

**METROLINK**

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**A13.1**

**Baseline Noise  
Monitoring Report**





The Tecpro Building,  
Clonsaugh Business & Technology Park,  
Dublin 17, Ireland.

T: + 353 1 847 4220  
F: + 353 1 847 4257  
E: [info@awnconsulting.com](mailto:info@awnconsulting.com)  
W: [www.awnconsulting.com](http://www.awnconsulting.com)

# BASELINE NOISE MONITORING FOR DUBLIN METROLINK EIAR

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Technical Report Prepared For

**Jacobs Engineering**

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Technical Report Prepared By

**Jennifer Harmon BSc, MIOA**

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Our Reference

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**Cork Office**  
Unit 5, ATS Building,  
Carrigaline Industrial Estate,  
Carrigaline, Co. Cork.  
T: + 353 21 438 7400  
F: + 353 21 483 4606

AWN Consulting Limited  
Registered in Ireland No. 319812  
Directors: F Callaghan, C Dilworth,  
T Donnelly, T Hayes, D Kelly, E Porter



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## EXECUTIVE SUMMARY

Noise monitoring has been conducted 125 locations along the alignment of the Metrolink Project consisting of long term unattended and short term attended surveys.

Within Assessment Zone 1 (Northern Section), between Estuary to north of the Dublin Airport North Portal, the surrounding environment is suburban to urban in nature. Noise sensitive properties are predominantly residential buildings with a small number of hotels and educational buildings located along the Proposed Scheme. Road traffic along the R132 is the dominant noise source at the monitoring positions surveyed, with aircraft activities from Dublin Airport at noise sensitive locations becoming a more dominant noise source towards Nevinstown West and the Naul Road. Overall ambient noise levels in this study area are high due to the proximity of noise sensitive properties potentially affected by the Metrolink Project being in proximity to busy roads.

Within Assessment Zone 2 (Airport Section), the surrounding environment is dominated by ground activities within the Dublin Airport Campus (road traffic, aircraft ground sources and building services plant), in addition to overhead aircraft take-off and landing. The closest noise sensitive location to the Metrolink Airport Station development is the Dublin Airport Church. Airport hotels and offices are located at further distances from the proposed Metrolink Airport station. Overall ambient noise levels in this study area are high and are influenced by ongoing activities at Dublin Airport as noted above.

Within Assessment Zone 3 (Dardistown to Northwood), the surrounding environment is a mixture of commercial and residential areas. Noise sensitive properties are residential buildings and a hotel to the south. Road traffic along the R108 Ballymun Road, the M50 and Santry Avenue are the dominant noise sources. Aircraft activities from Dublin Airport also contributes to the noise environment within this study area. Overall ambient noise levels in this study area are high due to the proximity of noise sensitive properties potentially affected by the Metrolink Project and their proximity to busy roads and aircraft noise.

Within Assessment Zone 4 (Northwood to Charlemont), the surrounding environment is predominately urban with a mixture of commercial, retail and residential areas. The key noise sensitive properties and areas are residential buildings, schools, hotels, hospitals and offices. Road traffic along the surrounding road network is the dominant noise source noted across this study area, with rail activities an additional noise source at Glasnevin/ Whitworth, Tara Street and Charlemont and to a very minor degree along O'Connell Street. Other sources of noise include urban activities from pedestrian movements, retail and commercial activities, and building services plant. Overall ambient noise levels in this study area are high due to the proximity of noise sensitive properties potentially affected by the Metrolink Project, and their proximity to busy roads. Lowest noise levels were recorded at those locations set back from road edges.

Specific details of the surveys locations, procedures and results are included for each assessment zone within this report.

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<b>CONTENTS</b>		<b>Page</b>
	Executive Summary	3
1.0	Introduction	5
2.0	Survey Methodology	6
2.1	Study Area	6
2.2	Survey Locations	6
2.3	Survey Periods	10
2.4	Survey Equipment and Personnel	10
2.5	Survey Parameters	11
2.6	Reference Procedure	12
3.0	Survey Results	14
3.1	Assessment Zone 1 (AZ1)	14
3.2	Assessment Zone 2 (AZ2)	23
3.3	Assessment Zone 3 (AZ3)	24
3.4	Assessment Zone 4 (AZ4)	26
4.0	Summary and Conclusion	42
	Appendix A – Calibration Certificate for Monitoring Equipment	
	Appendix B –Unattended Monitoring Equipment Set-up	

## **1.0 INTRODUCTION**

This report includes the relevant survey details and results associated with baseline noise monitoring undertaken as part of the Metrolink project. The survey has been undertaken to inform the airborne noise and vibration chapter of the Metrolink EIAR.

Long-term unattended surveys (typically one week in duration) were made at a total of 52 locations.

Short-term surveys (attended day-time measurements), made at a total of 73 locations along the length of the Proposed Project, were used to supplement the long-term surveys.

Survey details and results for each of the noise monitoring locations are included within this report.

**2.0 SURVEY METHODOLOGY**

**2.1 Study Area**

The Proposed Project covers an extensive linear study area between Estuary and Charlemont via Dublin City Centre. The study area for the EIAR is split between four distinct Assessment Zones AZ1 to AZ4, as described in Table 1.

Reference	Geographical Split	Description
AZ 1	Northern Section	Estuary Station to DANP. It includes the rail line crossing on viaduct over the Broadmeadow and Ward Rivers and associated flood plains. This section will include open, retained cut and cut-and-cover sections. Section AZ1 includes the Park and Ride Facility at Estuary Station as well as stations at Seatown, Swords Central and Fosterstown.
AZ 2	Airport Section	Section AZ2 of the proposed Project includes the ESBN connection and new substation, the DANP, the tunnel underneath Dublin Airport, Dublin Airport Station and DASP and associated intervention and ventilation tunnels.
AZ 3	Dardistown to Northwood	Section AZ3 of the proposed Project covers from south of DASP to the Northwood Portal. Section AZ3 includes Dardistown station, the Dardistown Depot, the M50 Viaduct, Northwood station and the TBM launch site at Northwood. This section will include open, retained cut, and cut and cover sections of the alignment.
AZ 4	Northwood to Charlemont	Section AZ4 extends from a location south of the Northwood Portal to the tunnel termination located south of Charlemont Station, nine underground stations, and the Albert College Park Intervention shaft.

**Table 1** Geographical Split of Assessment Zones

**2.2 Survey Locations**

Baseline noise surveys have been conducted at locations representative of the nearest noise sensitive areas which have the potential to be impacted by construction works and/or those likely to be impacted during the operational phase of the Proposed Project. Baseline noise measurements were made over both long-term and short-term periods to inform the assessment.

- Long-term surveys (typically one week in duration) were made at a total of 52 locations.
- Short-term surveys (attended day-time measurements), made at a total of 73 locations along the length of the proposed Project were used to supplement the long-term surveys.

Figure 13.1 (Sheets 1 to 7), Volume 3 of the EIAR present the baseline noise monitoring locations. Each is discussed in the relevant geographic area AZ1 to AZ4 in the following sections.

**2.2.1 Assessment Zone 1**

A total of 20 long-term unattended monitoring locations and 26 attended survey locations were surveyed within the AZ1 study area. The location reference, and a description of the survey positions are included in Table 2.

Location	Description of Survey Location
<b>Unattended (Long term) Noise Survey Locations</b>	
UT1	Green area to front of residential and farm buildings in Lissenhall Great
UT2	Green area within grounds of Emmaus Retreat Centre, Estuary
UT3	Green area to rear of Tigin Montesso School, Estuary
UT4	Rear garden of residential building in Seatown Park, Swords
UT5	At side of residential building in Estuary Court, Swords
UT6	Rear garden of residential building in Comyn Manor, Swords
UT7	Rear garden of Kids Inc. Creche, Seatown Walk, Swords
UT8	Rear garden of residential building on Chapel Lane, Swords
UT9	Rear garden of residential building on Ashley Avenue, Swords
UT10	Rear garden of residential building in Castle Grove, Swords
UT11	Rear garden of residential building in Foxwood, Swords
UT12	Green area to rear of commercial building in Airside Business Park, Swords
UT13	Rear garden of residential building in Carlton Court, Swords
UT14	Green area to side of Hotel at Pinnock Hill Roundabout, Swords
UT15	Green area to front of residential building at Cremona, Swords
UT16	Rear garden of residential building in Boroimhe Willows, Airside
UT17	Carpark area to side of Private Clinic in Nevinstown West
UT18	Rear garden of residential building in Boroimhe Hazel, Nevinstown West
UT19 <sup>Note 1</sup>	Rear garden of residential building in Nevinstown West off R132
UT20 <sup>Note 1</sup>	Rear garden of residential building in Nevinstown West off R132
<b>Attended Noise Survey Locations</b>	
AT1	Green area at HSE Ambulance Depot in Lissenhall Great
AT2	Grass siding set back from R132 in Lissenhall Great
AT3	Side of road near car park of sports facility in Seatown West
AT4	Green area in Seatown Villas housing estate
AT5	Siding of access road to North Dublin Corporate park
AT6	Green area within Seatown Villas
AT7	Green area in Castle Park housing estate
AT8	Green area at end of Foxwood housing estate
AT9	Grass siding of exit from Pavilions SC at junction with R132
AT10	Carpark of commercial building within Airside Business Park
AT11	Green area at end of Carlton Court housing estate
AT12	Paved area to side of Airside Retail Park
AT13	Green area in Boroimhe Poplars housing estate
AT14	Green area in Boroimhe Hazel housing estate
AT74	Green are on verge of Ennis Lane
AT50	Cul-de-sac at end of Seatown W, bordering roundabout linking R132 and R125
AT51	Green area on Seatown Terrace
AT52	Green area at end of Estuary Court bordering the R132
AT53	Green area on Seatown Wak bordering the R132
AT54	Green area off of Ashley Ave bordering the R132
AT55	Green area at end of Castle Grove bordering the R132
AT56	Northern end of Carlton Court bordering the R132
AT57	Southern end of Carlton Court bordering the R132
AT58	Green area on the side of the R132 carriageway
AT59	North-eastern end of Boroimhe Willows bordering the R132
AT60	Green area at the merge of Nevinstown Lane and the R132

**Table 2** Noise Monitoring Locations AZ1

Note 1: Noise monitoring undertaken at UT19 & UT20 were logged for a period of 3 hours within gardens of these properties. The 3 hour survey results are summarised in Table 7 under the attended survey results.

### 2.2.2 Assessment Zone 2

One (1 No.) long term unattended monitoring location and one attended location was surveyed within the AZ2 study area described in Table 3.

Location	Description of Survey Location
Unattended (Long term) Noise Survey Location	
UT21	Rear garden of the Dublin Airport Church grounds
Attended Noise Survey Location	
AT15	Green area near former entrance to creche off Naul Road

**Table 3:** Noise Monitoring Locations AZ2

### 2.2.3 Assessment Zone 3

A total of 3 long-term unattended monitoring locations and 4 attended survey locations were surveyed within the AZ3 study area. The location reference, and a description of the survey positions are included in Table 4.

Location	Description of Survey Location
Unattended (Long term) Noise Survey Locations	
UT22	Rear garden of residential building off Old Airport Road
UT23	Green area within grounds of residential building in Charter School Hill, Ballymun Cross
UT24	Garden to rear of residential apartment building at junction of Ballymun Road and Santry Avenue
Attended Noise Survey Locations	
AT16	Road side at derelict residence near commercial buildings in Ballymun, north of the M50
AT17	Side road at entrance to Gulliver's Retail Park
AT61	Side of road on Charter School Hill
AT62	Green area on the carriageway edge of the R108

**Table 4** Noise Monitoring Locations AZ3

### 2.2.4 Assessment Zone 4

A total of 28 long term unattended monitoring locations and 42 attended survey locations were surveyed within the AZ4 study area. The location reference, and a description of the survey positions are included in Table 5.

Location	Description of Survey Location
Unattended (Long term) Noise Survey Locations	
UT25	Garden to rear of Primary Education building in Ballymun
UT26	On roof of Civic Centre building in Ballymun
UT27	Garden to side of Secondary Education building off Ballymun Road
UT28	Paved area to side of CDETB Building off Ballymun Road
UT29	Carpark area to front of Primary Education building off Ballymun Road

Location	Description of Survey Location
UT30	Carpark area to side of Church in Whitehall
UT31	Paved area to front of residential building off R108 in Whitehall
UT32	Green area within grounds of Special Education building off Ballymun Road in Ballygall
UT33	Green area to side of Scoil Chaitríona Secondary School building off St. Mobhi Road in Glasnevin
UT34	Paved area to front of residential building off St. Mobhi Road in Glasnevin
UT35	Green area to side of Scoil mobhí Primary Education building off St. Mobhi Road in Glasnevin
UT36	Garden to rear of residential building in Claremont Crescent
UT37	Garden to rear of house on St. Teresa's Rd
UT38	Garden to rear of residential building in Claremont Lawns
UT39	Garden to rear of residential building in Coke Oven Cottages
UT40	Garden to rear of residential building in Dalcassian Downs
UT41	Garden to rear of residential building off Whitworth Road
UT42	Green area to front of Mater Hospital on Eccles St
UT43	Green area to front of Mater Hospital on Eccles St
UT44	Green area to side of St Joseph's Church, Berkeley Road
UT45	To front of construction site off O'Connell Street Upper
UT46	To rear of construction site off O'Connell Street Upper
UT47	To front of construction site/commercial carpark off O'Connell Street Upper
UT48	On roof of Fire Station building on Townsend Street
UT49	On roof of residential apartment building at Tara and Townsend Street junction
UT50	Green area within St. Stephen's Green maintenance compound
UT51	Paved area withing compound of disused commercial building off Grand Parade in Charlemont
UT52	Paved area withing compound of disused commercial building off Grand Parade in Charlemont
<b>Attended Noise Survey Locations</b>	
AT18	In public park off R104 in Ballymun
AT19	In carpark off R108 in Ballymun
AT20	Grass area outside HSE Carpark in Ballymun
AT21	On footpath in car park of terraced housing off R108 in Ballymun
AT22	Green area at side of R108 in Ballymun
AT23	Green area at side of R108 at entrance to primary school in Ballymun
AT24	Grass siding to R108 at pedestrian entrance to housing estate on Albert College Grove
AT25	Grass siding of R108 beside pedestrian entrance to UCD
AT26	Side road footpath at entrance to sports and education buildings in Ballygall
AT27	Carpark of sports facility adjacent to housing estate in Ballygall
AT28	On footpath at junction of 2 lanes of R108 in Ballygall
AT29	Grass verge at side of driveway entrance to Secondary Education building off St. Mobhi Road in Glasnevin
AT30	Grass area inside entrance gate to Secondary Education building off St. Mobhi Road in Glasnevin
AT31	Carpark of Bon Secours Hospital in Glasnevin Hill
AT32	Side of driveway entrance to sports facility off St. Mobhi Road in Glasnevin
AT33	Carpark of sports facility, Primary Education building adjacent off St. Mobhi Road in Glasnevin
AT34	Green area in Dalcassian Downs housing estate
AT35	On footpath on north side of Royal Canal Way off Whitworth Road
AT36	On footpath at side of R108 at junction with Whitworth Road
AT37	On footpath on south side of Royal Canal Way off Whitworth Road

Location	Description of Survey Location
AT38	On footpath at corner of North Circular Road and Berkeley Road
AT39	On footpath at side of Berkely Road
AT40	On footpath at side of Eccles Street Rd
AT41	At entrance to Mater Staff car park, at side of Eccles Street
AT42	On footpath at side of Berkely Rd
AT43	On footpath at side of Poolbeg St
AT44	On footpath at gated entrance to 1 George's Quay complex, under DART bridge.
AT45	On footpath at side of Townsend St
AT46	On footpath at entrance of St. Stephen's Green
AT47	On footpath at junction of R138 and Hume St.
AT48	On footpath at side of R138
AT49	On footpath at entrance St. Stephen's Green, junction of R138 and R110
AT64	Footpath at the merge of Hampstead Avenue and Ballymun Road
AT65	Green area on Dalcassian Downs at the edge of the R108
AT66	Walkway on the canal edge of Phibsborough Road
AT67	Footpath on Eglinton Terrace bordering the R108
AT68	Footpath on the edge of Eccles Street
AT69	Side of the carriageway on Berkeley Road
AT70	Footpath at the merge of O'Rahilly Parade and Moore Lane
AT71	Position on the road edge of Henry Place
AT72	Position on the road edge of Dartmouth Road
AT73	Carpark on the edge of Dartmouth Place

**Table 5** Noise Monitoring Locations AZ4

### 2.3 Survey Periods

Unattended noise surveys were undertaken between December 2018 and November 2019. The specific survey dates for each location are included in the survey result tables in Section 3.

Attended noise surveys were undertaken over the following months:

- September 2018;
- May 2019;
- May 2022; and
- June 2022 .

The specific survey dates and times for each location are included in the survey results tables in Section 3.

### 2.4 Survey Equipment

All surveys were conducted by AWN Consulting. The surveys was undertaken using RION NL-52 sound level meters for both attended and unattended surveys. The specific equipment details are summarised in Table 6. Calibration certificate of the monitoring equipment are included within Appendix A.

Equipment	Serial Number	Calibration Date
Rion NL-52	1076328	15/08/2018
	586940	15/08/2018
	586944	16/08/2018
	1076330	15/08/2018
	998413	16/03/2022

**Table 6** Noise Monitoring Equipment

For unattended surveys, a Rion WS-15 Outdoor Microphone Protection System with microphone extension cable and outdoor peli case. An image of the equipment install at each unattended monitoring location is included in Appendix B.

## 2.5 Survey Parameters

The following noise parameters were measured and are discussed within this report.

**L<sub>Aeq,T</sub>** is the A-weighted equivalent continuous steady sound level during the sample period and effectively represents an average value of the defined measurement period, T.

L<sub>Aeq,16hr</sub> refers to the ambient daytime period between 07:00 and 23:00hrs.

L<sub>Aeq,8hr</sub> refers to the ambient night-time noise level between 23:00 and 07:00hrs

**L<sub>A10,T</sub>** is the A-weighted sound level that is exceeded for 10% of the sample period; this parameter gives an indication of the upper limit of fluctuating noise such as that from road traffic. The T is the sample period the parameter is measured over.

L<sub>A10,18hr</sub> is the L<sub>A10</sub> parameter between 06:00 and 00:00hrs as defined within the CRTN<sup>1</sup>.

**L<sub>A90,T</sub>** is the A-weighted sound level that is exceeded for 90% of the sample period; generally used to quantify background noise. The T is the sample period the parameter is measured over.

The 16hr and 8hr L<sub>A90</sub> values are averaged over the same time periods for the L<sub>Aeq</sub> discussed above.

The L<sub>den</sub> parameter is also discussed within the report. For long-term survey locations, this parameter is derived from the L<sub>Aeq</sub> data over each 24 hour period as is defined as follows:

L<sub>den</sub> is the 24hour noise rating level determined by the averaging of the L<sub>day</sub> with the L<sub>evening</sub> (plus a 5dB penalty) and the L<sub>night</sub> (plus a 10dB penalty). L<sub>den</sub> is calculated using the following formula, as defined within the Environmental Noise Regulations <sup>2</sup>:

<sup>1</sup> UK's Department of Transport. 1988. *Calculation of Road Traffic Noise* (CRTN)

<sup>2</sup> S.I. No. 549/2018 - Environmental Noise Regulations 2018

$$L_{den} = 10 \log \left( \frac{1}{24} \left( 12 * \left( 10^{\frac{L_{day}}{10}} \right) + 4 * \left( 10^{\frac{L_{evening+}}{10}} \right) + 8 * \left( 10^{\frac{L_{night+10}}{10}} \right) \right) \right)$$

Where:

**L<sub>day</sub>** is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the day periods of a year. The 12 hour daytime period is between 07:00 to 19:00hrs.

**L<sub>evening</sub>** is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the evening periods of a year. The 4 hour evening period is between 19:00 to 23:00hrs.

**L<sub>night</sub>** is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the night periods of a year. The 8 hour night-time period is between 23:00 to 07:00hrs.

## 2.6 Survey Procedure

Noise measurements were conducted in general accordance with the guidance contained in ISO 1996: *Acoustics – Description measurement and assessment and environmental noise. Part 1: Basic quantities and assessment procedures* (2016) and Part 2: *Determination of sound pressure levels* (2017).

### 2.6.1 Unattended Measurements

For unattended noise surveys, the monitoring equipment was installed within the private grounds of residential properties or private property lands (schools, churches, hospitals, parks etc.). For single story buildings, the microphone was installed at the height of ground floor windows (typically 1.5m above ground). For all other locations, the microphone was extended to a height of approximately 3.8m above ground. The equipment was set to log for 15 minute intervals on a continual basis over a 1 week period.

### 2.6.2 Attended Measurements

Attended noise surveys were undertaken at public locations at positions representative of the adjacent noise sensitive locations (e.g. on green areas in residential areas, footpaths, parks etc.). For all attended surveys, the microphone was positioned at height of approximately 1.2m above ground.

The attended surveys were undertaken in accordance with the shortened measurement procedure described in the UK's Department of Transport. 1988. *Calculation of Road Traffic Noise* (CRTN) and Transport Infrastructure Ireland's (TII) document *Guidelines for the Treatment of Noise and Vibration on National Road* (2004).

This methodology involves a method whereby  $L_{A10(18\text{hour})}$  and  $L_{den}$  values are obtained through a combination of measurement and calculation as follows:

- Noise level measurements are undertaken at the chosen location over three consecutive hours between 10:00 and 17:00hrs.
- Each sample period was measured over a 15 minute duration.

- The  $L_{A10(18\text{hour})}$  for the location is derived by subtracting 1 dB from the arithmetic average of the three hourly sample values, i.e.

$$L_{A10(18\text{hour})} = ((\sum L_{A10(15\text{ minutes})}) \div 3) - 1 \text{ dB.}$$

- The derived  $L_{\text{den}}$  value is calculated from the  $L_{A10(18\text{hour})}$  value, i.e.

$$L_{\text{den}} = 0.86 \times L_{A10(18\text{hr})} + 9.86 \text{ dB.}$$

### 3.0 SURVEY RESULTS

#### 3.1 Assessment Zone 1 (AZ1)

##### 3.1.1 Unattended Surveys

The survey results for unattended surveys within AZ1 are summarised in the following tables. The tables are split between the following areas:

- Table 7: Estuary;
- Table 8: R132 Estuary to Fosterstown; and
- Table 9: R132 Fosterstown to Naul Road.

##### *Estuary*

The survey results for the unattended monitoring locations within AZ1 at Estuary are presented in Table 7.

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
<b>UT1</b>							
13/12/2018	69	71	65	67	63	53	72
14/12/2018	69	71	65	68	64	57	72
15/12/2018	68	70	62	63	61	51	70
16/12/2018	65	67	59	62	61	48	69
17/12/2018	69	70	64	67	62	54	71
18/12/2018	69	71	62	65	60	50	71
19/12/2018	67	68	62	65	59	47	69
<b>Average</b>	<b>68</b>	<b>70</b>	<b>63</b>	<b>66</b>	<b>62</b>	<b>51</b>	<b>71</b>
<b>UT2</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
13/12/2018	60	61	57	57	53	49	62
14/12/2018	60	61	58	59	58	55	65
15/12/2018	60	62	55	50	49	46	61
16/12/2018	53	55	50	49	49	43	56
17/12/2018	58	59	56	57	57	53	63
18/12/2018	56	58	54	53	47	44	58
19/12/2018	54	56	52	52	46	41	56
<b>Average</b>	<b>58</b>	<b>60</b>	<b>55</b>	<b>55</b>	<b>54</b>	<b>47</b>	<b>61</b>
<b>UT3</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
13/12/2018	64	65	61	62	57	52	66
14/12/2018	64	65	61	63	61	57	69
15/12/2018	65	67	58	61	53	47	65
16/12/2018	58	60	54	56	54	45	62
17/12/2018	65	67	59	61	59	54	68
18/12/2018	61	62	57	59	53	47	63
19/12/2018	65	67	57	58	51	44	65
<b>Average</b>	<b>64</b>	<b>65</b>	<b>58</b>	<b>61</b>	<b>57</b>	<b>49</b>	<b>66</b>

**Table 7** Unattended noise survey results for UT1 to UT3 (AZ1)

Between Estuary and Lissenhall, road traffic along the M1 and R132 are the dominant noise sources at the monitoring positions in the vicinity of the Proposed Project. During daytime periods, average ambient noise levels were recorded in range of 58 to 68 dB

$L_{Aeq,16hr}$ . Average background daytime noise levels were measured in the range of 55 to 63 dB  $L_{A90,16hr}$ . Highest noise levels are recorded at the monitoring locations closest to the R132 Road (UT1).

Night-time noise levels at the monitoring locations are dominated by road traffic noise. Average ambient night-time noise levels were measured in the range of 54 to 62dB  $L_{Aeq,8hr}$ . Average background noise levels during this time period were measured in the range of 47 to 51 dB  $L_{A90,8hr}$ .

The measured  $L_{den}$  values in this study area ranged between 61 and 71dB  $L_{den}$ .

*R132 Estuary to Fosterstown*

The survey results for the unattended monitoring locations within AZ1 between Estuary to Fosterstown are presented in Table 8.

Survey date	Daytime			Evening	Night-time		$L_{den}$
	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	
<b>UT 4</b>							
06/12/2018	66	66	61	65	59	47	68
07/12/2018	68	68	63	67	61	53	70
08/12/2018	66	67	61	65	60	50	69
09/12/2018	65	66	59	65	57	44	67
10/12/2018	66	67	61	65	57	48	67
11/12/2018	66	67	62	66	58	46	68
12/12/2018	67	67	63	67	60	52	69
<b>Average</b>	<b>66</b>	<b>67</b>	<b>61</b>	<b>66</b>	<b>59</b>	<b>49</b>	<b>68</b>
<b>UT5</b>							
Survey date	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	$L_{den}$
13/12/2018	68	68	65	68	60	50	70
14/12/2018	68	68	65	68	62	56	71
15/12/2018	68	69	63	67	62	51	70
16/12/2018	67	67	61	66	59	47	69
17/12/2018	68	68	64	67	60	53	70
18/12/2018	68	68	64	67	59	48	69
19/12/2018	68	68	64	68	60	47	70
<b>Average</b>	<b>68</b>	<b>68</b>	<b>64</b>	<b>67</b>	<b>60</b>	<b>50</b>	<b>70</b>
<b>UT6</b>							
Survey date	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	$L_{den}$
04/04/2019	74	76	63	72	68	50	77
05/04/2019	74	75	64	72	66	51	76
06/04/2019	73	75	62	71	65	51	75
07/04/2019	73	75	60	70	67	48	75
08/04/2019	73	75	61	71	68	52	76
09/04/2019	73	74	62	71	68	52	76
10/04/2019	73	75	61	71	68	52	76
<b>Average</b>	<b>73</b>	<b>75</b>	<b>62</b>	<b>71</b>	<b>67</b>	<b>51</b>	<b>76</b>
<b>UT7</b>							
Survey date	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	$L_{den}$
25/04/2019	65	66	57	62	60	47	68
26/04/2019	64	66	57	62	60	52	68
27/04/2019	63	64	54	60	56	42	65
28/04/2019	63	64	53	60	60	46	67

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
29/04/2019	65	66	57	62	61	49	69
30/04/2019	65	67	55	61	58	44	67
01/05/2019	63	64	53	60	58	44	66
<b>Average</b>	<b>64</b>	<b>66</b>	<b>55</b>	<b>61</b>	<b>59</b>	<b>46</b>	<b>67</b>
<b>UT8</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
06/12/2018	67	68	62	66	60	49	69
07/12/2018	67	68	62	65	60	52	69
08/12/2018	66	67	61	65	59	47	68
09/12/2018	65	66	57	64	59	44	68
10/12/2018	67	68	61	65	61	49	69
11/12/2018	67	69	61	65	60	47	69
12/12/2018	68	69	63	68	61	51	70
<b>Average</b>	<b>67</b>	<b>68</b>	<b>61</b>	<b>66</b>	<b>60</b>	<b>48</b>	<b>69</b>
<b>UT9</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
04/04/2019	59	62	54	55	53	46	62
05/04/2019	56	57	53	54	52	48	60
06/04/2019	56	56	53	55	54	48	61
07/04/2019	55	56	52	54	50	43	59
08/04/2019	56	57	52	53	54	48	61
09/04/2019	57	58	53	55	52	47	60
10/04/2019	55	55	50	55	54	47	61
<b>Average</b>	<b>57</b>	<b>58</b>	<b>53</b>	<b>55</b>	<b>53</b>	<b>47</b>	<b>60</b>
<b>UT10</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
06/12/2018	58	58	55	57	52	46	60
07/12/2018	59	60	57	58	55	50	62
08/12/2018	58	59	55	56	51	47	60
09/12/2018	56	57	52	54	50	44	58
10/12/2018	57	58	54	56	53	48	61
11/12/2018	59	60	56	57	52	45	61
12/12/2018	61	61	58	60	57	52	65
<b>Average</b>	<b>58</b>	<b>59</b>	<b>55</b>	<b>57</b>	<b>53</b>	<b>47</b>	<b>61</b>
<b>UT11</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
06/12/2018	61	62	59	60	56	49	64
07/12/2018	63	63	61	62	58	53	66
08/12/2018	65	67	60	61	57	52	67
09/12/2018	62	63	60	61	57	48	65
10/12/2018	60	61	58	58	56	49	64
11/12/2018	60	62	57	57	55	45	63
12/12/2018	59	60	57	58	55	49	63
<b>Average</b>	<b>62</b>	<b>63</b>	<b>57</b>	<b>60</b>	<b>57</b>	<b>49</b>	<b>65</b>
<b>UT12</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
24/01/2019	74	74	65	73	65	43	75
25/01/2019	73	74	63	72	66	45	75
26/01/2019	73	74	61	71	67	50	75
27/01/2019	72	73	58	71	65	43	74

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	LA <sub>90,16hr</sub>	Levening	L <sub>night</sub>	LA <sub>90,8hr</sub>	
28/01/2019	73	74	63	72	65	44	75
29/01/2019	74	74	63	72	65	43	75
30/01/2019	74	74	63	73	65	45	75
<b>Average</b>	<b>73</b>	<b>74</b>	<b>62</b>	<b>72</b>	<b>65</b>	<b>45</b>	<b>75</b>
<b>UT13</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	LA <sub>90,16hr</sub>	Levening	L <sub>night</sub>	LA <sub>90,8hr</sub>	L <sub>den</sub>
02/05/2019	65	65	57	65	57	41	67
03/05/2019	65	66	57	65	57	43	67
04/05/2019	67	67	55	66	56	42	68
05/05/2019	64	65	54	63	56	40	66
06/05/2019	63	64	55	62	57	42	66
07/05/2019	65	66	58	64	58	45	68
08/05/2019	66	67	58	65	57	42	67
<b>Average</b>	<b>65</b>	<b>66</b>	<b>56</b>	<b>65</b>	<b>57</b>	<b>42</b>	<b>67</b>
<b>UT14</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	LA <sub>90,16hr</sub>	Levening	L <sub>night</sub>	LA <sub>90,8hr</sub>	L <sub>den</sub>
31/01/2019	64	64	61	63	57	48	66
01/02/2019	63	64	61	62	57	49	66
02/02/2019	62	63	59	60	59	48	66
03/02/2019	61	62	59	61	55	45	64
04/02/2019	62	63	59	62	56	47	65
05/02/2019	63	63	60	63	55	43	65
06/02/2019	62	62	59	61	58	50	66
<b>Average</b>	<b>63</b>	<b>63</b>	<b>60</b>	<b>62</b>	<b>57</b>	<b>47</b>	<b>65</b>
<b>UT15</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	LA <sub>90,16hr</sub>	Levening	L <sub>night</sub>	LA <sub>90,8hr</sub>	L <sub>den</sub>
24/01/2019	62	63	58	61	56	45	64
25/01/2019	61	62	57	60	55	47	64
26/01/2019	62	62	58	61	59	52	66
27/01/2019	61	62	55	59	56	45	64
28/01/2019	61	62	57	60	56	45	64
29/01/2019	62	63	57	60	56	45	64
30/01/2019	62	63	58	61	57	48	64
<b>Average</b>	<b>62</b>	<b>62</b>	<b>57</b>	<b>60</b>	<b>57</b>	<b>47</b>	<b>65</b>
<b>UT16</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	LA <sub>90,16hr</sub>	Levening	L <sub>night</sub>	LA <sub>90,8hr</sub>	L <sub>den</sub>
25/04/2019	56	57	52	55	56	49	49
26/04/2019	58	60	53	55	56	49	49
27/04/2019	54	56	48	48	52	43	43
28/04/2019	55	55	50	54	53	46	46
29/04/2019	56	58	53	54	56	49	49
30/04/2019	59	61	50	51	52	40	40
01/05/2019	56	59	47	51	51	43	43
<b>Average</b>	<b>57</b>	<b>58</b>	<b>50</b>	<b>53</b>	<b>54</b>	<b>46</b>	<b>61</b>
<b>UT17</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	LA <sub>90,16hr</sub>	Levening	L <sub>night</sub>	LA <sub>90,8hr</sub>	L <sub>den</sub>
09/05/2019	61	61	56	60	57	50	65
10/05/2019	59	60	55	58	56	49	63
11/05/2019	58	60	54	56	56	49	63
12/05/2019	58	59	54	58	56	49	63

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
13/05/2019	59	60	55	58	57	48	64
14/05/2019	59	60	55	58	56	48	63
15/05/2019	59	59	55	58	55	49	63
<b>Average</b>	<b>59</b>	<b>60</b>	<b>55</b>	<b>58</b>	<b>56</b>	<b>49</b>	<b>63</b>

**Table 8** Unattended noise survey results for UT4 to UT17 (AZ1)

Between Lissenhall and Nevinstown, noise monitoring locations were located along the R132 at representative noise sensitive properties in the vicinity of the proposed Project. At these monitoring positions, road traffic along the R132 is the dominant noise source at all locations surveyed. Overhead aircraft is also a contributory noise source at these monitoring locations.

During daytime periods, average ambient noise levels were recorded in range of 57 to 73 dB L<sub>Aeq,16hr</sub> at the unattended survey positions. Average daytime background noise levels were measured in the range of 50 to 64 dB L<sub>A90,16hr</sub>. Highest noise levels are recorded at the monitoring locations closest to the R132 Road (UT6 & UT12). The lowest values were recorded within a residential area set back some 100 to 140m from the R132 road edge (UT16).

Night-time noise levels at the monitoring locations are dominated by road traffic noise. Average ambient night-time noise levels were measured in the range of 53 to 67 dB L<sub>Aeq,8hr</sub>. Average background noise levels during this time period were measured in the range of 42 to 51 dB L<sub>A90,8hr</sub>.

The measured L<sub>den</sub> values in this study area ranged between 60 and 76 dB L<sub>den</sub>.

#### *R132 Fosterstown to Naul Road*

The survey results for the unattended monitoring locations within AZ1 within the Fosterstown to Naul Road are presented in Table 9.

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
<b>UT18</b>							
11/04/2019	57	59	52	56	55	51	62
12/04/2019	59	61	54	56	55	50	62
13/04/2019	59	61	53	55	55	50	63
14/04/2019	57	59	53	55	58	51	64
15/04/2019	60	62	56	57	56	51	64
16/04/2019	57	58	54	56	56	51	62
17/04/2019	55	57	50	53	59	51	64
<b>Average</b>	<b>58</b>	<b>60</b>	<b>53</b>	<b>55</b>	<b>56</b>	<b>51</b>	<b>63</b>

**Table 9** Unattended noise survey results for UT18 (AZ1)

Location UT18 at Boraimhe Hazel, Nevinstown West is located approximately 140m from the R132 Road. The dominant noise sources at this survey location were road traffic from the R132 Road and other distant roads in the surrounding area in addition to aircraft movements to and from Dublin Airport.

Ambient daytime noise levels were measured in the range of 57 to 60 dB L<sub>Aeq,16hr</sub> with an overall average value of 58 dB L<sub>Aeq,16hr</sub>. Background noise levels during daytime periods were measured in the range of 50 to 56 dB L<sub>A90,16hr</sub>, with an overall average value of 53 dB L<sub>A90,16hr</sub>.

Ambient night-time noise levels were measured in the range of 55 to 58 dB  $L_{Aeq,8hr}$  with an overall average value of 56 dB  $L_{Aeq,8hr}$ . Background noise levels during night-time periods were measured in the range of 50 to 51 dB  $L_{A90,8hr}$ , with an overall average value of 51 dB  $L_{A90,8hr}$ .

$L_{den}$  values at this location were measured in the range of 62 to 64 dB  $L_{den}$  with an overall average of 63 dB.

### 3.1.2 Attended Surveys

The survey results for the attended monitoring locations within AZ1 are presented in Table 10 overleaf.

Survey Location Ref	Date	Start Time	Measured Noise Levels (dB re.2x10 <sup>-5</sup> Pa)			Derived L <sub>den</sub>	Survey Notes
			L <sub>Aeq</sub>	L <sub>AF10</sub>	L <sub>AF90</sub>		
<i>Estuary</i>							
AT1	24/09/2018	14:48	65	68	60	68	Road Traffic Noise (RTN), HGV engine idling, rustling foliage, occasional local traffic, bird song
		15:08	66	69	60		Aircraft overhead, HGV Movements at nearby depot, Road Traffic Noise, Foliage, occasional local traffic, bird song
		16:08	67	69	63		
AT2	24/09/2018	15:19	69	72	65	71	Road Traffic Noise, Bird song, Nearby stream, Nearby light construction, Child play in distance
		16:27	70	72	66		As above, with addition of overhead aircraft
		17:29	70	72	67		
AT74	12/05/2022	13:47	57	61	45	62	Traffic on Ennis Lane, overhead aeroplanes
		15:21	56	60	46		Local traffic on Ennis Lane dominant, strimmer being used in distance
		17:01	62	65	45		Road traffic on Ennis Lane, cars beeping horn turning on sharp bend
<i>R132 Estuary to Seatown</i>							
AT3	24/09/2018	15:43	62	65	53	64	Distant lawn mowing, distant traffic, local traffic movements at nearby plant, dog barking in distance, aircraft overhead
		16:48	59	63	52		Increased traffic entering sports centre, pedestrians talking nearby, distant traffic, dog barking in distance, aircraft overhead
		17:48	59	62	54		
AT4	18/10/2018	14:30	62	64	59	63	Traffic noise dominant, nearby construction, nearby conversation, aircraft overhead, bird song, nearby music playing, distant lawn mower
		15:32	63	65	61		As above with addition of distant construction activities
		16:32	60	62	58		
AT5	18/10/2018	14:49	60	58	53	59	Traffic noise dominant, occasional local traffic, aircraft overhead, rustling foliage, occasional HGV traffic close by, distant piling/hammering, distant reverse beacon
		15:51	59	59	54		
		16:50	58	58	55		
AT6	18/10/2018	15:11	60	62	56	62	Traffic noise dominant, aircraft overhead, traffic noise constant, birds, occasional close traffic, foliage, nearby lawnmower
		16:11	60	61	57		As above with addition of distant piling/hammering
		17:10	62	63	59		
AT50	09/05/2022	13:00	61	62	58	62	Noise from R125/R132 dominant
		14:26	61	61	58		Noise from R125/R132 dominant, emergency sirens audible
		15:32	62	64	59		Noise from R125/R132 dominant
AT52	09/05/2022	14:02	65	67	62	67	Road traffic on R132 dominant
		15:09	66	67	64		Road traffic on R132 dominant, distant lawnmower audible
		16:16	65	67	63		Road traffic on R132 dominant, overhead aeroplanes audible
<i>R132 Seatown to Swords Central</i>							
AT7	19/10/2018	10:05	53	55	50	57	

Survey Location Ref	Date	Start Time	Measured Noise Levels (dB re.2x10 <sup>-5</sup> Pa)			Derived L <sub>den</sub>	Survey Notes
			L <sub>Aeq</sub>	L <sub>AF10</sub>	L <sub>AF90</sub>		
		11:19	53	55	49		Distant traffic, aircraft overhead, rustling foliage, occasional local traffic, nearby conversations, distant dog barking, distant lawnmower, bird song
		11:55	54	56	49		
AT8	19/10/2018	09:28	66	71	57	69	Local traffic dominant, distant traffic constant source, bird song, aircraft overhead, nearby conversations
		10:24	65	70	57		
		11:01	65	70	57		
AT9	19/10/2018	09:47	69	72	62	71	Road traffic dominant source, regular local traffic dominant when present, aircraft overhead, rustling foliage
		10:43	69	72	62		
		11:37	69	72	63		
AT10	22/10/2018	14:20	63	65	59	65	Road traffic dominant & constant source, rustling foliage, aircraft overhead, bird song
		15:24	64	65	58		As above with addition of helicopter over head
		16:27	63	65	60		
AT51	09/05/2022	13:28	60	68	57	61	Local traffic on Seatwon Road and noise from R132, nearby Montessori closing time
		14:50	59	69	56		Local traffic on Seatown Road and noise from R132
		15:55	56	68	54		Local traffic on Seatown Road and noise from R132
ATT53	10/05/2022	12:00	66	69	62	67	Traffic on R132 dominant, pedestrians and barking dogs audible
		13:30	66	69	62		Traffic on R132 dominant
		14:35	65	68	60		Traffic on R132 dominant, emergency sirens also audible
ATT54	10/05/2022	12:20	65	67	61	67	Road traffic on R132 dominant
		13:50	64	67	60		Road traffic on R132 dominant, tractor lawnmower on estate green
		14:55	65	67	61		Road traffic on R132 dominant
ATT55	10/05/2022	12:43	64	67	59	67	Road traffic on R132 dominant, children playing nearby
		14:13	64	67	60		Road traffic on R132, foliage blowing in wind
		15:16	64	67	59		Road traffic on R132
<i>R132 Swords Central to Fosterstown</i>							
AT11	22/10/2018	14:40	64	67	56	67	Traffic dominant source, rustling foliage, aircraft overhead, conversations nearby
		15:43	64	67	57		
		16:49	64	67	57		
AT12	22/10/2018	15:03	61	62	57	61	Traffic dominant source, local and distant, car park activity, overhead aircraft, bird song, rustling foliage
		16:07	58	59	55		
		17:12	62	59	55		
AT13	22/10/2018	10:22	53	52	45	55	Distant & local traffic dominant source, aircraft overhead, distant construction activity, bird song, rustling foliage
		10:59	55	56	46		As above with addition of distant alarm and car idling near meter

Survey Location Ref	Date	Start Time	Measured Noise Levels (dB re.2x10 <sup>-5</sup> Pa)			Derived L <sub>den</sub>	Survey Notes
			L <sub>Aeq</sub>	L <sub>AF10</sub>	L <sub>AF90</sub>		
		11:37	52	52	43		Distant & local traffic dominant source, aircraft overhead, distant construction activity, bird song, rustling foliage
AT56	11/05/2022	12:05	66	69	60	67	Road traffic along R132 dominant, pedestrian activity audible
		13:10	65	68	60		Road traffic along R132 dominant, cars turning nearby
		14:25	65	68	60		Road traffic along R132 dominant
AT57	11/05/2022	12:25	62	65	56	66	Road traffic on R132, foliage blowing in wind
		13:30	63	65	57		Road traffic on R132, emergency sirens
		14:50	63	66	57		Road traffic along R132
AT58	11/05/2022	12:45	71	75	61	72	Road traffic coming on and off Pinnock Hill roundabout on R132, birdsong audible during traffic lull
		13:51	70	72	60		Road traffic on R132 coming on and off Pinnock Hill roundabout
		15:13	70	73	60		Road traffic on R132 coming on and off Pinnock Hill roundabout
<i>R132 Fosterstown to Naul Road</i>							
AT14	22/10/2018	10:41	49	51	46	54	Road traffic dominants, bird song
		11:17	64	53	46		Distant alarm, low flying helicopter overhead, bird song, road traffic
		11:55	50	52	46		Road traffic dominants, bird song
UT19	17/04/2019	11:04	57	59	52	60	Road traffic dominates in addition to overhead aircraft. Dog barking noted within measurement garden, intermittent throughout measurement period
		12:04	58	60	52		
		13:04	58	60	53		
UT20	30/10/2018	11:18	50	50	43	55	Birds, HVAC from nearby housing block, R108 traffic distant, movements at nearby carpark, occasional local traffic, children playing in distance
		11:58	52	55	43		
		12:35	52	56	43		
AT59	11/05/2022	15:48	63	66	54	66	Traffic on R132 dominant, wind chimes from nearby house audible during traffic lull
		16:40	63	66	54		Traffic on R132 dominant
		17:24	63	66	55		Traffic on R132 dominant, some light rain also audible
AT60	11/05/2022	16:17	65	68	59	67	Traffic along Nevinstown Lane L2305 dominant with car horns audible
		17:02	65	68	60		Traffic along Nevinstown Lane L2305 dominant, pedestrians audible
		17:46	65	67	60		Traffic along Nevinstown Lane L2305 dominates with foliage blowing in wind audible during traffic lull

**Table 10** Attended Survey results for AZ1

### 3.2 Assessment Zone 2

#### 3.2.1 Unattended Survey

One unattended survey location was monitored at Dublin Airport within the Airport church grounds (UT 21) within this assessment zone. The results of the noise monitoring survey at this location is summarised in Table 11.

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
<b>UT21</b>							
07/02/2019	60	61	56	59	58	52	65
08/02/2019	62	63	59	62	61	57	68
09/02/2019	60	61	55	58	58	51	65
10/02/2019	62	62	58	62	58	52	66
11/02/2019	60	61	56	59	57	51	64
12/02/2019	60	61	55	58	56	50	63
13/02/2019	60	60	56	60	56	50	64
<b>Average</b>	<b>61</b>	<b>61</b>	<b>57</b>	<b>60</b>	<b>58</b>	<b>52</b>	<b>65</b>

**Table 11** Unattended noise survey results for UT21 (AZ2)

The noise survey results within this assessment zone is dominated by aircraft overhead noise and airport ground activities including traffic localised traffic movements.

Ambient daytime noise levels were measured in the range of 60 to 62 dB L<sub>Aeq,16hr</sub> with an overall average value of 61 dB L<sub>Aeq,16hr</sub>. Background noise levels during daytime periods were measured in the range of 55 to 59 dB L<sub>A90,16hr</sub>, with an overall average value of 57 dB L<sub>A90,16hr</sub>.

Ambient night-time noise levels were measured in the range of 56 to 61 dB L<sub>Aeq,8hr</sub> with an overall average value of 58 dB L<sub>Aeq,8hr</sub>. Background noise levels during night-time periods were measured in the range of 50 to 57 dB L<sub>A90,8hr</sub>, with an overall average value of 52 dB L<sub>A90,8hr</sub>.

L<sub>den</sub> values at this location were measured in the range of 63 to 68 dB L<sub>den</sub> with an overall average of 65 dB.

#### 3.2.2 Attended Survey

One attended monitoring position was surveyed within AZ2 at Location AT15. The survey results for this location are presented in Table 12.

Survey Date	Start Time	Measured Noise Levels (dB re.2x10 <sup>-5</sup> Pa)			Derived L <sub>den</sub>	Survey Notes
		L <sub>Aeq</sub>	L <sub>AF10</sub>	L <sub>AF90</sub>		
24/10/2018	10:37	60	63	56	62	HGV Movements to construction site, nearby construction, regular local traffic, ground movements at Dublin Airport, distant traffic, road sweeper
	11:35	58	61	55		
	12:26	60	63	55		

**Table 12** Attended survey results for AT15 (AZ2)

### 3.3 Assessment Zone 3

#### 3.3.1 Unattended Surveys

The survey results for the unattended monitoring locations within AZ3 are presented in Table 13.

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
<b>UT22</b>							
24/01/2019	66	66	54	66	61	47	69
25/01/2019	66	67	55	65	57	48	68
26/01/2019	64	63	54	65	62	51	69
27/01/2019	67	68	53	65	61	47	69
28/01/2019	65	66	54	62	57	49	67
29/01/2019	65	66	54	63	61	48	68
30/01/2019	64	65	54	64	61	51	68
<b>Average</b>	<b>65</b>	<b>66</b>	<b>54</b>	<b>64</b>	<b>60</b>	<b>49</b>	<b>68</b>
<b>UT23</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
28/08/2019	57	58	56	57	54	51	61
29/08/2019	60	62	57	57	55	52	63
30/08/2019	58	59	56	57	55	51	63
31/08/2019	60	61	58	58	55	52	63
01/09/2019	59	60	56	57	55	53	63
02/09/2019	60	60	58	59	55	52	63
03/09/2019	60	62	57	57	57	53	64
<b>Average</b>	<b>59</b>	<b>61</b>	<b>57</b>	<b>57</b>	<b>55</b>	<b>52</b>	<b>63</b>
<b>UT24</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
23/05/2019	66	66	60	65	61	50	69
24/05/2019	65	66	60	64	60	50	68
25/05/2019	66	67	59	64	60	51	68
26/05/2019	65	65	59	65	60	50	68
27/05/2019	67	69	61	65	61	50	70
28/05/2019	66	67	60	64	61	47	69
29/05/2019	68	68	61	68	61	50	70
<b>Average</b>	<b>66</b>	<b>67</b>	<b>60</b>	<b>65</b>	<b>61</b>	<b>50</b>	<b>69</b>

**Table 13** Unattended noise survey results for UT22 – UT24 (AZ3)

The noise environment at Location UT22 is largely dominated by aircraft noise from Dublin Airport in addition to traffic along the R108. The noise environment at Location UT23 is dominated by road traffic along the M50 Motorway, the Ballymun Road and aircraft noise from Dublin Airport. Location UT24 was measured in a garden area of apartment building at the junction of Ballymun Road and Santry Avenue and was dominated by road traffic along these two adjacent roads.

During daytime periods, average ambient noise levels were recorded in range of 59 to 66 dB L<sub>Aeq,16hr</sub>. Average daytime background noise levels were measured in the range of 54 to 60 dB L<sub>A90,16hr</sub>.

Night-time noise levels at the monitoring locations are also heavily influenced by road traffic noise and overhead aircraft at locations in proximity to Dublin Airport. Average ambient night-time noise levels were measured in the range of 55 to 61 dB L<sub>Aeq,8hr</sub>.

Average background noise levels during this time period were measured in the range of 49 to 52 dB  $L_{A90,8hr}$ .

The measured  $L_{den}$  values in this study area from the long-term unattended survey locations ranged between 63 and 69 dB  $L_{den}$ .

3.3.2 Attended Surveys

The survey results for the attended monitoring locations within AZ3 are presented in Table 14.

Survey Date	Start Time	Measured Noise Levels (dB re.2x10 <sup>-5</sup> Pa)			Derived $L_{den}$	Survey Notes
		$L_{Aeq}$	$L_{AF10}$	$L_{AF90}$		
Location AT16						
24/10/2018	11:10	65	64	59	64	Aircraft activities from Dublin Airport, M50 traffic constant, local traffic dominant when present with occasional local HGV movements, foliage rustling
	12:00	64	65	58		
	14:16	64	64	58		
Location AT17						
24/10/2018	14:36	68	70	62	69	R108 traffic constant noise source. Nearby construction activities. Regular local traffic with HGVs dominant when present, nearby car wash, airport activities
	15:19	67	69	61		
	16:01	68	69	64		
ATT61						
12/05/2022	12:50	60	61	57	61	Road traffic from R108 and M50 dominate, trucks turning and overhead aeroplanes, foliage blowing in wind and light rain audible
	14:24	58	60	56		
	15:58	60	62	57		
ATT62						
12/05/2022	13:12	71	75	63	74	Traffic along R108 and local traffic on Old Ballymun Road, heavy HGV traffic, beeping horns, pedestrian activity, beeping traffic lights
	14:45	73	76	64		
	16:24	73	76	66		
16/06/2022	00:18	54	56	52	N/A	Industrial fan running throughout, road traffic on R108
	01:52	54	56	52		Industrial fan, R108 road traffic, passers by talking
	03:12	51	52	46		Industrial fan, R108 road traffic

**Table 14** Attended survey results for AT16,AT17, ATT61 & ATT62 (AZ3)

### 3.4 Assessment Zone 4

#### 3.4.1 Unattended Surveys

The survey results for unattended surveys within AZ4 are summarised in the following tables. The tables are split between the following areas:

- Table 15: Ballymun;
- Table 16: Collins Avenue;
- Table 17: Albert College Park;
- Table 18: Griffith Park;
- Table 19: Glasnevin / Whitworth;
- Table 20: Mater Hospital/ Eccels Street;
- Table 21: O Connell Street;
- Table 22: Tara Street;
- Table 23: St Stephens Green; and,
- Table 24: Charlemont.

#### *Ballymun*

The survey results for the unattended monitoring locations within AZ4 between Ballymun and Griffith Park are presented in Table 15.

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
<b>UT25</b>							
14/02/2019	58	61	46	48	47	40	59
15/02/2019	56	59	47	49	47	41	58
16/02/2019	52	52	46	53	47	39	55
17/02/2019	59	62	46	51	52	40	61
18/02/2019	54	56	49	52	52	41	59
19/02/2019	57	60	47	50	50	39	59
20/02/2019	57	60	46	49	49	38	59
<b>Average</b>	<b>57</b>	<b>59</b>	<b>47</b>	<b>50</b>	<b>50</b>	<b>40</b>	<b>59</b>
<b>UT26</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
31/01/2019	69	70	63	68	63	50	72
01/02/2019	69	69	63	69	64	54	72
02/02/2019	68	69	62	68	62	51	71
03/02/2019	66	68	60	62	62	49	70
04/02/2019	68	69	61	67	62	47	71
05/02/2019	68	69	62	68	63	49	71
06/02/2019	68	69	61	67	63	53	71
<b>Average</b>	<b>68</b>	<b>69</b>	<b>62</b>	<b>67</b>	<b>63</b>	<b>50</b>	<b>71</b>
<b>UT27</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
31/01/2019	59	60	53	58	54	44	62
01/02/2019	61	61	56	61	56	48	64
02/02/2019	60	61	53	60	54	43	63
03/02/2019	59	59	51	58	56	43	63
04/02/2019	60	61	54	59	54	41	63
05/02/2019	60	60	53	59	54	42	63
06/02/2019	59	60	52	58	56	47	63

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
<b>Average</b>	<b>60</b>	<b>60</b>	<b>53</b>	<b>59</b>	<b>55</b>	<b>44</b>	<b>63</b>
<b>UT28</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
31/01/2019	64	65	56	63	58	46	67
01/02/2019	63	65	58	62	58	51	66
02/02/2019	61	62	53	60	55	41	64
03/02/2019	60	60	49	59	55	42	63
04/02/2019	62	62	55	62	56	39	64
05/02/2019	62	63	53	60	57	41	65
06/02/2019	62	62	53	61	56	47	65
<b>Average</b>	<b>62</b>	<b>63</b>	<b>54</b>	<b>61</b>	<b>56</b>	<b>44</b>	<b>65</b>

**Table 15** Unattended noise survey results for UT25 to UT28 (AZ4)

Between Ballymun and Griffith Park, road traffic along the Ballymun Road, St Mobhi Road and adjacent surrounding roads is the dominant noise source in addition to localised suburban activities within schools, parks and local commercial areas.

During daytime periods, average ambient noise levels were recorded in range of 57 to 68 dB L<sub>Aeq,16hr</sub>. Average background noise levels were measured in the range of 47 to 62 dB L<sub>A90,16hr</sub>.

Night-time noise levels at the monitoring locations are influenced by road traffic noise. Average ambient night-time noise levels were measured in the range of 50 to 63 dB L<sub>Aeq,8hr</sub>. Average background noise levels during this time period were measured in the range of 40 to 50 dB L<sub>A90,8hr</sub>.

The measured L<sub>den</sub> values in this study area ranged between 59 and 71dB L<sub>den</sub>.

**Collins Avenue**

The survey results for the unattended monitoring locations within AZ4 at Collins Avenue are presented in Table 16.

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
<b>UT29</b>							
14/02/2019	51	52	47	51	45	41	54
15/02/2019	52	54	48	48	43	39	53
16/02/2019	49	50	45	49	46	41	53
17/02/2019	49	51	45	48	43	38	52
18/02/2019	50	51	46	49	42	38	52
19/02/2019	49	50	46	48	43	39	52
20/02/2019	52	55	46	47	40	36	53
<b>Average</b>	<b>51</b>	<b>52</b>	<b>46</b>	<b>49</b>	<b>43</b>	<b>39</b>	<b>53</b>
<b>UT30</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
14/02/2019	56	58	46	51	49	42	58
15/02/2019	58	60	48	52	50	41	60
16/02/2019	52	53	47	51	46	41	55
17/02/2019	54	54	48	53	48	40	57
18/02/2019	54	55	48	52	47	40	56

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
19/02/2019	53	53	48	52	49	41	57
20/02/2019	53	55	47	50	47	38	56
<b>Average</b>	<b>55</b>	<b>56</b>	<b>47</b>	<b>52</b>	<b>48</b>	<b>41</b>	<b>57</b>

**Table 16** Unattended noise survey results for UT29 and UT30 (AZ4)

Noise levels at the monitoring location within this study area are dominated by road traffic along the Ballymun Road, Collins Avenue and adjacent surrounding local roads in addition to localised suburban activities. At location UT29, elevated noise levels associated with children playing within the school yard during break periods have been excluded from the data sets.

During daytime periods, average ambient noise levels were recorded in range of 51 to 55 dB L<sub>Aeq,16hr</sub>. Average daytime background noise levels were measured in the range of 46 to 47 dB L<sub>A90,16hr</sub>.

Night-time noise levels at the monitoring locations are influenced by road traffic noise. Average ambient night-time noise levels were measured in the range of 43 to 48 dB L<sub>Aeq,8hr</sub>. Average background noise levels during this time period were measured in the range of 39 to 41 dB L<sub>A90,8hr</sub>.

The measured L<sub>den</sub> values in this study area ranged between 53 and 57dB L<sub>den</sub>.

*Albert College Park*

The survey results for the unattended monitoring locations within AZ4 at Albert College Park are presented in Table 17.

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
<b>UT31</b>							
25/04/2019	69	71	62	68	66	44	73
26/04/2019	68	69	61	66	65	52	72
27/04/2019	67	68	60	65	63	43	71
28/04/2019	67	68	57	65	64	44	71
29/04/2019	69	69	61	68	64	44	72
30/04/2019	69	70	61	67	64	41	72
01/05/2019	67	69	59	66	64	41	71
<b>Average</b>	<b>68</b>	<b>69</b>	<b>56</b>	<b>66</b>	<b>64</b>	<b>44</b>	<b>72</b>
<b>UT32</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
24/01/2019	61	62	54	59	54	42	63
25/01/2019	59	60	53	58	55	43	63
26/01/2019	61	61	54	60	57	48	64
27/01/2019	59	59	51	58	55	43	63
28/01/2019	60	61	53	59	55	43	63
29/01/2019	60	61	54	59	54	43	63
30/01/2019	60	61	54	59	56	43	64
<b>Average</b>	<b>60</b>	<b>61</b>	<b>53</b>	<b>59</b>	<b>55</b>	<b>44</b>	<b>63</b>

**Table 17** Unattended noise survey results for UT31 and UT32 (AZ4)

Noise levels at the monitoring locations within this study area are dominated by road traffic along the Ballymun Road, adjacent surrounding local roads in addition to localised suburban activities.

Monitoring location UT31 was positioned in close proximity to the Ballymun Road at front façade of residential properties along this road. UT32 was set back further from the road edge within the grounds of Special Education building off Ballymun Road. Highest noise levels in this area are therefore measured at location UT31 due to the proximity to the Ballymun Road.

During daytime periods, average ambient noise levels were recorded in range of 60 to 68 dB  $L_{Aeq,16hr}$ . Average background noise levels were measured in the range of 53 to 56 dB  $L_{A90,16hr}$ .

Night-time noise levels at the monitoring locations are influenced by road traffic noise. Average ambient night-time noise levels were measured in the range of 55 to 64 dB  $L_{Aeq,8hr}$ . Average background noise levels during this time period were measured as 44 dB  $L_{A90,8hr}$ .

The measured  $L_{den}$  values in this study area ranged between 63 and 72 dB  $L_{den}$ .

*Griffith Park*

The survey results for the unattended monitoring locations within AZ4 at Griffith Park are presented in Table 18.

Survey date	Daytime			Evening	Night-time		$L_{den}$
	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	
<b>UT33</b>							
07/02/2019 <sup>Note 1</sup>	56	57	50	55	52	46	60
08/02/2019 <sup>Note 1</sup>	58	58	53	58	60	52	66
09/02/2019	55	58	49	50	48	43	58
10/02/2019	55	56	50	53	48	43	57
11/02/2019	55	55	49	55	48	42	57
12/02/2019	56	56	49	56	47	41	58
13/02/2019	55	54	49	55	47	41	57
<b>Average</b>	<b>55</b>	<b>56</b>	<b>48</b>	<b>54</b>	<b>49</b>	<b>42</b>	<b>58</b>
<b>UT34</b>							
Survey date	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	$L_{den}$
10/01/2019	70	71	55	69	65	39	73
11/01/2019	70	71	54	68	65	42	73
12/01/2019	69	70	54	68	65	48	73
13/01/2019	69	70	51	68	65	38	73
14/01/2019	70	70	53	68	65	39	73
15/01/2019	69	70	55	68	65	41	73
16/01/2019	70	70	55	70	66	41	74
<b>Average</b>	<b>70</b>	<b>70</b>	<b>54</b>	<b>68</b>	<b>65</b>	<b>41</b>	<b>73</b>
<b>UT35</b>							
Survey date	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	$L_{den}$
07/02/2019 <sup>Note 1</sup>	55	57	50	52	55	47	61
08/02/2019 <sup>Note 1</sup>	61	62	54	57	65	55	70
09/02/2019	55	57	49	51	50	45	58
10/02/2019	56	57	51	55	50	44	59
11/02/2019	55	56	49	52	48	42	57

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
12/02/2019	54	56	48	51	48	41	57
13/02/2019	56	57	49	54	49	41	58
<b>Average</b> <small>Note 1</small>	<b>55</b>	<b>57</b>	<b>49</b>	<b>53</b>	<b>49</b>	<b>43</b>	<b>59</b>

**Table 18** Unattended noise survey results for UT33 to UT35 (AZ4)

**Note 1:** Noise data recorded during night periods of 7/8th February and daytime of 8<sup>th</sup> February 2020 was influenced by high winds and heavy rainfall. Noise data during this time period has been excluded from the overall average.

Noise levels at monitoring locations within this study area are dominated by road traffic along the St Mobhi Road, adjacent surrounding local roads in addition to localised suburban activities and activities within the playing fields and school grounds.

Monitoring location UT33 is set back from St. Mobhi Road within the grounds of Scoil Chaitríona. Monitoring location UT35 was positioned within grounds of Scoil Mobhí at similar distance from the road as UT33. Monitoring Location UT34 was positioned to the front of a residential property facing onto St. Mobhi Road. This monitoring location recorded highest noise levels due to its proximity to passing road traffic.

At monitoring locations UT33 and UT35, daytime average ambient noise levels were 55 dB L<sub>Aeq,16hr</sub> at both locations. Average background noise levels measured 48 to 49 dB L<sub>A90,16hr</sub>.

Average ambient night-time noise levels at these monitoring locations measured in the 49 dB L<sub>Aeq,8hr</sub>. Average background noise levels during this time period measured between 42 and 43 dB L<sub>A90,8hr</sub>. Average L<sub>den</sub> values at these locations were between 58 and 59 dB L<sub>den</sub>.

At monitoring location UT34, daytime average ambient noise levels were 70 dB L<sub>Aeq,16hr</sub>. Average background noise levels measured 54 dB L<sub>A90,16hr</sub>. Average night-time ambient noise levels measured 65 dB L<sub>Aeq,8hr</sub> with average background noise levels measuring 41 dB L<sub>A90</sub>. Average L<sub>den</sub> values at this location measured 73 dB L<sub>den</sub>.

*Glasnevin / Whitworth*

The survey results for the unattended monitoring locations within AZ4 at Glasnevin and Whitworth are presented in Table 19.

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
<b>UT36</b>							
23/10/2019	59	60	43	57	52	39	61
24/10/2019	58	58	43	58	51	37	60
25/10/2019	57	58	41	57	47	36	59
26/10/2019	56	56	42	57	48	40	58
27/10/2019	56	55	40	56	49	35	58
28/10/2019	56	57	36	55	54	35	61
29/10/2019	59	59	40	58	53	36	61
<b>Average</b>	<b>57</b>	<b>58</b>	<b>41</b>	<b>57</b>	<b>51</b>	<b>37</b>	<b>60</b>
<b>UT37</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
10/01/2019	47	47	44	47	44	38	51
11/01/2019	50	51	45	48	44	41	53

Survey date	Daytime			Evening	Night-time		Lden
	LAeq,16hr	Lday	LA90,16hr	Levening	Lnight	LA90,8hr	
12/01/2019	50	51	47	48	48	44	55
13/01/2019	48	50	46	46	44	38	52
14/01/2019	49	51	44	46	43	39	52
15/01/2019	49	50	45	48	45	39	53
16/01/2019	50	52	45	47	44	39	53
<b>Average</b>	<b>49</b>	<b>51</b>	<b>44</b>	<b>47</b>	<b>45</b>	<b>40</b>	<b>53</b>
<b>UT38</b>							
Survey date	LAeq,16hr	Lday	LA90,16hr	Levening	Lnight	LA90,8hr	Lden
23/10/2019	57	58	44	55	45	38	58
24/10/2019	54	56	45	52	45	40	56
25/10/2019	53	54	46	52	43	38	54
26/10/2019	50	51	44	49	44	41	53
27/10/2019	54	51	43	56	43	39	55
28/10/2019	53	55	43	47	47	39	55
29/10/2019 <small>note 1</small>	60	61	46	63	47	41	62
<b>Average</b>	<b>54</b>	<b>55</b>	<b>44</b>	<b>53</b>	<b>45</b>	<b>39</b>	<b>56</b>
<b>UT39</b>							
Survey date	LAeq,16hr	Lday	LA90,16hr	Levening	Lnight	LA90,8hr	Lden
16/05/2019	56	57	42	54	50	39	58
17/05/2019	57	58	44	57	50	39	59
18/05/2019	56	57	42	55	50	39	59
19/05/2019	56	57	40	55	51	38	59
20/05/2019	57	57	42	57	55	38	62
21/05/2019	57	58	42	56	51	36	60
22/05/2019	57	59	41	55	51	37	60
<b>Average</b>	<b>57</b>	<b>57</b>	<b>42</b>	<b>56</b>	<b>52</b>	<b>38</b>	<b>60</b>
<b>UT40</b>							
Survey date	LAeq,16hr	Lday	LA90,16hr	Levening	Lnight	LA90,8hr	Lden
05/07/2019	51	52	42	49	47	41	54
06/07/2019	51	49	40	52	44	38	53
07/07/2019	50	50	41	51	44	38	53
08/07/2019	49	50	39	49	45	39	53
09/07/2019	51	51	41	50	46	41	54
10/07/2019	52	53	42	50	46	41	54
11/07/2019	52	53	43	51	47	42	55
<b>Average</b>	<b>51</b>	<b>51</b>	<b>41</b>	<b>50</b>	<b>46</b>	<b>40</b>	<b>54</b>
<b>UT41</b>							
Survey date	LAeq,16hr	Lday	LA90,16hr	Levening	Lnight	LA90,8hr	Lden
10/01/2019	50	50	46	50	46	40	54
11/01/2019	51	52	48	50	47	43	55
12/01/2019	52	52	47	51	49	45	56
13/01/2019	51	51	46	50	46	40	54
14/01/2019	51	52	46	50	47	42	54
15/01/2019	51	51	47	50	47	41	55
16/01/2019	51	52	47	51	46	42	54
<b>Average</b>	<b>51</b>	<b>52</b>	<b>47</b>	<b>51</b>	<b>47</b>	<b>42</b>	<b>55</b>

**Table 19** Unattended noise survey results for UT36 to UT41 (AZ4)

**Note 1** A number of outlier values were recorded during survey the period of 29 October 2019 at UT38. This data set has been excluded from the average weekly values.

At Glasnevin/Whitworth monitoring locations UT36, UT39, UT40 are influenced by rail noise from the Dublin to Maynooth railway line in addition to local residential activities set back from road traffic. UT37 and UT38 are set back from road and rail traffic in a residential area. UT41 is influenced by road traffic and to a lower degree from rail traffic.

During daytime periods, average ambient noise levels were recorded in range of 49 to 57 dB  $L_{Aeq,16hr}$ . Average background noise levels were measured in the range of 41 to 47 dB  $L_{A90,16hr}$ .

Night-time noise levels at the monitoring locations are influenced by road traffic and rail pass by's. Average ambient night-time noise levels were measured in the range of 45 to 52 dB  $L_{Aeq,8hr}$ . Average background noise levels during this time period were measured in the range of 37 to 42 dB  $L_{A90,8hr}$ .

The measured  $L_{den}$  values in this study area ranged between 53 and 60 dB  $L_{den}$ .

*Mater Hospital / Eccels Street/ Berkeley Road*

The survey results for the unattended monitoring locations within AZ4 in the vicinity of the Mater Hospital are presented in Table 20.

Survey date	Daytime			Evening	Night-time		$L_{den}$
	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	
<b>UT42</b>							
16/04/2019	64	65	50	62	61	43	68
17/04/2019	64	65	50	62	62	42	69
18/04/2019	63	64	50	62	63	46	70
19/04/2019	63	63	50	62	60	45	67
20/04/2019	63	64	48	62	60	45	67
21/04/2019	62	63	47	62	59	46	67
22/04/2019	63	63	47	63	60	42	67
<b>Average</b>	<b>63</b>	<b>64</b>	<b>49</b>	<b>62</b>	<b>61</b>	<b>44</b>	<b>68</b>
<b>UT43</b>							
Survey date	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	$L_{den}$
16/04/2019	62	63	51	60	59	48	66
17/04/2019	61	61	51	61	58	48	66
18/04/2019	60	61	50	59	58	48	65
19/04/2019	60	61	50	60	58	46	65
20/04/2019	59	60	48	59	56	46	63
21/04/2019	59	60	47	58	56	47	63
22/04/2019	59	60	48	58	57	47	64
<b>Average</b>	<b>60</b>	<b>61</b>	<b>49</b>	<b>60</b>	<b>57</b>	<b>47</b>	<b>65</b>
<b>UT44</b>							
Survey date	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	$L_{den}$
14/02/2019	58	59	48	57	55	42	62
15/02/2019	58	59	50	57	55	44	62
16/02/2019	56	57	48	56	55	42	62
17/02/2019	57	57	48	57	54	42	61
18/02/2019	58	59	50	57	54	43	62
19/02/2019	58	59	50	57	54	43	62
20/02/2019	59	59	49	58	54	41	62
<b>Average</b>	<b>58</b>	<b>58</b>	<b>49</b>	<b>47</b>	<b>54</b>	<b>42</b>	<b>62</b>

**Table 20** Unattended noise survey results for UT42 to UT44 (AZ4)

Noise monitoring locations at the monitoring locations in this study area are influenced predominately by road traffic along Berkley Road, Eccles Street, the North Circular Road and the surrounding road network. Local sources from within the Mater Hospital campus in addition to local suburban sources (e.g. pedestrian movements local commercial activities) also contribute to the noise environment in this study area. Highest noise levels were recorded at location UT42 immediately fronting the road representative of residential properties in this area which directly front the local road network. Lowest levels were recorded at UT44, adjacent to St Joseph's Church.

During daytime periods, average ambient noise levels were recorded in range of 58 to 63dB  $L_{Aeq,16hr}$ . Average background noise levels measured 49dB  $L_{A90,16hr}$  during the daytime period at the three monitoring locations.

Night-time noise levels at the monitoring locations are also heavily influenced by road traffic. Average ambient night-time noise levels were measured in the range of 54 to 61 dB  $L_{Aeq,8hr}$ . Average background noise levels during this time period were measured in the range of 42 to 47 dB  $L_{A90,8hr}$ .

The measured  $L_{den}$  values in this study area from the long-term unattended survey locations ranged between 62 and 68 dB  $L_{den}$ .

#### *O'Connell Street*

The survey results for the unattended monitoring locations within AZ4 at O'Connell Street are presented in Table 21.

Survey date	Daytime			Evening	Night-time		$L_{den}$
	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	
<b>UT45</b>							
18/06/2019	58	60	53	57	54	48	62
19/06/2019	59	59	54	58	55	50	63
20/06/2019	58	59	54	57	56	50	63
21/06/2019	59	59	54	58	57	50	64
22/06/2019	58	58	54	58	55	50	62
23/06/2019	59	58	55	59	56	49	63
24/06/2019	58	59	53	58	55	47	63
<b>Average</b>	<b>58</b>	<b>59</b>	<b>54</b>	<b>58</b>	<b>56</b>	<b>49</b>	<b>63</b>
<b>UT46</b>							
Survey date	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	$L_{den}$
18/06/2019	59	61	53	58	57	48	64
19/06/2019	61	61	54	59	58	50	65
20/06/2019	60	60	54	59	58	51	65
21/06/2019	60	61	54	60	57	50	65
22/06/2019	59	59	53	58	57	50	64
23/06/2019	60	59	54	61	59	50	66
24/06/2019	60	61	54	58	56	48	64
<b>Average</b>	<b>60</b>	<b>60</b>	<b>54</b>	<b>59</b>	<b>58</b>	<b>50</b>	<b>65</b>
<b>UT47</b>							
Survey date	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	$L_{den}$
25/06/2019	67	67	61	66	63	52	70
26/06/2019	67	66	61	67	63	53	71
27/06/2019	67	66	61	67	64	54	71
28/06/2019	67	67	62	66	64	56	71
29/06/2019	70	72	62	66	65	56	73

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
30/06/2019	65	66	61	65	63	53	70
01/07/2019	67	66	61	67	62	51	70
<b>Average</b>	<b>67</b>	<b>68</b>	<b>61</b>	<b>66</b>	<b>63</b>	<b>54</b>	<b>71</b>

**Table 21** Unattended noise survey results for UT45 to UT47 (AZ4)

Noise monitoring locations at the O'Connell Street area are influenced predominately by road traffic along O'Connell Street, Parnell Street, the Luas rail line in addition to traffic along the surrounding road network. Local sources from retail and commercial units in addition to local urban sources (e.g. pedestrian movements, plant noise etc.) also contribute to the noise environment in this study area.

Highest noise levels were recorded at UT47 which was recorded directly along the O'Connell Street façade representative of buildings in this area which directly front this street. UT45 and UT46 were set back further from the road edge and were shielded to a greater extent from the sources noted above by façade structures and surrounding buildings.

During daytime periods, average ambient noise levels were recorded in range of 58 to 67 dB L<sub>Aeq,16hr</sub>. Background noise levels were measured between 54 and 61 dB L<sub>A90,16hr</sub>.

Night-time noise levels at the monitoring locations are also heavily influenced by road traffic. Average ambient night-time noise levels were measured in the range of 56 to 63 dB L<sub>Aeq,8hr</sub>. Average background noise levels during this time period were measured in the range of 49 to 54 dB L<sub>A90,8hr</sub>.

The measured L<sub>den</sub> values in this study area ranged between 63 and 71 dB L<sub>den</sub>.

### Tara Street

The survey results for the unattended monitoring locations within AZ4 at Tara Street are presented in Table 22.

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
<b>UT48</b>							
25/07/2019	64	65	60	64	60	57	68
26/07/2019	64	64	59	64	61	57	68
27/07/2019	64	65	58	62	61	56	68
28/07/2019	64	63	57	64	61	56	68
29/07/2019	64	64	59	64	60	57	68
30/07/2019	64	66	59	63	61	57	69
31/07/2019	63	64	59	61	60	56	67
<b>Average</b>	<b>64</b>	<b>64</b>	<b>59</b>	<b>63</b>	<b>61</b>	<b>56</b>	<b>68</b>
<b>UT49</b>							
Survey date	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	L <sub>den</sub>
16/08/2019	65	66	58	65	59	52	68
17/08/2019	61	61	55	60	58	52	65
18/08/2019	61	61	55	60	57	50	65
19/08/2019	63	64	56	61	57	50	66
20/08/2019	63	63	57	61	57	50	66
21/08/2019	65	66	59	63	58	51	67
22/08/2019	64	66	58	61	58	51	67

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
<b>Average</b>	<b>63</b>	<b>64</b>	<b>57</b>	<b>62</b>	<b>58</b>	<b>51</b>	<b>66</b>

**Table 22** Unattended noise survey results for UT48 to UT49 (AZ4)

Noise monitoring locations within this study area are influenced predominately by road traffic along Tara Street, Townsend Street, Parnell Street, the DART rail line in addition to traffic along the surrounding road network. Local sources from retail and commercial units in addition to local urban sources (e.g. pedestrian movements, plant noise etc.) also contribute to the noise environment in this study area.

During daytime periods, average ambient noise levels measured between 63 and 64 dB L<sub>Aeq,16hr</sub>. Average background noise levels were measured in the range of 57 to 59 dB L<sub>A90,16hr</sub>.

Night-time noise levels at the monitoring locations are also heavily influenced by road traffic in addition to surrounding urban sources. Average ambient night-time noise levels were measured in the range of 58 to 61 dB L<sub>Aeq,8hr</sub>. Average background noise levels during this time period were measured in the range of 51 to 56 dB L<sub>A90,8hr</sub>.

The measured L<sub>den</sub> values in this study area ranged between 66 and 68 dB L<sub>den</sub>.

**St Stephens Green**

One unattended survey location was monitored at St Stephens Green. The survey results are presented in Table 23.

Survey date	Daytime			Evening	Night-time		L <sub>den</sub>
	L <sub>Aeq,16hr</sub>	L <sub>day</sub>	L <sub>A90,16hr</sub>	L <sub>evening</sub>	L <sub>night</sub>	L <sub>A90,8hr</sub>	
<b>UT50</b>							
13/11/2019	63	64	56	62	59	50	66
14/11/2019	63	63	55	63	59	51	67
15/11/2019	64	66	54	60	60	52	68
16/11/2019	61	61	52	60	60	51	66
17/11/2019	60	60	51	60	56	48	64
18/11/2019	62	62	53	61	59	48	66
19/11/2019	62	63	53	61	58	50	66
<b>Average</b>	<b>62</b>	<b>63</b>	<b>54</b>	<b>61</b>	<b>59</b>	<b>50</b>	<b>66</b>

**Table 23** Unattended noise survey results for UT50 (AZ4)

Traffic along the surrounding road network, in addition to traffic along the surrounding road network with a small contribution from Luas rail movements. Local sources from retail and commercial units in addition to local urban sources (e.g. pedestrian movements, plant noise etc.) also contribute to the noise environment in this study area.

Ambient daytime noise levels were measured in the range of 60 to 64 dB L<sub>Aeq,16hr</sub> with an overall average value of 62 dB L<sub>Aeq,16hr</sub>. Background noise levels during daytime periods were measured in the range of 51 to 56 dB L<sub>A90,16hr</sub>, with an overall average value of 54 dB L<sub>A90,16hr</sub>.

Night-time noise levels were influenced by road traffic in addition to surrounding urban sources. Ambient night-time noise levels were measured in the range of 58 to 60 dB L<sub>Aeq,8hr</sub> with an overall average value of 59 dB L<sub>Aeq,8hr</sub>. Background noise levels during

night-time periods were measured in the range of 48 to 52 dB  $L_{A90,8hr}$ , with an overall average value of 50 dB  $L_{A90,8hr}$ .

The  $L_{den}$  at the unattended monitoring location measured 66dB  $L_{den}$ .

*Charlemont*

The survey results for the unattended monitoring locations within AZ4 at Charlemont are presented in Table 24.

Survey date	Daytime			Evening	Night-time		$L_{den}$
	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	
<b>UT51</b>							
02/05/2019	62	63	40	60	56	36	65
03/05/2019	62	63	42	61	51	41	63
04/05/2019	61	61	39	60	52	38	62
05/05/2019	59	59	37	59	48	34	60
06/05/2019	59	59	38	58	55	33	63
07/05/2019	62	63	43	60	56	43	65
08/05/2019	61	62	46	60	56	39	64
<b>Average</b>	<b>61</b>	<b>62</b>	<b>41</b>	<b>60</b>	<b>54</b>	<b>38</b>	<b>63</b>
<b>UT52</b>							
Survey date	$L_{Aeq,16hr}$	$L_{day}$	$L_{A90,16hr}$	$L_{evening}$	$L_{night}$	$L_{A90,8hr}$	$L_{den}$
02/05/2019	58	59	44	55	53	40	61
03/05/2019	58	58	46	58	50	43	60
04/05/2019	56	56	42	56	50	40	58
05/05/2019	54	54	41	55	48	37	57
06/05/2019	54	54	42	54	47	35	56
07/05/2019	58	58	45	57	49	40	59
08/05/2019	61	62	49	58	49	40	62
<b>Average</b>	<b>57</b>	<b>58</b>	<b>44</b>	<b>56</b>	<b>50</b>	<b>39</b>	<b>59</b>

**Table 24** Unattended noise survey results for UT51 to UT52 (AZ4)

Noise monitoring locations at Charlemont are influenced predominately by road traffic along the surrounding road network, the Luas rail line in addition local sources from residential and commercial units. Highest noise levels were recorded at the survey location which bounds the Luas Green Line (UT51).

During daytime periods, average ambient noise levels were measured in the range of 57 to 61 dB  $L_{Aeq,16hr}$ . Average background noise levels were measured in the range of 41 to 44 dB  $L_{A90,16hr}$ .

Night-time noise levels at the monitoring locations are influenced by surrounding road traffic, Luas rail pass by's in addition to surrounding suburban sources. Average ambient night-time noise levels were measured in the range of 50 to 54 dB  $L_{Aeq,8hr}$ . Average background noise levels during this time period were measured in the range of 38 to 39 dB  $L_{A90,8hr}$ .

The measured  $L_{den}$  values in this study area ranged between 59 and 63 dB  $L_{den}$ .

**3.4.2 Attended Surveys**

The survey results for the attended monitoring locations within AZ4 are presented in Table 25 overleaf.

Survey Location Ref	Date	Start Time	Measured Noise Levels (dB re.2x10 <sup>-5</sup> Pa)			Derived L <sub>den</sub>	Notes
			L <sub>Aeq</sub>	L <sub>AF10</sub>	L <sub>AF90</sub>		
<i>Ballymun</i>							
AT18	24/10/2018	14:57	57	58	53	59	Local traffic regular & dominant noise source when passing, aircraft activities from Dublin airport rustling foliage As above with motorbike passing nearby.
		15:39	56	57	53		
		16:25	57	59	52		
AT19	30/10/2018	11:18	50	50	43	55	R108 traffic dominant, regular side road traffic, bird song, passing pedestrians As above, car siren passing and aircraft overhead
		11:58	52	55	43		
		12:35	52	56	43		
AT20	30/10/2018	10:59	65	69	56	68	R108 traffic distant, movements at nearby carpark, occasional local traffic, bird songs, plant noise from nearby apartment building
		11:39	65	69	54		
		12:18	70	69	55		
AT21	30/10/2018	15:07	69	73	58	72	R108 traffic dominant, passing pedestrians, bird song, occasional local traffic in carpark, bin collections nearby As above with vehicle siren noted and dog barking
		15:44	69	72	60		
		16:19	70	73	62		
AT22	30/10/2018	14:49	68	71	59	70	R108 traffic dominant, buses passing and stopping regularly near monitoring location, passing pedestrians
		15:24	68	72	60		
		16:01	68	72	60		
<i>Collins Avenue</i>							
AT23	01/11/2018	10:49	67	70	58	69	R108 traffic dominant, passing pedestrians, rustling foliage, bird song. Leaf blower audible from nearby location R108 traffic dominant, car siren, church bells ringing, passing pedestrians, rustling foliage, bird song.
		11:45	66	70	51		
		12:41	65	69	54		
AT24	01/11/2018	11:07	70	74	62	72	R108 traffic, rustling foliage, bird song, overhead aircraft R108 traffic, distant power washer, passing pedestrians, rustling foliage, bird song, aircraft overhead R108 traffic, passing pedestrians, rustling foliage, bird song, aircraft overhead
		12:03	69	72	59		
		13:01	68	72	58		
AT25	01/11/2018	11:25	65	68	56	68	R108 traffic, pedestrian crossing beacon, passing pedestrians, foliage, planes, birds
		12:21	65	69	55		
		13:19	66	69	56		
ATT63	13/05/2022	10:03	68	71	60	70	Road traffic on R108 and R103 dominate, beeping horns Road traffic on R108 and R103, pedestrians and birdsong also audible R108 and R103 road traffic, beeping traffic lights audible during traffic lull
		10:52	67	70	58		
		11:38	67	71	57		
<i>Albert College Park</i>							
AT26	01/11/2018	14:05	60	63	50	63	Local traffic dominant, R108 traffic dominant when local traffic not present, overhead aircraft, rustling foliage, bird song, pedestrian crossing beacon
		14:59	59	62	50		

Survey Location Ref	Date	Start Time	Measured Noise Levels (dB re.2x10 <sup>-5</sup> Pa)			Derived L <sub>den</sub>	Notes
			L <sub>Aeq</sub>	L <sub>AF10</sub>	L <sub>AF90</sub>		
		15:53	61	63	50		As above with motorbike pass by and car siren.
AT27	01/11/2018	14:21	48	50	45	52	Bird song & rustling foliage, distant R108 traffic, overhead aircraft, distant M50 traffic
		15:16	47	48	45		As above with activity from nearby sports ground
		16:10	49	51	47		
AT28	01/11/2018	14:41	72	75	62	71	R108 traffic dominant, passing pedestrians, building alarm in distance
		15:35	68	70	62		As above with localised vehicle movements noted also.
		16:29	68	70	62		R108 traffic dominant, passing pedestrians
AT64	13/05/2022	10:29	67	71	55	69	Road traffic along R108 dominates with some local traffic on Hampstead Avenue
		11:15	66	70	57		Road traffic on R108 and local traffic on Hampstead Avenue, pedestrians and car alarms audible
		12:01	67	70	56		Road traffic on R108 and Hampstead Avenue, tractor lawnmower in park
<b>Griffith Park</b>							
AT29	26/03/2019	10:32	62	65	52	65	R108 traffic dominant, local traffic dominant when present. Birdsong, rustling foliage, activities within adjacent carpark, activities within adjacent school yard
		12:20	62	65	52		
AT30	26/03/2019	10:53	51	52	47	54	R108 traffic dominant, local traffic dominant when present Intermittent construction noise, distant activities from sports ground, birdsong, aircraft overhead
		12:38	54	53	46		As above with car horn sounding
AT31	26/03/2019	11:54	58	55	44	56	R108 traffic dominant, local traffic dominant when present Birdsong, children in school yard, distant activities from sports ground, intermittent construction noise.
		13:25	52	55	45		
AT32	26/03/2019	11:30	57	61	48	61	R108 traffic dominant, local traffic dominant when present, Birdsong, aircraft overhead, children in school yard, , intermittent construction noise.
AT33 <sup>Note 1</sup>	26/03/2019	11:12	52	53	48	54	Movements in carpark dominant when present, R108 audible during lulls, pedestrian movements birdsong, distant reverse beacon intermittent
		12:57	51	53	46		
<b>Glasnevin / Whitworth</b>							
AT34	22/05/2019	11:51	47	49	39	50	Distant road traffic along R108, intermittent local traffic, birdsong, train pass by approx. 5 min intervals, distant construction noise
		13:31	45	47	40		
		15:27	45	47	42		
AT35	22/05/2019	13:02	58	59	57	59	Road traffic along R108, birdsong pedestrian conversation, train pass by approx. 5 min intervals
		14:59	58	57	56		As above train pass by at approx. 11 min intervals
		16:38	58	59	57		Road traffic along R108, birdsong, pedestrian conversation, train pass by approx. 5 min intervals

Survey Location Ref	Date	Start Time	Measured Noise Levels (dB re.2x10 <sup>-5</sup> Pa)			Derived L <sub>den</sub>	Notes
			L <sub>Aeq</sub>	L <sub>AF10</sub>	L <sub>AF90</sub>		
AT36	22/05/2019	12:39	70	72	63	71	Road traffic along R108, birdsong, large truck reversing, frequent buses, pedestrian conversation, train pass by approx. 5 min intervals
		14:32	72	73	63		
		16:16	70	73	62		
AT37	22/05/2019	12:15	51	53	47	55	Birdsong, cyclists, distant sirens
		14:10	51	53	47		Birdsong, pedestrian conversation, 2 train pass by's, car horn
		15:57	53	55	48		Birdsong, pedestrian conversation, 3 train pass by's, train horn
AT65	16/05/2022	10:43	66	69	58	67	Road traffic on R108 dominant, pedestrians on footpath and bus stop audible
		11:48	69	68	57		R108 road traffic, emergency vehicle siren
		13:27	65	68	56		Road traffic on R108 dominant, foliage blowing in breeze
	16/06/2022	00:44	48	48	41	N/A	R108 traffic, bins emptying, car door noises, train horn
		02:17	45	48	39		R108 traffic, duck and cat noises
		03:32	45	48	38		R108 traffic, canal flow, animal sounds
AT66	16/05/2022	11:08	53	56	48	57	Pedestrians on canal walkway dominant with R108 traffic less significant, Waterways Ireland works audible
		12:49	54	56	49		Canal walkway pedestrians, canal water flow, tonal reverse alarms
		13:49	54	57	50		Canal walkway pedestrians, overhead helicopter, train movement and train horn
	16/06/2022	01:03	54	57	47	N/A	Canal flow, pedestrians talking and playing music
		02:36	48	50	46		Canal flow, road traffic on R108
		03:53	49	50	46		Canal flow, duck quacks, birdsong
AT67	16/05/2022	11:26	63	66	55	66	Road traffic on R108 and Eglinton Terrace, pedestrian activity audible
		13:06	63	66	55		Road traffic on R108 and Eglinton Terrace, canal water flow
		14:06	62	65	54		Road traffic on R108 and Eglinton Terrace, canal water flow and pedestrian activity
	16/06/2022	01:25	65	69	53	N/A	R108 road traffic, pedestrian activity, canal flow, train movement
		02:53	66	70	53		R108 road traffic - delivery trucks, canal flow
		04:09	65	68	52		R108 traffic - bin lorries, road sweepers, birdsong, canal flow
<i>Mater Hospital/ Eccels Street/ Berkeley Road</i>							
AT38	16/04/2019	10:48	70	72	63	71	Road traffic dominant, pedestrian conversation, bus every 5 minutes, birdsong
		12:26	69	72	60		Road traffic dominant, car horn, bin truck, HGV noise significant, pedestrian conversation, birdsong
		14:02	69	72	61		Road traffic dominant, pedestrian conversation, bus every 5 minutes, birdsong
AT39	16/04/2019	11:06	61	64	53	64	Road traffic dominant, nearby construction noise, pedestrian conversation, siren, birdsong
		12:46	61	65	54		

Survey Location Ref	Date	Start Time	Measured Noise Levels (dB re.2x10 <sup>-5</sup> Pa)			Derived L <sub>den</sub>	Notes
			L <sub>Aeq</sub>	L <sub>AF10</sub>	L <sub>AF90</sub>		
		14:21	67	64	53		Road traffic dominant, nearby construction noise, delivery truck movements, car horn, pedestrian conversation, birdsong
AT40	16/04/2019	12:07	63	67	54	67	Road traffic dominant, pedestrian conversation, bus every 5 minutes, truck idling nearby, birdsong
		13:44	64	67	54		
		15:22	64	67	54		
AT41	16/04/2019	11:27	60	58	50	59	Road traffic dominant, pedestrian conversation, bin truck, vehicle siren, birdsong
		13:05	57	59	50		Road traffic dominant, pedestrian conversation, bus every 5 minutes, birdsong
		14:42	56	58	60		Road traffic dominant, van unloading and reverse beacon, car horn, pedestrian conversation, bus every 5 minutes, birdsong
AT42	16/04/2019	11:48	64	67	54	68	Road traffic dominant, pedestrian conversation, birdsong
		13:25	65	69	50		Road traffic dominant, distant construction noise, noise from inside hospital - cheering, pedestrian conversation, birdsong
		15:04	64	68	50		Road traffic dominant, distant construction noise, pedestrian conversation, siren, birdsong
AT68	16/05/2022	14:31	62	66	53	67	Road traffic on Eccles Street, delivery trucks unloading, tonal reverse alarms
		15:15	63	67	51		Road traffic on Eccles Street, pedestrian activity, nearby construction work slightly audible
		15:49	64	68	50		Road traffic on Eccles street, increased pedestrian footfall
AT69	16/05/2022	14:58	64	67	51	66	Road traffic on Berkeley Road most dominant with significant bus volume, car alarms, beeping horns
		15:32	63	66	51		Road traffic on Berkeley Road, bus beeping horn, emergency sirens
		16:06	64	67	52		Road traffic on Berkeley Road, increased pedestrian footfall
<i>O'Connell Street</i>							
ATT70	17/05/2022	11:18	62	65	56	65	Traffic on O'Rahilly parade and Moore Lane dominant, delivery trucks unloading, industrial fan
		11:55	63	63	52		Traffic on O'Rahilly Parade/Moore Lane, pedestrian activity
		12:32	66	69	57		Traffic on O'Rahilly Parade/Moore Lane, street sweeper, tonal alarms
ATT71	17/05/2022	11:37	58	60	56	61	Pedestrian footfall and talking, cars turning on Henry Place
		12:13	58	60	56		Pedestrian activity, bins emptying
		12:58	60	61	57		Pedestrian activity, delivery drivers unloading
<i>Tara Street</i>							
AT43	16/04/2019	12:22	62	65	57	68	Traffic dominant, cars exiting adjacent carpark, pedestrian conversations, nearby man-hole works, train movements audible, distant construction noise, footpath sweeper, birdsong
		13:16	66	67	57		

Survey Location Ref	Date	Start Time	Measured Noise Levels (dB re.2x10 <sup>-5</sup> Pa)			Derived L <sub>den</sub>	Notes
			L <sub>Aeq</sub>	L <sub>AF10</sub>	L <sub>AF90</sub>		
		14:10	72	74	58		Traffic dominant, construction works nearby, cars exiting adjacent carpark, train movements audible, distant construction noise, birdsong
AT44	16/04/2019	11:46	68	73	57	71	Traffic dominant, train noise dominant when present, construction noise from nearby site, pedestrians, birdsong
		12:41	66	71	56		
		13:35	66	72	56		
AT45	16/04/2019	12:04	71	74	63	72	Local traffic dominant when present, traffic along surrounding road network dominant, pedestrian crossing beacon, nearby van loading, pedestrians, train noise significant when present, birdsong
		12:58	70	73	61		
		13:52	70	73	62		
<b>St Stephens Green</b>							
AT46	14/05/2019	11:05	66	69	61	68	Road traffic, birdsong, pedestrian conversations, car horns, bus passes every 5 minutes
		12:21	66	69	61		
		14:12	65	68	59		
AT47	14/05/2019	11:24	69	71	63	70	Road traffic, bus pass by's every 5 minutes tour bus commentator, pedestrian conversation, birdsong
		12:39	68	71	59		
		14:30	68	71	58		
AT48	14/05/2019	11:43	68	71	61	70	Road traffic, pedestrian conversations ,bus passes every 3 minutes, birdsong, occasional car horn
		12:57	68	70	61		As above, bus passes every 5 minutes
		14:47	68	71	55		
AT49	14/05/2019	12:02	68	71	60	71	Road traffic, pedestrian conversation, construction noise, birdsong, car horn
		13:16	74	72	61		
		15:06	69	72	60		
<b>Charlemont</b>							
ATT72	19/05/2022	10:25	64	68	55	67	Construction noise from site across road, Dartmouth Road traffic, nearby Luas line
		10:58	64	68	53		Construction noise, delivery trucks, Dartmouth Road traffic, nearby Luas line
		11:31	63	67	57		Construction site noise, Dartmouth Road traffic, Luas line, pedestrians
ATT73	19/05/2022	10:41	61	64	51	65	Construction site noise, elevated Luas line noise, intermittent traffic on Dartmouth Place
		11:14	63	65	53		Construction site noise, Luas line noise, nearby Montessori noise
		11:47	64	65	53		Construction site noise, Luas line, pedestrians

**Table 25** Attended Survey results for AZ4

#### **4.0 SUMMARY AND CONCLUSION**

Baseline noise monitoring has been undertaken at 125 locations across the Metrolink study area to inform the baseline study for the airborne noise and vibration chapter of the Metrolink EIA.

The survey locations have been selected to gain a representative range of noise levels associated with the nearest noise sensitive areas which have the potential to be impacted by construction works and/or those likely to be impacted during the operational phase of the Metrolink Project.

Long-term surveys (typically one week in duration) were made at a total of 52 locations. Short-term surveys (attended day-time measurements), made at a total of 73 locations along the length of the proposed Project were used to supplement the long-term surveys.

The majority of noise sensitive buildings and areas along the length of the Metrolink project are in urban and suburban areas located in proximity to busy roads. Road traffic is the dominant source of noise noted at all survey locations with noise sensitive properties immediately adjacent to road boundaries recording the highest noise levels.



## **APPENDIX A**

### **Calibration Certificate for Monitoring Equipment**

**Rion NL-52 S/N 1076328**



**CERTIFICATE  
OF CALIBRATION**



0653

**Date of Issue: 15 August 2018**

**Certificate Number: UCRT18/1836**

Issued by:  
 ANV Measurement Systems  
 Beaufort Court  
 17 Roebuck Way  
 Milton Keynes MK5 8HL  
 Telephone 01908 642846 Fax 01908 642814  
 E-Mail: info@noise-and-vibration.co.uk  
 Web: www.noise-and-vibration.co.uk  
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages

Approved Signatory



J. Harriman

**Customer**                      AWN Consulting Limited  
 The Tecpro Building  
 IDA Business and Technology Park  
 Dublin 17  
 Ireland

**Order No.**                      1869  
**Description**                 Sound Level Meter / Pre-amp / Microphone / Associated Calibrator  
**Identification**

Manufacturer	Instrument	Type	Serial No. / Version
Rion	Sound Level Meter	NL-52	01076328
Rion	Firmware		1.9
Rion	Pre Amplifier	NH-25	76545
Rion	Microphone	UC-59	12271
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

**Performance Class**         1  
**Test Procedure**             TP 2.SLM 61672-3 TPS-49  
*Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*  
**Type Approved to IEC 61672-1:2002**    YES            **Approval Number**        21.21 / 13.02  
*If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003*  
**Date Received**             13 August 2018                      **ANV Job No.**        UKAS18/08513  
**Date Calibrated**           15 August 2018

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	Dated	Certificate No.	Laboratory
	Initial Calibration		

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<b>CERTIFICATE OF CALIBRATION</b>	<b>Certificate Number</b> <b>UCRT18/1836</b>
	Page 2 of 2 Pages
UKAS Accredited Calibration Laboratory No. 0653	

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52
SLM instruction manual ref / issue		11-03
SLM instruction manual source	Manufacturer	
Internet download date if applicable		N/A
Case corrections available		Yes
Uncertainties of case corrections		Yes
Source of case data	Manufacturer	
Wind screen corrections available		Yes
Uncertainties of wind screen corrections		Yes
Source of wind screen data	Manufacturer	
Mic pressure to free field corrections		Yes
Uncertainties of Mic to F.F. corrections		Yes
Source of Mic to F.F. corrections	Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes	
Specified or equivalent Calibrator	Specified	
Customer or Lab Calibrator	Lab Calibrator	
Calibrator adaptor type if applicable	NC-74-002	
Calibrator cal. date	06 August 2018	
Calibrator cert. number	UCRT18/1784	
Calibrator cal cert issued by	0653	
Calibrator SPL @ STP	93.99	dB Calibration reference sound pressure level
Calibrator frequency	1001.97	Hz Calibration check frequency
Reference level range	25 - 130	dB

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15  
 Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	22.84	22.87	± 0.30 °C
Humidity	49.8	49.7	± 3.00 %RH
Ambient Pressure	100.67	100.63	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.			
Initial indicated level	93.9	dB	Adjusted indicated level
			94.0
			dB
The uncertainty of the associated calibrator supplied with the sound level meter ±			0.10
			dB

Self Generated Noise	This test is currently not performed by this Lab.		
Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device -	UR = Under Range indicated		
Weighting	A	C	Z
	11.5	15.5	21.4
	dB	dB	dB
	UR	UR	UR
Uncertainty of the electrical self generated noise ±	0.12		
	dB		

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

..... END .....

Calibrated by: A Patel

R 1

Additional Comments

None

**Rion NL-52 S/N 586940**



**CERTIFICATE  
OF CALIBRATION**



**Date of Issue: 15 August 2018**

**Certificate Number: UCRT18/1831**

Issued by:  
ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes MK5 8HL  
Telephone 01908 642846 Fax 01908 642814  
E-Mail: info@noise-and-vibration.co.uk  
Web: www.noise-and-vibration.co.uk  
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages
Approved Signatory
J. Harriman

**Customer**                      **AWN Consulting Limited**  
The Tecpro Building  
IDA Business and Technology Park  
Dublin 17  
Ireland

<b>Order No.</b>	1869																												
<b>Description</b>	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator																												
<b>Identification</b>	<table border="0"> <thead> <tr> <th><i>Manufacturer</i></th> <th><i>Instrument</i></th> <th><i>Type</i></th> <th><i>Serial No. / Version</i></th> </tr> </thead> <tbody> <tr> <td>Rion</td> <td>Sound Level Meter</td> <td>NL-52</td> <td>00586940</td> </tr> <tr> <td>Rion</td> <td>Firmware</td> <td></td> <td>1.9</td> </tr> <tr> <td>Rion</td> <td>Pre Amplifier</td> <td>NH-25</td> <td>87059</td> </tr> <tr> <td>Rion</td> <td>Microphone</td> <td>UC-59</td> <td>13402</td> </tr> <tr> <td>Rion</td> <td>Calibrator</td> <td>NC-74</td> <td>34536109</td> </tr> <tr> <td></td> <td>Calibrator adaptor type if applicable</td> <td></td> <td>NC-74-002</td> </tr> </tbody> </table>	<i>Manufacturer</i>	<i>Instrument</i>	<i>Type</i>	<i>Serial No. / Version</i>	Rion	Sound Level Meter	NL-52	00586940	Rion	Firmware		1.9	Rion	Pre Amplifier	NH-25	87059	Rion	Microphone	UC-59	13402	Rion	Calibrator	NC-74	34536109		Calibrator adaptor type if applicable		NC-74-002
<i>Manufacturer</i>	<i>Instrument</i>	<i>Type</i>	<i>Serial No. / Version</i>																										
Rion	Sound Level Meter	NL-52	00586940																										
Rion	Firmware		1.9																										
Rion	Pre Amplifier	NH-25	87059																										
Rion	Microphone	UC-59	13402																										
Rion	Calibrator	NC-74	34536109																										
	Calibrator adaptor type if applicable		NC-74-002																										

**Performance Class**      1  
**Test Procedure**            TP 2.SLM 61672-3 TPS-49  
*Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*

**Type Approved to IEC 61672-1:2002**    YES      **Approval Number**      21.21 / 13.02  
*If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003*

**Date Received**            13 August 2018                      **ANV Job No.**      UKAS18/08513  
**Date Calibrated**        15 August 2018

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

<b>Previous Certificate</b>	<i>Dated</i>	<i>Certificate No.</i>	<i>Laboratory</i>
	Initial Calibration		

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<b>CERTIFICATE OF CALIBRATION</b>	<b>Certificate Number</b> <b>UCRT18/1831</b>
	Page 2 of 2 Pages

UKAS Accredited Calibration Laboratory No. 0653

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52
SLM instruction manual ref / issue		11-03
SLM instruction manual source	Manufacturer	
Internet download date if applicable		N/A
Case corrections available		Yes
Uncertainties of case corrections		Yes
Source of case data	Manufacturer	
Wind screen corrections available		Yes
Uncertainties of wind screen corrections		Yes
Source of wind screen data	Manufacturer	
Mic pressure to free field corrections		Yes
Uncertainties of Mic to F.F. corrections		Yes
Source of Mic to F.F. corrections	Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes	
Specified or equivalent Calibrator		Specified
Customer or Lab Calibrator		Lab Calibrator
Calibrator adaptor type if applicable		NC-74-002
Calibrator cal. date		06 August 2018
Calibrator cert. number		UCRT18/1784
Calibrator cal cert issued by		0653
Calibrator SPL @ STP	93.99	dB Calibration reference sound pressure level
Calibrator frequency	1001.97	Hz Calibration check frequency
Reference level range	25 - 130	dB

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15  
 Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	21.89	22.52	± 0.30 °C
Humidity	61.4	53.7	± 3.00 %RH
Ambient Pressure	100.71	100.68	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.0	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A	C	Z
	11.4	15.5	21.5
	dB	dB	dB
	UR	UR	UR

Uncertainty of the electrical self generated noise ± 0.12 dB

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

END

Calibrated by: A Patel

R 1

Additional Comments

None

**Rion NL-52 S/N 586944**



**CERTIFICATE OF CALIBRATION**



**Date of Issue: 16 August 2018**

**Certificate Number: UCRT18/1839**

Issued by:  
 ANV Measurement Systems  
 Beaufort Court  
 17 Roebuck Way  
 Milton Keynes MK5 8HL  
 Telephone 01908 642846 Fax 01908 642814  
 E-Mail: info@noise-and-vibration.co.uk  
 Web: www.noise-and-vibration.co.uk  
Acoustic Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages  
 Approved Signatory  
  
 J. Harriman

**Customer**                      **AWN Consulting Limited**  
 The Tecpro Building  
 IDA Business and Technology Park  
 Dublin 17  
 Ireland

<b>Order No.</b>	1869			
<b>Description</b>	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
<b>Identification</b>	<i>Manufacturer</i>	<i>Instrument</i>	<i>Type</i>	<i>Serial No. / Version</i>
	Rion	Sound Level Meter	NL-52	00586944
	Rion	Firmware		1.9
	Rion	Pre Amplifier	NH-25	87063
	Rion	Microphone	UC-59	13407
	Rion	Calibrator	NC-74	34536109
		Calibrator adaptor type if applicable		NC-74-002

**Performance Class**            **1**  
**Test Procedure**                **TP 2.SLM 61672-3 TPS-49**  
*Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*  
**Type Approved to IEC 61672-1:2002**   **YES**    **Approval Number**    **21.21 / 13.02**  
*If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003*  
**Date Received**                **15 August 2018**                      **ANV Job No.**    **UKAS18/08525**  
**Date Calibrated**              **16 August 2018**

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

<b>Previous Certificate</b>	<i>Dated</i>	<i>Certificate No.</i>	<i>Laboratory</i>
	<b>Initial Calibration</b>		

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<b>CERTIFICATE OF CALIBRATION</b>	<b>Certificate Number</b> UCRT18/1839
	Page 2 of 2 Pages
UKAS Accredited Calibration Laboratory No. 0653	

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52
SLM instruction manual ref / issue		11-03
SLM instruction manual source	Manufacturer	
Internet download date if applicable		N/A
Case corrections available	Yes	
Uncertainties of case corrections	Yes	
Source of case data	Manufacturer	
Wind screen corrections available	Yes	
Uncertainties of wind screen corrections	Yes	
Source of wind screen data	Manufacturer	
Mic pressure to free field corrections	Yes	
Uncertainties of Mic to F.F. corrections	Yes	
Source of Mic to F.F. corrections	Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes	
Specified or equivalent Calibrator	Specified	
Customer or Lab Calibrator	Lab Calibrator	
Calibrator adaptor type if applicable	NC-74-002	
Calibrator cal. date	06 August 2018	
Calibrator cert. number	UCRT18/1784	
Calibrator cal cert issued by	0653	
Calibrator SPL @ STP	93.99	dB Calibration reference sound pressure level
Calibrator frequency	1001.97	Hz Calibration check frequency
Reference level range	25 - 130	dB

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15  
 Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	21.53	22.10	± 0.30 °C
Humidity	60.5	62.5	± 3.00 %RH
Ambient Pressure	100.16	100.15	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.0	dB	Adjusted indicated level	94.0	dB	
The uncertainty of the associated calibrator supplied with the sound level meter ±			0.10			dB

Self Generated Noise This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device -	UR = Under Range indicated					
Weighting	A		C		Z	
	11.3	dB UR	15.3	dB UR	21.4	dB UR

Uncertainty of the electrical self generated noise ±	0.12	dB
--	------	----

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

END

Calibrated by: A Patel

R 1

Additional Comments

None

**Rion NL-52 S/N 1076330**



**CERTIFICATE  
OF CALIBRATION**



0653

**Date of Issue: 15 August 2018**

**Certificate Number: UCRT18/1834**

Issued by:  
ANV Measurement Systems  
Beaufort Court  
17 Roebuck Way  
Milton Keynes MK5 8HL  
Telephone 01908 642846 Fax 01908 642814  
E-Mail: info@noise-and-vibration.co.uk  
Web: www.noise-and-vibration.co.uk  
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages
Approved Signatory    J. Harriman

**Customer**                    AWN Consulting Limited  
The Tecpro Building  
IDA Business and Technology Park  
Dublin 17  
Ireland

**Order No.**                    1869  
**Description**                Sound Level Meter / Pre-amp / Microphone / Associated Calibrator  
**Identification**

<i>Manufacturer</i>	<i>Instrument</i>	<i>Type</i>	<i>Serial No. / Version</i>
Rion	Sound Level Meter	NL-52	01076330
Rion	Firmware		1.9
Rion	Pre Amplifier	NH-25	76547
Rion	Microphone	UC-59	12273
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

**Performance Class**        1  
**Test Procedure**            TP 2.SLM 61672-3 TPS-49  
*Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*  
**Type Approved to IEC 61672-1:2002**    **YES**    **Approval Number**    21.21 / 13.02  
*If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003*  
**Date Received**            13 August 2018                    **ANV Job No.**        UKAS18/08513  
**Date Calibrated**         15 August 2018

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

<b>Previous Certificate</b>	<i>Dated</i>	<i>Certificate No.</i>	<i>Laboratory</i>
	Initial Calibration		

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

<b>CERTIFICATE OF CALIBRATION</b>	<b>Certificate Number</b>
	<b>UCRT18/1834</b>
	Page 2 of 2 Pages

UKAS Accredited Calibration Laboratory No. 0653

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.			
SLM instruction manual title	Sound Level Meter	NL-42 / NL-52	
SLM instruction manual ref / issue		11-03	
SLM instruction manual source	Manufacturer		
Internet download date if applicable	N/A		
Case corrections available	Yes		
Uncertainties of case corrections	Yes		
Source of case data	Manufacturer		
Wind screen corrections available	Yes		
Uncertainties of wind screen corrections	Yes		
Source of wind screen data	Manufacturer		
Mic pressure to free field corrections	Yes		
Uncertainties of Mic to F.F. corrections	Yes		
Source of Mic to F.F. corrections	Manufacturer		
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes		
Specified or equivalent Calibrator	Specified		
Customer or Lab Calibrator	Lab Calibrator		
Calibrator adaptor type if applicable	NC-74-002		
Calibrator cal. date	06 August 2018		
Calibrator cert. number	UCRT18/1784		
Calibrator cal cert issued by	0653		
Calibrator SPL @ STP	93.99	dB	Calibration reference sound pressure level
Calibrator frequency	1001.97	Hz	Calibration check frequency
Reference level range	25 - 130	dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15  
 Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	22.73	22.92	± 0.30 °C
Humidity	52.2	50.8	± 3.00 %RH
Ambient Pressure	100.66	100.65	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.			
Initial indicated level	94.0	dB	Adjusted indicated level
			94.0 dB
The uncertainty of the associated calibrator supplied with the sound level meter ±	0.10 dB		

Self Generated Noise This test is currently not performed by this Lab.  
 Microphone installed (if requested by customer) = Less Than N/A dB A Weighting  
 Uncertainty of the microphone installed self generated noise ± N/A dB

Microphone replaced with electrical input device -				UR = Under Range indicated			
Weighting	A	C	Z				
	11.5	15.4	21.6	dB	dB	dB	dB
				UR	UR	UR	UR
Uncertainty of the electrical self generated noise ±	0.12			dB			

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

..... END .....

Calibrated by: A Patel R 1

Additional Comments  
None

**APPENDIX B**  
**Unattended Monitoring Equipment Set Up**

Location	Equipment Set up
<p style="text-align: center;"><b>UT1</b></p> <p>Green area to front of residential and farm buildings in Lissenhall Great</p>	
<p style="text-align: center;"><b>UT2</b></p> <p>Green area within grounds of Emmaus Retreat Centre, Estuary</p>	
<p style="text-align: center;"><b>UT3</b></p> <p>Green area to rear of Tigín Montessoi School, Estuary</p>	

Location	Equipment Set up
<p><b>UT4</b></p> <p>Rear Garden of residential building in Seatown Park, Swords</p>	 <p>A photograph showing a surveying instrument mounted on a black tripod in a residential garden. The instrument is positioned on a paved area next to a concrete wall. In the background, there are trees and a pink and white playhouse.</p>
<p><b>UT5</b></p> <p>At side of residential building in Estuary Court, Swords</p>	 <p>A photograph showing a surveying instrument on a tripod positioned next to a residential building. The instrument is on a paved area, and a brown bin is visible in the foreground. The building is a light-colored structure with a window.</p>
<p><b>UT6</b></p> <p>Rear Garden of residential building in Comyn Manor, Swords</p>	 <p>A photograph showing a surveying instrument on a tripod in a residential garden. The instrument is positioned on a paved area next to a white building with a window. A wooden fence and a metal frame are also visible in the background.</p>

Location	Equipment Set up
<p><b>UT7</b></p> <p>Rear Garden of Kids Inc. Creche, Seatown Walk, Swords</p>	
<p><b>UT8</b></p> <p>Rear Garden of residential building on Chapel Lane, Swords</p>	
<p><b>UT9</b></p> <p>Rear Garden of residential building on Ashley Avenue, Swords</p>	
<p><b>UT10</b></p> <p>Rear Garden of residential building in Castle Grove, Swords</p>	

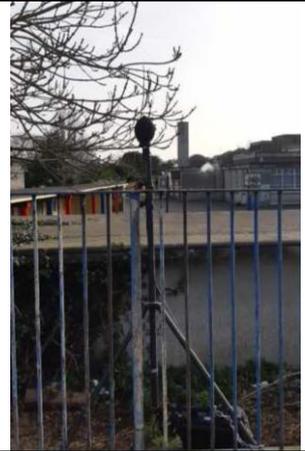
Location	Equipment Set up
<p><b>UT11</b></p> <p>Rear Garden of residential building in Foxwood, Swords</p>	
<p><b>UT12</b></p> <p>Green Area to rear of commercial building in Airside Business Park, Swords</p>	
<p><b>UT13</b></p> <p>Rear Garden of residential building in Carlton Court, Swords</p>	

Location	Equipment Set up
<p><b>UT14</b></p> <p>Green area to side of Hotel at Pinnock Hill Roundabout, Swords</p>	
<p><b>UT15</b></p> <p>Green area to front of residential building at Cremona, Swords</p>	
<p><b>UT16</b></p> <p>Rear Garden of residential building in Boroimhe Willows, Airside</p>	
<p><b>UT17</b></p> <p>Carpark area to side of Private Clinic in Nevinstown West</p>	

Location	Equipment Set up
<p><b>UT18</b> Rear Garden of residential building in Boraimhe Hazel, Nevinstown West</p>	 <p>A photograph showing a tall, black antenna mounted on a tripod. The antenna is positioned in a garden area next to a grey stone wall. A small wooden doghouse is visible in the foreground to the left of the tripod. The sky is overcast.</p>
<p><b>UT19</b> Rear Garden of residential building in Nevinstown West off R132</p>	 <p>A photograph showing a tall, black antenna on a tripod. The antenna is located in a garden area with a green lawn and a wooden fence. In the background, there are trees and a residential building under a cloudy sky.</p>
<p><b>UT20</b> Rear Garden of residential building in Nevinstown West off R132</p>	 <p>A photograph showing a tall, black antenna mounted on a vertical pole. The antenna is situated in a garden area with a green lawn and a wooden fence. A street lamp is visible in the background, and the sky is overcast.</p>

Location	Equipment Set up
<p><b>UT21</b></p> <p>Rear garden of the Dublin Airport Church grounds</p>	
<p><b>UT22</b></p> <p>Rear Garden of residential building off Old Airport Road</p>	
<p><b>UT23</b></p> <p>Green area within grounds of residential building in Charter School Hill, Ballymun Cross</p>	
<p><b>UT24</b></p> <p>Garden to rear of residential apartment building at junction of Ballymun Road and Santry Avenue</p>	

Location	Equipment Set up
<p><b>UT25</b></p> <p>Garden to rear of Primary Education building in Ballymun</p>	
<p><b>UT26</b></p> <p>On roof of Civic Centre building in Ballymun</p>	
<p><b>UT27</b></p> <p>Garden to side of Secondary Education building off Ballymun Road</p>	

Location	Equipment Set up
<p><b>UT28</b></p> <p>Paved area to side of CDETB Building off Ballymun Road</p>	
<p><b>UT29</b></p> <p>Carpark area to front of Primary Education building off Ballymun Road</p>	
<p><b>UT30</b></p> <p>Carpark area to side of Church in Whitehall</p>	
<p><b>UT31</b></p> <p>Paved area to front of residential building off R108 in Whitehall</p>	

Location	Equipment Set up	
<p><b>UT32</b></p> <p>Green area within grounds of Special Education building off Ballymun Road in Ballygall</p>		
<p><b>UT33</b></p> <p>Green area to side of Scoil Chaitríona Secondary School building off St. Mobhi Road in Glasnevin</p>		
<p><b>UT34</b></p> <p>Paved area to front of residential building off St. Mobhi Road in Glasnevin</p>		

Location	Equipment Set up
<p><b>UT35</b></p> <p>Green area to side of Scoil mobhí Primary Education building off St. Mobhi Road in Glasnevin</p>	
<p><b>UT36</b></p> <p>Garden to rear of residential building in Claremont Crescent</p>	
<p><b>UT37</b></p> <p>Garden to rear of house on St. Teresa's Rd</p>	
<p><b>UT38</b></p> <p>Garden to rear of residential building in Claremont Lawns</p>	

Location	Equipment Set up
<p><b>UT39</b></p> <p>Garden to rear of residential building in Coke Oven Cottages</p>	
<p><b>UT41</b></p> <p>Garden to rear of residential building off Whitworth Road</p>	
<p><b>UT42</b></p> <p>Green area to front of Mater Hospital on Eccles St</p>	

Location	Equipment Set up
<p><b>UT43</b></p> <p>Green area to front of Mater Hospital on Eccles St</p>	
<p><b>UT44</b></p> <p>Green area to side of St Joseph's Church, Berkeley Road</p>	
<p><b>UT45</b></p> <p>To front of construction site off O'Connell Street Upper</p>	

Location	Equipment Set up
<p><b>UT46</b></p> <p>To rear of construction site off O'Connell Street Upper</p>	
<p><b>UT47</b></p> <p>To front of construction site/commercial carpark off O'Connell Street Upper</p>	
<p><b>UT48</b></p> <p>On roof of Fire Station building on Townsend Street</p>	
<p><b>UT49</b></p> <p>On roof of residential apartment building at Tara and Townsend Street junction</p>	

Location	Equipment Set up	
<p><b>UT50</b></p> <p>Green area within St. Stephen's Green maintenance compound</p>		
<p><b>UT51</b></p> <p>Paved area withing compound of disused commercial building off Grand Parade in Charlemont</p>		
<p><b>UT52</b></p> <p>Paved area withing compound of disused commercial building off Grand Parade in Charlemont</p>		