis, it can be concluded that the DWTE site activities undertaken are not resulting in exceedances of the construction noise limit values at sensitive receptors[1] during the assessed period.

Detailed noise monitoring data is included in Appendix A.

[1] Noise is measured using a logarithmic scale that ranges from 0 dBA to about 140 dBA and approximates the range of human hearing. However, due to the logarithmic nature of the decibel scale, the sound levels for different noise sources cannot be added directly for a combined sound level. For example, two adjacent sound sources with the same sound level have a composite noise level only 3 decibels greater than either source; two adjacent sound sources with sound levels that differ by 10 decibels have a composite noise level only 0.4 decibels greater than the louder source.

4 Dust Deposition

A scheme for monitoring dust deposition and direction has been developed for the construction phase of the development.

4.1 Monitoring Method

Monitoring was overseen by the Project Environmental Consultant and undertaken by independent laboratory in accordance with the 'Dublin Waste to Energy - Construction Phase Monitoring Scheme', September 2009. Dust monitoring locations D1 – D4 are shown in Figure 2.1.

There are no legislative regulations regarding fugitive dust during construction either in Ireland or the UK. The "Technical Instructions on Air Quality Control – TA Luft" 2002 emission value for dustfall of 350 mg/m^2/day is therefore used as the maximum guideline level during construction.

4.2 Monitoring Results

4.2.1 Weather Conditions

The average weather conditions during the January to March 2016 monitoring period are given below (http://www.wunderground.com);

- January 2016
  - Average Precipitation: 1.8mm/day
  - Average Wind Speed: 23.8km/hr
  - Average Temperature: 5.4°C
  - Total Precipitation: 56.6mm
- February 2016
  - Average Precipitation: 1.2mm/day
  - Average Wind Speed: 24.0km/hr
  - Average Temperature: 4.1°C
  - Total Precipitation: 36.1mm
- March 2016
  - Average Precipitation: 0.8mm/day
  - Average Wind Speed: 19.0km/hr
  - Average Temperature: 6.0°C
  - Total Precipitation: 24.38mm

4.2.2 Dust Deposition – Bergerhoff Gauges

The dust deposition results from the Bergerhoff gauges are given in Tables 4.1 – 4.3. Refer to Figure 2.1 in Section 2 for the monitoring locations.

Table 4.1: Dust Deposition Results – January 2016

Sample Locations	Date Deployed	Date Collected	Days Exposed	Dust Gauge Diameter (cm)	Dust Collected mg/gauge	Rate of Dust Deposition mg/m²/day	TA Luft Limit mg/m²/day (Annual Average)
1 (West)	08.12.2015	13/01/2016	36	9.5	39.9	156.4	350
2 (North)	08.12.2015	13/01/2016	36	9.5	41.7	163.4	350
3 (East)	08.12.2015	13/01/2016	36	9.5	30.3	118.7	350
4 (South)	08.12.2015	13/01/2016	36	9.5	27.5	107.8	350

Table 4.2: Dust Deposition Results – February 2016

Sample Locations	Date Deployed	Date Collected	Days Exposed	Dust Gauge Diameter (cm)	Dust Collected mg/gauge	Rate of Dust Deposition mg/m²/day	TA Luft Limit mg/m²/day (Annual Average)
1 (West)	13/01/2016	09/02/2016	27	9.5	17.6	92.0	350
2 (North)	13/01/2016	09/02/2016	27	9.5	10.9	57.0	350
3 (East)	13/01/2016	09/02/2016	27	9.5	21.2	110.8	350
4 (South)	13/01/2016	09/02/2016	27	9.5	26.9	140.6	350

Table 4.3: Dust Deposition Results – March 2016

Sample Locations	Date Deployed	Date Collected	Days Exposed	Dust Gauge Diameter (cm)	Dust Collected mg/gauge	Rate of Dust Deposition mg/m²/day	TA Luft Limit mg/m²/day (Annual Average)
1 (West)	09/02/2016	08/03/2016	28	9.5	26.1	131.5	350
2 (North)	09/02/2016	08/03/2016	28	9.5	21.8	109.8	350
3 (East)	09/02/2016	08/03/2016	28	9.5	30.4	153.2	350
4 (South)	09/02/2016	08/03/2016	28	9.5	17.2	86.7	350

Table 4.4: Dust Deposition Results – Annual Average March 2015 – March 2016

Sample Locations	Commencement Date	Completion Date	Days Exposed	Rate of Dust Deposition mg/m²/day (Annual Average)	TA Luft Limit mg/m²/day (Annual Average)
1 (West)	18.03.2015	08.03.2016	356	251.7	350
2 (North)	18.03.2015	08.03.2016	356	152.3	350
3 (East)	18.03.2015	08.03.2016	356	201.1	350
4 (South)	18.03.2015	08.03.2016	356	136.1	350

4.3 Conclusion

The annual average readings (Table 4.4) for all monitoring locations are below the recommended "Technical Instructions on Air Quality Control – TA Luft" 2002 standard guideline of 350mg/m^2/day over an annual period. The largest annual average reading of 251.7mg/m^2/day on the westerly boundary location for dust deposition exists for the site over the past year.

The highest monthly reading of 163.4mg/m^2/day was recorded in January on the northerly boundary (D2) from the twelve results over the three monthly periods. A water bowser is operated to mitigate dust in dry weather conditions. All vehicles leaving the construction areas of the site pass through a wheel cleansing area prior to entering the local road network. A road sweeper continual cleans site hard surfaced roads and road networks linked to the site.

5 Surface Water

A scheme for monitoring suspended solids in surface waters adjacent to the site is placed for the construction phase of the project, as per the EIS requirements and in accordance with An Bord Pleanala Order-29S.EF2022. Refer to Figure 2.1 in Section 2 for the monitoring locations.

5.1 Monitoring Method

Monitoring was carried out by an independent laboratory technician and overseen by the project environmental consultant in accordance with 'Dublin Waste to Energy - Construction Phase Monitoring Scheme' September 2009.

5.2 Monitoring Results

Analysis of suspended solids in surface water at the four surface water monitoring locations was undertaken.

The suspended solids results for January to March 2016 are presented in Table 5.1.

Table 5.1: Surface Water Monitoring – Suspended Solids Results

Parameter	Units	Date	Time	High Tide	Low Tide	SW(01)	SW(02)s	SW(02)d	SW(03)s	SW(03)d	SW(04)
Location						Cooling Water Channel	Fairway West (surface)	Fairway West (deep)	Fairway East (surface)	Fairway East - Pier (deep)	Irishtown Nature Park
Grid Reference Easting						6°11'54.95W	6°12'170W	6°12'170W	6°11'640W	6°11'640W	6°12'02.01W
Grid Reference Northing						53°20'28.32N	53°20'596N	53°20'596N	53°20'606N	53°20'606N	53°20'08.35N
Suspended Solids (January 2016)	mg/l	13/01/16	09:30-13:20	01:23 & 13:37	06:54 & 19:25	15	<10	<10	<10	25	30
Suspended Solids (February 2016)	mg/l	09/02/16	09:00 -10:35	11:51	05:12 & 17:37	37	14	23	20	38	29
Suspended Solids (March 2016)	mg/l	08/03/16	09:15 – 12:50	10:49 & 23:17	04:13 & 16:36	31	<10	36	30	44	43

5.3 Conclusion

In the 1st Quarter (January – March) 2016 period the suspended solids ranged from <10 – 44mg/l. The highest level of suspended solids was recorded at the Fairway East -Pier (deep), SW(03) in March 2016 with a result of 44mg/l. Baseline monitoring from 2010 – May 2015 ranged from 1 - 508mg/l.

Enabling works for site setup to construct the cooling water pump station commenced at end of June 2015. Construction works of the coffer dam for the cooling water pump station commenced at the end of July 2015. Construction of the intake channel is on-going.

During the construction period no elevated suspended solid readings were recorded when compared against preconstruction baseline readings and previous months. The levels recorded in 1st Quarter 2016 were low levels compared to baseline monitoring from 2010 – May 2015 which ranged from 1 - 508mg/l and the monitoring range of 2 – 300mg/l over the past year. Fluctuations in suspended solids occur due to the intertidal area, urbanised catchment being sampled and water traffic operating on the waterbody. Therefore variation is expected throughout all samples readings. Fluctuations in suspended solids are common with levels recorded up to 508mg/l over the preconstruction monitoring period. During the quarterly monitoring period no elevated suspended solid readings were recorded compared to previous readings.

Appendix A
Noise Data

Table 1.1: Construction Noise Monitoring Locations

Noise Monitoring Location	Description
N1 – Rehab Institute	Outside front gate of Rehab, Roslyn Park
N2 – Seafort Avenue	Footpath adjacent to No. 33 Seafort Avenue
N3 – Beach Avenue	Footpath adjacent to the dividing wall of No. 10 and No. 11 Beach Avenue
N4 – Leukos Road	In front of DCC recycling facility
N5 – Pigeon House Road	Footpath immediately in front of the Coastguard Cottages
N6 – Walkway (Irishtown Nature Reserve)	Walkway south of the site connecting Sean Moore Park and Irishtown Nature Reserve
N7 – Western Site Boundary	Midway on the western site boundary
N8 – Northern Site Boundary	Midway on the northern site boundary
N9 – Eastern Site Boundary	Midway on the eastern site boundary
N10 – Southern Site Boundary	Midway on the southern site boundary

Table 1.2 Continued: January Noise Monitoring Results

Date	Location No.	Boundary Location	Duration (min)	Start Time	L_{Aeq} dB(A)	L_{AMax} dB(A)	LA90 dB(A)	L_{A10} dB(A)	Principal Noise Sources	Weather Conditions
05th January 2016	N7	Western	30	11.43	65.8	81.2	58.7	69.8	- Cranes lifting materials - Mobile plant operating on ground - Steel erection - Mechanical equipment installation - Digger excavating material - Scaffolding Erection - Rebar installation - Formwork installation - Road sweeper - Trucks arriving with materials	Dry, Cloudy, Calm,
05th January 2016	N8	Northern	30	12.22	58.9	79.8	62.3	65.3		
05th January 2016	N9	Eastern	30	14.15	69.8	81.2	64.3	73.3		
05th January 2016	N10	Southern	30	15.03	68.8	78.9	63.0	71.9		
05th January 2016	N10	Western	30	19.56	56.8	72.3	49.4	55.1	- Steel erection - Cladding installation - Hum from Wastewater Treatment Plant - Internal mechanical installation - Cranes and mobile lifting equipment operating	Dry, Cloudy, Calm,
05th January 2016	N7	Western	30	20.38	59.9	79.8	52.1	59.8		

Table 1.2 Continued: January Noise Monitoring Results

Date	Location No.	Boundary Location	Duration (min)	Start Time	L_{Aeq} dB(A)	L_{AMax} dB(A)	LA90 dB(A)	L_{A10} dB(A)	Principal Noise Sources	Weather Conditions
14th January 2016	N7	Western	30	14.13	75.2	89.5	69.8	78.8	- Digger excavating material - Steel erection - Concrete pumps operating - Mechanical equipment installation - Cranes lifting materials - Mobile lifting equipment operating - Scaffolding Erection - Rebar installation - Formwork installation - Trucks arriving with materials	Clear, Calm,
14th January 2016	N8	Northern	30	16.06	64.7	84.7	57.8	68.2		
14th January 2016	N9	Eastern	30	15.31	70.0	82.8	66.5	72.7		
14th January 2016	N10	Southern	30	14.54	61.4	82.7	56.7	64.4		
14th January 2016	N7	Western	30	19.56	56.9	77.4	56.0	58.1	- Mechanical equipment installation - Steel erection - Hum from Wastewater Treatment Plant - Cladding installation - Cranes and mobile lifting equipment operating	Dry, Moderate Breeze,
14th January 2016	N10	Southern	30	19.16	54.3	75.7	49.1	54.6		
14th January 2016	N7	Western	30	23.39	59.8	79.8	57.8	61.3		
14th January 2016	N10	Southern	30	23.05	54.8	77.8	49.3	55.9		

Table 1.2 Continued: January Noise Monitoring Results

Date	Location No.	Boundary Location	Duration (min)	Start Time	L_{Aeq} dB(A)	L_{AMax} dB(A)	LA90 dB(A)	L_{A10} dB(A)	Principal Noise Sources	Weather Conditions
22nd January 2016	N7	Western	30	09.45	74.5	87.8	66.9	77.4	- Cranes operating, MEWP operating - Steel erection - Mobile plant operating onsite - Internal mechanical installation works - Digger excavating material - Formwork installation - Road sweeper operating	Dry, Cloudy, Slight / Moderate Breeze
22nd January 2016	N8	Northern	30	10.19	56.9	73.2	55.1	58.8		
22nd January 2016	N9	Eastern	30	11.04	73.6	88.8	67.6	77.1		
22nd January 2016	N10	Southern	30	11.47	63.0	80.3	56.8	65.6		
22nd January 2016	N7	Western	30	21.56	59.6	78.3	53.3	56.6	- Hum from Wastewater Treatment Plant - Cladding installation - Internal mechanical installation works - Cranes and mobile lifting equipment operating	Dry, Cloudy, Slight / Moderate Breeze
22nd January 2016	N10	Southern	30	21.15	56.8	79.9	50.7	53.1		
28th January 2016	N7	Western	30	11.03	71.6	90.8	64.7	74.7	- Cranes operating, MEWP operating - Steel erection - Mobile plant operating onsite - Internal mechanical installation works - Digger excavating material - Formwork installation - Road sweeper operating	Dry, Cloudy, Slight / Moderate breeze,
28th January 2016	N8	Northern	30	11.45	70.2	87.0	57.9	74.2		
28th January 2016	N9	Eastern	30	12.24	72.1	91.0	67.1	74.0		
28th January 2016	N10	Southern	30	14.16	65.3	78.6	57.1	68.2		

Table 1.2 Continued: February Noise Monitoring Results

Date	Location No.	Location	Duration (min)	Start Time	L_{Aeq} dB(A)	L_{AMax} dB(A)	LA90 dB(A)	L_{A10} dB(A)	Principal Noise Sources	Weather Conditions
04th February 2016	N7	Western	30	10.40	70.0	84.4	61.5	74.3	- Steel erection - Cranes lifting materials - Mobile plant operating on ground - Internal mechanical equipment installation - Digger excavating material - Road sweeper - Trucks arriving with materials	Dry, Cloudy, Slight Breeze
04th February 2016	N8	Northern	30	11.34	59.2	81.9	56.0	61.3		
04th February 2016	N9	Eastern	30	12.10	71.4	93.5	65.4	71.9		
04th February 2016	N10	Southern	30	12.50	65.9	94.2	59.9	68.2		
04th February 2016	N7	Western	30	22.05	57.5	81.3	51.3	55.9	- Cladding installation - Hum from Wastewater Treatment Plant - Internal mechanical installation - Cranes and mobile lifting equipment operating	Dry, Cloudy, Calm,
04th February 2016	N10	Southern	30	21.15	56.8	78.9	48.9	51.8		

Table 1.2 Continued: February Noise Monitoring Results

Date	Location No.	Location	Duration (min)	Start Time	L_{Aeq} dB(A)	L_{AMax} dB(A)	LA90 dB(A)	L_{A10} dB(A)	Principal Noise Sources	Weather Conditions
11th February 2016	N1	Rehab	30	15.54	66.6	84.8	56.8	69.7	- Consistent road traffic - No construction noise audible at any noise monitoring location	Calm, Dry, Partially Cloudy,
11th February 2016	N2	Seafort Avenue	30	15.20	67.8	84.5	52.1	71.6		
11th February 2016	N3	Beech Ave	30	16.30	68.9	86.5	57.2	72.4		
11th February 2016	N4	Leukos Road	30	13.55	62.1	80.9	56.7	64.9		
11th February 2016	N5	Pigeon Hs	30	13.21	61.4	80.2	54.9	64.7	- Background crane noise from Dublin Port - Car passing - No construction noise audible at the noise monitoring location	Calm, Dry, Partially Cloudy,
11th February 2016	N6	Nature Reserve	30	12.33	55.0	79.3	52.2	56.3	- Humming noise from WWTP - Back round MEWP noise - Background banging noise - Dog Barking	Calm, Dry, Partially Cloudy,
11th February 2016	N7	Western	30	10.24	70.5	92.6	64.7	73.4	- Mobile plant operating on ground - Steel erection - Cranes lifting materials - Internal Mechanical equipment installation - Digger excavating material - Road sweeper - Trucks arriving with materials - Humming noise from WWTP	Dry, Calm, Clear Skies,
11th February 2016	N8	Northern	30	11.14	57.0	80.8	51.8	60.9		
11th February 2016	N9	Eastern	30	11.49	71.9	96.5	72.5	74.1		
11th February 2016	N10	Southern	30	09.22	68.4	85.4	61.9	71.8		

Table 1.2 Continued: February Noise Monitoring Results

Date	Location No.	Location	Duration (min)	Start Time	L_{Aeq} dB(A)	L_{AMax} dB(A)	LA90 dB(A)	L_{A10} dB(A)	Principal Noise Sources	Weather Conditions
11th February 2016	N7	Western	30	21.25	56.3	79.8	50.8	55.9	- Cranes operating, MEWP operating - Steel and cladding erection - Mobile plant operating onsite - Internal mechanical installation works - Humming noise from WWTP	Dry, Slight Breeze
11th February 2016	N10	Southern	30	20.38	55.8	77.9	50.3	54.8		
12th February 2016	N7	Western	30	00.10	52.8	79.9	50.1	52.6		
11th February 2016	N10	Southern	30	23.25	53.5	76.3	46.8	52.8		
18th February 2016	N7	Western	30	11.01	76.5	84.9	67.3	80.2	- Steel erection - Cladding installation - Decking installation - Cranes lifting materials - Internal Mechanical equipment installation - Digger excavating material - Mobile plant operating on ground - Trucks arriving with materials	Dry, Calm, Clear
18th February 2016	N8	Northern	30	11.36	60.5	85.7	56.5	62.8		
18th February 2016	N9	Eastern	30	12.12	68.4	82.9	64.2	70.8		
18th February 2016	N10	Southern	30	12.55	69.6	92.1	57.6	72.6		
18th February 2016	N7	Western	30	21.25	58.9	79.8	50.9	56.8	- Cladding installation - Hum from Wastewater Treatment Plant - Internal mechanical installation - Cranes and mobile lifting equipment operating	Dry, Calm, Clear
18th February 2016	N10	Southern	30	20.38	56.5	81.2	50.1	54.3		

Table 1.2 Continued: February Noise Monitoring Results

Date	Location No.	Location	Duration (min)	Start Time	L_{Aeq} dB(A)	L_{AMax} dB(A)	LA90 dB(A)	L_{A10} dB(A)	Principal Noise Sources	Weather Conditions
25th February 2016	N7	Western	30	09.57	66.6	87.7	60.1	69.9	- Steel erection - Cladding installation - Decking installation - Cranes lifting materials - Internal Mechanical equipment installation - Digger excavating material - Mobile plant operating on ground - Trucks arriving with materials	Dry, Calm, Clear
25th February 2016	N8	Northern	30	10.31	63.7	91.8	57.6	59.5		
25th February 2016	N9	Eastern	30	11.36	69.4	78.7	66.9	71.6		
25th February 2016	N10	Southern	30	09.21	72.9	94.2	59.9	73.6		
25th February 2016	N7	Western	30	22.29	51.9	80.7	47.2	54.2	- Cranes operating, MEWP operating - Steel and cladding erection - Internal mechanical installation works - Humming noise from WWTP	Dry, Calm, Cloudy
25th February 2016	N10	Southern	30	21.53	52.1	79.2	45.3	52.3		

Table 1.2 Continued: February Noise Monitoring Results

Date	Location No.	Location	Duration (min)	Start Time	L_{Aeq} dB(A)	L_{AMax} dB(A)	LA90 dB(A)	L_{A10} dB(A)	Principal Noise Sources	Weather Conditions
03rd March 2016	N7	Western	30	12.52	66.4	86.1	56.6	69.7	- Steel erection - Installation of decking - Cranes lifting materials - Mobile plant operating on ground - Internal mechanical equipment installation - Digger excavating material - Road sweeper - Trucks arriving with materials - Hum from Wastewater Treatment Plant	Dry, Partially Clear, Slight Breeze
03rd March 2016	N8	Northern	30	13.26	56.0	77.6	52.7	58.8		
03rd March 2016	N9	Eastern	30	14.24	68.2	81.9	65.8	69.7		
03rd March 2016	N10	Southern	30	12.17	66.3	89.4	60.4	68.2		
03rd March 2016	N7	Western	30	21.10	59.9	79.8	53.1	58.1	- Steel erection - Cladding installation - Hum from Wastewater Treatment Plant - Internal mechanical installation - Cranes and mobile lifting equipment operating	Dry, Clear, Slight Breeze,
03rd March 2016	N10	Southern	30	20.25	55.3	76.9	49.1	55.1		
03rd March 2016	N7	Western	30	23.25	55.8	78.1	50.1	55.5	- Steel erection - Cladding installation - Hum from Wastewater Treatment Plant - Internal mechanical installation - Cranes and mobile lifting equipment operating	Dry, Clear, Calm
04th March 2016	N10	Southern	30	00.08	53.8	79.3	47.2	53.1		

Table 1.2 Continued: March Noise Monitoring Results

Date	Location No.	Location	Duration (min)	Start Time	L_{Aeq} dB(A)	L_{AMax} dB(A)	LA90 dB(A)	L_{A10} dB(A)	Principal Noise Sources	Weather Conditions
10th March 2016	N7	Western	30	11.37	67.0	80.2	58.8	71.3	- Mobile plant operating on ground - Steel erection - Decking installation - Cranes lifting materials - Internal Mechanical equipment installation - Road sweeper - Trucks arriving with materials - Humming noise from WWTP	Dry, Partially Cloudy, Calm
10th March 2016	N8	Northern	30	12.11	58.2	76.4	57.5	59.6		
10th March 2016	N9	Eastern	30	12.47	67.6	89.9	65.3	69.4		
10th March 2016	N10	Southern	30	10.58	68.7	85.4	61.5	71.4		
10th March 2016	N7	Western	30	22.15	60.1	79.8	56.1	59.8	- Steel erection - Cladding installation - Hum from Wastewater Treatment Plant - Internal mechanical installation - Cranes and mobile lifting equipment operating	Dry, Clam, Clear,
10th March 2016	N10	Southern	30	21.33	54.9	77.8	50.1	55.3		

Table 1.2 Continued: March Noise Monitoring Results

Date	Location No.	Location	Duration (min)	Start Time	L_{Aeq} dB(A)	L_{AMax} dB(A)	LA90 dB(A)	L_{A10} dB(A)	Principal Noise Sources	Weather Conditions
16th March 2016	N7	Western	30	15.06	68.0	86.9	61.5	71.2	- Cranes operating, MEWP operating - Steel and cladding erection - Mobile plant operating onsite - Internal mechanical installation works - Humming noise from WWTP	Dry, Cloudy Slight Breeze
16th March 2016	N8	Northern	30	15.40	56.3	79.3	53.4	58.2		
16th March 2016	N9	Eastern	30	16.15	69.8	87.8	64.9	68.4		
16th March 2016	N10	Southern	30	14.30	67.1	81.6	58.0	70.3		
16th March 2016	N7	Western	30	20.55	63.8	81.9	57.6	60.8	- Steel erection - Cladding installation - Hum from Wastewater Treatment Plant - Internal mechanical installation - Cranes and mobile lifting equipment operating	Dry, Cloudy, Slight Breeze,
16th March 2016	N10	Southern	30	20.15	59.1	82.1	53.1	57.3		

Table 1.2 Continued: March Noise Monitoring Results

Date	Location No.	Location	Duration (min)	Start Time	L_{Aeq} dB(A)	L_{AMax} dB(A)	LA90 dB(A)	L_{A10} dB(A)	Principal Noise Sources	Weather Conditions
22nd March 2016	N1	Rehab	30	15.06	65.2	80.5	53.5	68.7	- Consistent road traffic - No construction noise audible at any noise monitoring location	Calm, Dry, Partially Cloudy,
22nd March 2016	N2	Seafort Avenue	30	15.43	60.0	76.7	44.9	63.6		
22nd March 2016	N3	Beech Ave	30	16.22	73.9	92.9	77.3	61.4		
22nd March 2016	N4	Leukos Road	30	14.08	62.2	87.0	55.3	64.3		
22nd March 2016	N5	Pigeon Hs	30	13.35	60.5	88.0	52.1	62.3	- Background crane noise from Dublin Port - Car passing - No construction noise audible at the noise monitoring location	
22nd March 2016	N6	Nature Reserve	30	12.06	52.3	82.5	48.5	52.9	- Humming noise from WWTP - Drilling noise	
22nd March 2016	N7	Western	30	09.58	63.0	81.7	58.4	65.7	- Diggers excavating - Mobile plant operating on ground - Steel erection - Decking installation - Cranes lifting materials - Internal Mechanical equipment installation - Road sweeper - Trucks arriving with materials - Humming noise from WWTP	Dry, Calm, Cloudy
22nd March 2016	N8	Northern	30	10.32	54.6	82.4	51.1	56.3		
22nd March 2016	N9	Eastern	30	11.10	68.8	83.9	65.7	70.8		
22nd March 2016	N10	Southern	30	09.22	67.1	85.9	59.7	70.2		

Table 1.2 Continued: March Noise Monitoring Results

Date	Location No.	Location	Duration (min)	Start Time	L_{Aeq} dB(A)	L_{AMax} dB(A)	LA90 dB(A)	L_{A10} dB(A)	Principal Noise Sources	Weather Conditions
22nd March 2016	N7	Western	30	21.06	63.5	78.9	52.3	55.8	- Cladding installation - Steel erection - Internal mechanical installation - Cranes and mobile lifting equipment operating - Hum from Wastewater Treatment Plant	Dry, Calm, Cloudy
22nd March 2016	N10	Southern	30	20.25	56.3	79.8	52.3	55.8		
22nd March 2016	N7	Western	30	23.15	60.1	76.8	53.1	58.1	- Cladding installation - Steel erection - Internal mechanical installation - Cranes and mobile lifting equipment operating - Hum from Wastewater Treatment Plant	Dry, Calm, Cloudy
22nd March 2016	N10	Southern	30	23.54	54.8	78.7	51.3	55.3		

Table 1.2 Continued: March Noise Monitoring Results

Date	Location No.	Location	Duration (min)	Start Time	L_{Aeq} dB(A)	L_{AMax} dB(A)	LA90 dB(A)	L_{A10} dB(A)	Principal Noise Sources	Weather Conditions
30th March 2016	N7	Western	30	12.14	64.6	84.5	61.0	66.3	- Mobile plant operating on ground - Steel erection - Decking installation - Cranes lifting materials - Internal Mechanical equipment installation - Road sweeper - Trucks arriving with materials - Humming noise from WWTP - Diggers excavating	Dry, Slight Breeze, Partially Cloudy
30th March 2016	N8	Northern	30	12.51	56.5	81.9	51.3	59.5		
30th March 2016	N9	Eastern	30	13.36	71.2	103.6	59.3	72.0		
30th March 2016	N10	Southern	30	11.38	72.6	89.2	63.6	76.2		
30th March 2016	N7	Western	30	19.56	65.3	78.1	58.3	61.3	- Cladding installation - Steel erection - Internal mechanical installation - Cranes and mobile lifting equipment operating - Hum from Wastewater Treatment Plant	Dry, Calm, Cloudy
30th March 2016	N10	Southern	30	19.21	62.1	79.1	55.3	60.1		

Table 1.3: January - March Daytime Noise Level Calculation Monitoring Results "(BS 5228-1:2009:+*A1:2014* Code of practice for noise and vibration control on construction and open sites – Part 1:Noise (Section F.2.2)"

Date	Time	Site Boundary	Noise Level dB(A) (Laeq 30 min)	Distance between boundary monitoring location and noise source location (m)	Distance betweeen receptor location and noise source location (m)						Screening adjustment dB(A)	Calculated Noise level at closest Sensitive receptors (Noise Level dB(A) (Laeq 30 min)					
					Rehab Institute	Seafort	Beach	Leukos	Irishtown Nature Park	Pigeon House Rd		Rehab Institute	Seafort	Beach	Leukos	Irishtown Nature Park	Pigeon House Rd
05/01/2016	11:43	Western	65.8	20				900		865	10				28		28
05/01/2016	15:03	Southern	68.8	30	870	941	1127		191		10	35	34	32		48	
14/01/2016	14:13	Western	75.2	15				900		865	10				35		35
14/01/2016	14:54	Southern	61.4	30	870	941	1127		191		10	27	26	25		40	
22/01/2016	09:45	Western	74.5	20				900		865	10				36		37
22/01/2016	11:47	Southern	63.0	50	870	941	1127		191		10	33	33	31		46	
28/01/2016	11:03	Western	71.6	15				900		865	10				31		31
28/01/2016	14:16	Southern	65.3	30	870	941	1127		191		10	31	30	29		44	
04/02/2016	10:40	Western	70.0	25				900		865	10				34		34
04/02/2016	12:50	Southern	65.9	40	870	941	1127		191		10	34	33	32		47	
11/02/2016	10:24	Western	70.5	20				900		865	10				32		33
11/02/2016	09:22	Southern	68.4	40	870	941	1127		191		10	37	36	34		50	
18/02/2016	11:01	Western	76.5	15				900		865	10				36		36
18/02/2016	12:55	Southern	69.6	40	870	941	1127		191		10	38	37	36		51	
25/02/2016	09:57	Western	66.6	15				900		865	10				26		26
25/02/2016	09:21	Southern	72.9	20	870	941	1127		191		10	35	34	33		48	
03/03/2016	12:52	Western	66.4	20				900		865	10				28		29
03/03/2016	12:17	Southern	66.3	50	870	941	1127		191		10	36	36	34		50	
10/03/2016	11:37	Western	67.0	30				900		865	10				32		33
10/03/2016	10:58	Southern	68.7	20	870	941	1127		191		10	31	30	29		44	
16/03/2016	15:06	Western	68.0	30				900		865	10				33		34
16/03/2016	14:30	Southern	67.1	30	870	941	1127		191		10	33	32	31		46	
22/03/2016	09:58	Western	63.0	25				900		865	10				27		27
22/03/2016	09:22	Southern	67.1	25	870	941	1127		191		10	31	31	29		44	
30/03/2016	12:14	Western	64.6	30				900		865	10				30		30
30/03/2016	11:38	Southern	72.6	20	870	941	1127		191		10	35	34	33		48	

Table 1.3: Continued: January - March Evening Time Noise November noise Level Calculation Monitoring Results "(BS 5228-1:2009:+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1:Noise (Section F.2.2)"

Date	Time	Site Boundary	Noise Level dB(A) (Laeq 30 min)	Distance between boundary monitoring location and noise source location (m)	Distance betweeen receptor location and noise source location (m)						Screening adjustment dB(A)	Calculated Noise level at closest Sensitive receptors (Noise Level dB(A) (Laeq 30 min)					
					Rehab Institute	Seafort	Beach	Leukos	Irishtown Nature Park	Pigeon House Rd		Rehab Institute	Seafort	Beach	Leukos	Irishtown Nature Park	Pigeon House Rd
05/01/2016	19:56	Western	56.8	40				900		865	10				25		25
05/01/2016	20:38	Southern	59.9	60	870	941	1127		191		10	32	31	29		45	
14/01/2016	19:56	Western	56.9	40				900		865	10				25		25
14/01/2016	19:16	Southern	54.3	50	870	941	1127		191		10	24	24	22		38	
22/01/2016	21:56	Western	59.6	30				900		865	10				25		25
22/01/2016	21:15	Southern	56.8	50	870	941	1127		191		10	27	26	25		40	
04/02/2016	22:05	Western	57.5	30				900		865	10				23		23
04/02/2016	21:15	Southern	56.8	40	870	941	1127		191		10	25	24	23		38	
11/02/2016	21:25	Western	56.3	30				900		865	10				22		22
11/02/2016	20:38	Southern	55.8	40	870	941	1127		191		10	24	23	22		37	
18/02/2016	21:25	Western	58.9	30				900		865	10				24		25
18/02/2016	20:38	Southern	56.5	40	870	941	1127		191		10	25	24	23		38	
25/02/2016	22:29	Western	51.9	30				900		865	10				17		18
25/02/2016	21:53	Southern	52.1	40	870	941	1127		191		10	20	20	18		34	
03/03/2016	21:10	Western	59.9	25				900		865	10				24		24
03/03/2016	20:25	Southern	55.3	50	870	941	1127		191		10	25	25	23		39	
10/03/2016	22:15	Western	60.1	30				900		865	10				26		26
10/03/2016	21:33	Southern	54.9	50	870	941	1127		191		10	25	24	23		38	
16/03/2016	20:55	Western	63.8	30				900		865	10				29		30
16/03/2016	20:15	Southern	59.1	50	870	941	1127		191		10	29	29	27		42	
22/03/2016	21:06	Western	63.5	25				900		865	10				27		28
22/03/2016	20:25	Southern	56.3	50	870	941	1127		191		10	26	26	24		40	
30/03/2016	19:56	Western	65.3	25				900		865	10				29		30
30/03/2016	19:21	Southern	62.1	40	870	941	1127		191		10	30	30	28		44	

Table 1.3: Continued: January - March Night-time Noise Level Calculation Monitoring Results "(BS 5228-1:2009:+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1:Noise (Section F.2.2)"

Date	Time	Site Boundary	Noise Level dB(A) (Laeq 30 min)	Distance between boundary monitoring location and noise source location (m)	Distance betweeen receptor location and noise source location (m)						Screening adjustment dB(A)	Calculated Noise level at closest Sensitive receptors (Noise Level dB(A) (Laeq 30 min)					
					Rehab Institute	Seafort	Beach	Leukos	Irishtown Nature Park	Pigeon House Rd		Rehab Institute	Seafort	Beach	Leukos	Irishtown Nature Park	Pigeon House Rd
14/01/2016	23:39	Western	59.8	40				900		865	10				28		28
14/01/2016	23:05	Southern	54.8	50	870	941	1127		191		10	25	24	23		38	
12/02/2016	00:10	Western	52.8	40				900		865	10				21		21
11/02/2016	23:25	Southern	53.5	40	870	941	1127		191		10	22	21	20		35	
03/03/2016	23:25	Western	55.8	25				900		865	10				20		20
04/03/2016	00:08	Southern	53.8	50	870	941	1127		191		10	24	23	22		37	
22/03/2016	23:15	Western	60.1	25				900		865	10				24		24
22/03/2016	23:54	Southern	54.8	50	870	941	1127		191		10	25	24	23		38	