
Appendix 14.1
Baseline Noise &
Vibration Surveys

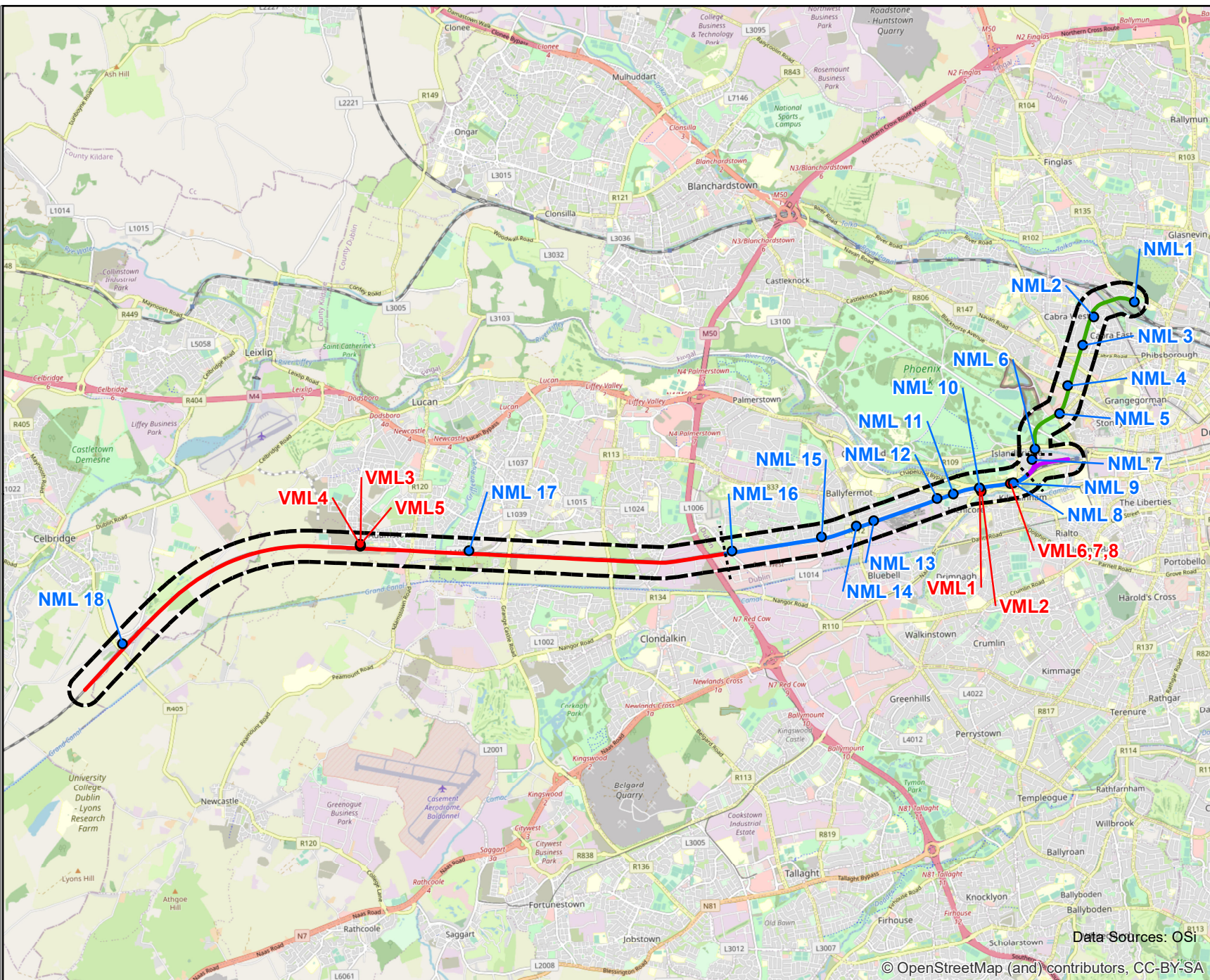
APPENDIX 14.1 BASELINE NOISE & VIBRATION SURVEYS

A.1. Baseline Noise and Vibration Surveys

Baseline noise and vibration surveys were carried out at representative locations over the length of the proposed Project.

A.1.1. Baseline Monitoring Locations

The baseline noise and vibration survey locations are shown in Figure A14-1 below and in drawing DP-04-23-DWG-EV-TTA-23782 of Volume 3A of this EIAR.



Legend

- Zone A: from Hazelhatch & Celbridge Station to West & Cherry Orchard Station
- Zone B: Park West & Cherry Orchard Station to Heuston
- Zone C: Heuston Station and Yard
- Zone D: From Liffey Bridge to Glasnevin Junction
- Zone Boundaries
- 250m Buffer
- Noise Monitoring Location (NML)
- Vibration Monitoring Location (VML)



Data Sources: OSi

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Rev	Date	Dm	Chkd	App'd	Description
v03	31/01/2023	MV	EM	EM	Noise and Vibration Monitoring Location
v02	28/10/2022	MV	EM	EM	Noise and Vibration Monitoring Location
v01	24/08/2022	MV	EM	EM	Noise and Vibration Monitoring Location

Engineering Designer: **ATKINS**

Supported by: **TYPES** and **RPS**

Date: 01/02/2023 Scale: 1:85,000 @ A4

Project Code: 5195886 Issuer: TTA

Drawn: MV Checked: EM Approved: EM

Project Title	DART + SOUTH WEST		
Drawing Title	Figure 14.3: Baseline Noise and Vibration Monitoring Locations		
Drawing File Name	DP-04-23-DWG-EV-TTA-23782	Version	v03
Status			S3

DO NOT SCALE USE FIGURED DIMENSIONS ONLY

A.2. Baseline Vibration Survey

A baseline vibration surveys were carried out at eight representative locations over the length of the proposed Project. The locations are shown in Figure A14-1 and the details are summarised in Table A14.1.

Measurements were undertaken in accordance with ISO 4866:2010 Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effects on structures. The measurement instrumentation was a Bruel and Kjaer Vibration Monitoring Terminal Type 3680 using a triaxial geophone and recording both Peak Particle Velocity and Vibration Dose Value. The geophone was mounted on three spikes to ensure good base contact and weighed down with a sandbag.

Table A14.1: Vibration Baseline Survey Details

Monitoring Location	ITM Co-ordinates		Location Description	Survey Dates
	Easting	Northing		
Con Colbert House	712041, 712068	733796, 733741	VMT1 outside Con Colbert House at foundation level. VMT2 inside at main building server room. Train vibrations noticeable but levels not of concern. Traffic/HGVs can be a source of vibration at VMT1. Self-induced vibration from servers main vibration source at VMT2.	13/04/2022 10:52 – 13:31 (external) 12:00 – 12:23 (internal)
Adamstown Park	702146, 702147, 702146	732864, 732877, 732897	VMT1 located 10m from the nearest track. VMT2 located 20m from the nearest track. VMT3 located 40m from the nearest track on footpaths.	05/05/2022 13:30 – 14:39
Kilmainham Square	712534, 712534, 712534	733868, 733868, 733868	VMT1 on the ground floor of the building nearest the tracks of Kilmainham square VMT2 on the 2nd floor and VMT3 on the 6th floor.	05/05/2022 10:20 – 11:59

A.2.1. Con Colbert House

Con Colbert house contains a computer data centre on the first floor of the westernmost block. Measurements were taken on a plinth at the north-western corner of the building and on the concrete floor in the server room. The computer servers are mounted directly onto this floor. Figure A14-2 shows the geophone installation prior to the deployment of the sandbags.



Figure A14-2 Con Colbert House Installation (External (left) and Server Room (right)).

A.2.2. Adamstown Park

Three VMTs were deployed at Adamstown at distances of 10m, 20m and 40m from the railway. Figure A14-3 shows the geophone installation at 10 m with the sandbag deployed. The purpose of having three VMTs in an array simultaneously was to determine the horizontal attenuation of vibration levels.



Figure A14-3 Adamstown 10m Installation

A.2.3. Kilmainham Square

Kilmainham Square is a high rise apartment complex immediately adjacent to the railway. Simultaneous vibration measurements were taken on three floors of the building to evaluate the potential for building resonances occurring and amplification of the vibration with height. Figure A14-4 shows the location of the measurement locations and the geophone installation prior to the deployment of the sandbag.



Figure A14-4 Kilmainham Square Installation

A.2.4. Vibration Monitoring Results

The vibration monitoring results indicate that vibration from railway traffic is low. Table 14.5 of Chapter 14 in Volume 2 of this EIAR indicated that Peak Particle Velocity (PPV) levels of 0.3 mm/s are at just perceptible levels in residential environments. As can be seen from the time series plots of vibration levels All measurements were lower than this perception level except for a single peak external measurement at the corner of Con Colbert House and a single measurement on the ground floor of Kilmainham Square when a steam train was passing by.

Table 14.8 of Chapter 14 in Volume 2 of this EIAR set out the Vibration Dose Values (VDV) that could result in adverse comment on the vibration level. It is noted that adverse comment is not expected below 0.2 - 0.4 m/s^{1.75} during the day and 0.1 - 0.2 m/s^{1.75} at night. Apart from the external measurement at Con Colbert House, all the other measurement results were an order of magnitude below this threshold level.

It should be noted that vibration levels from freight trains are generally higher than those arising from passenger trains and no measurements were taken while a freight train was passing. Freight trains result in higher vibration levels because they have a single or no suspension system on the bogies. Modern passenger trains operate a double suspension system for passenger comfort, and this has the consequence of a reduction in external vibration levels. The steam train may in fact be worse than a freight train due to the weight of the carriages and the higher speed. Vibrations from freight trains are therefore likely to be no higher than perception level on ground level properties immediately adjacent to the railway.

The average vibration levels with and without trains passing is set out in Table A14.2. Both PPV and VDV levels are reported.

Table A14.2: Baseline Vibration Levels

Monitoring Location	Description	PPV (mm/s) With Trains	PPV (mm/s) No Trains	VDV (m/s ^{1.75}) With Trains	VDV (m/s ^{1.75}) No Trains
VML 1	Con Colbert House (External - ground level).	0.170	0.020	0.059	0.052
VML 2	Con Colbert House (Server Room - 1 st floor).	0.150	0.12	0.01	0.005
VML 3	Adamstown Park (10 m from tracks – footpath).	0.090	0.010	0.042	0.011
VML 4	Adamstown Park (20 m from tracks – footpath).	0.049	0.010	0.018	0.032
VML 5	Adamstown Park (40 m from tracks – footpath).	0.030	0.015	0.011	0.015
VML 6	Kilmainham Square (ground floor).	0.130	0.010	0.092	0.018
VML 7	Kilmainham Square (second floor).	0.060	0.010	0.039	0.019
VML 8	Kilmainham Square (Sixth floor).	0.040	0.010	0.028	0.009

Figure A14-5 to Figure A14-20 show the time series plots of PPV and VDV at each of the baseline locations.

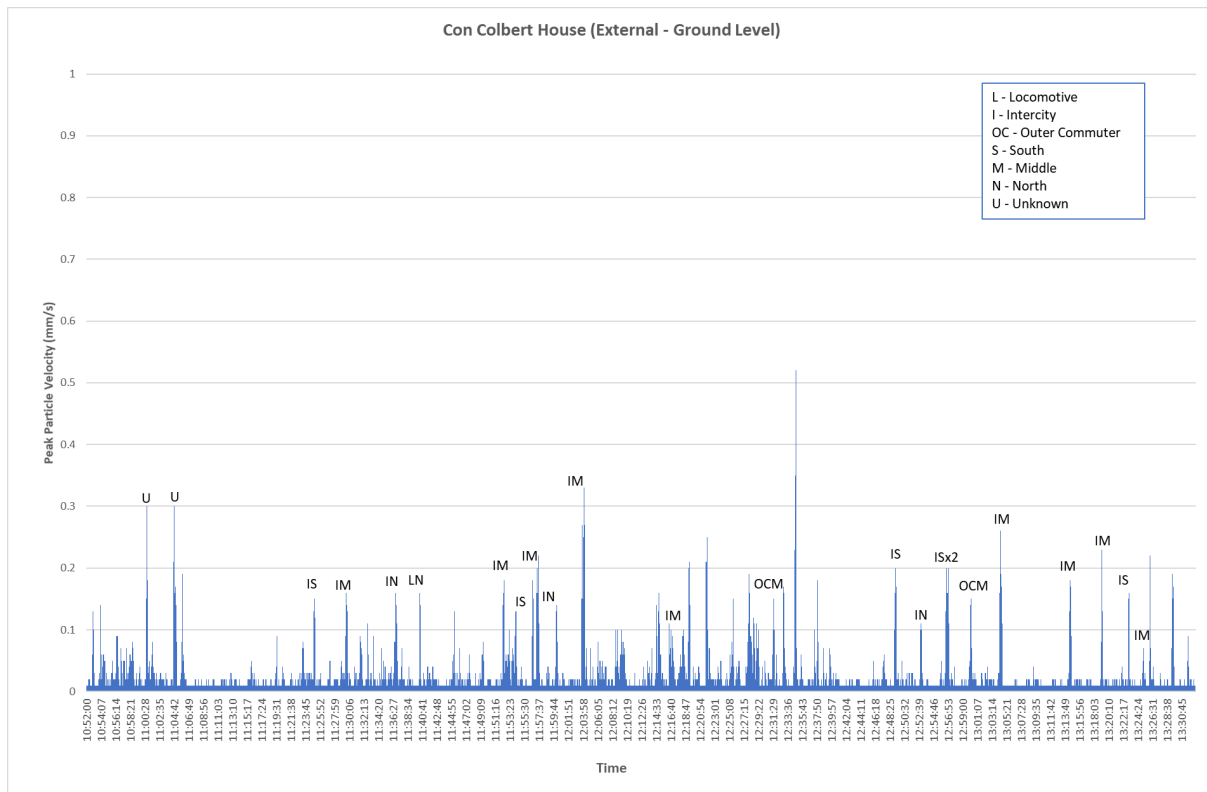


Figure A14-5 PPV Con Colbert House – Ground Level

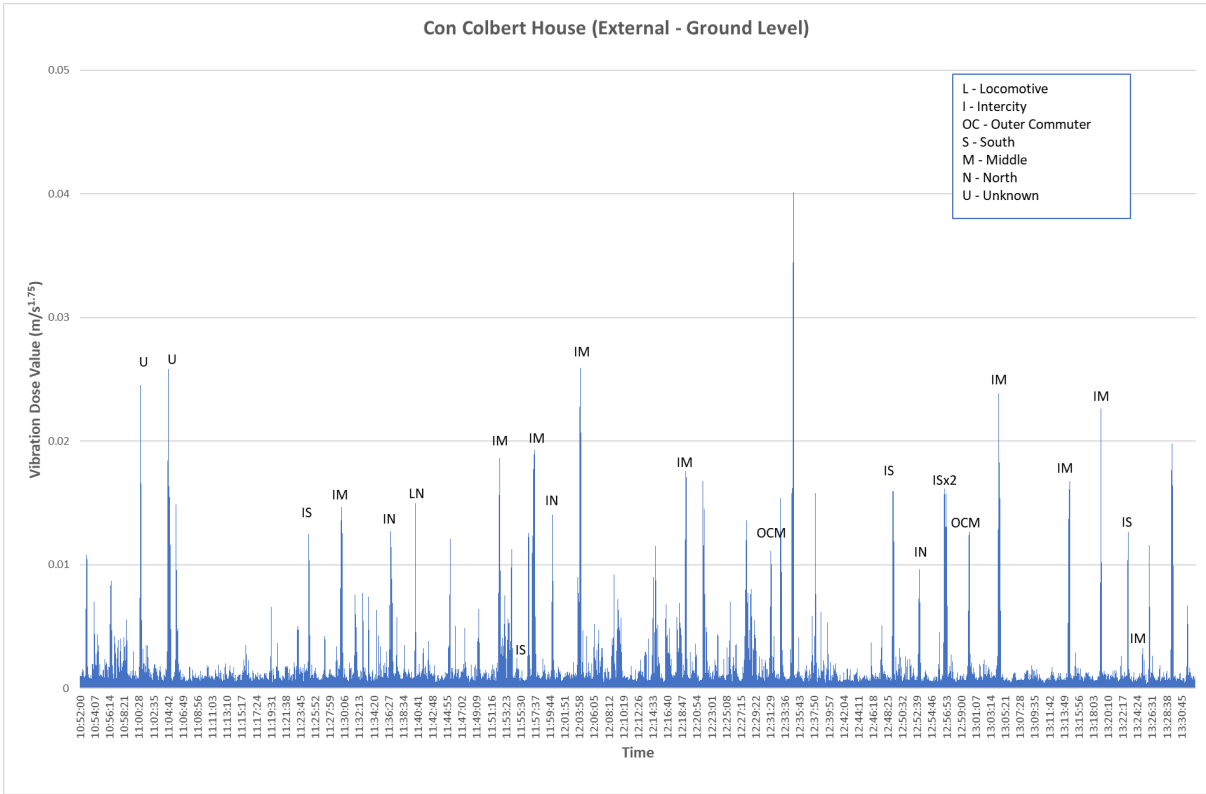


Figure A14-6 VDV Con Colbert House – Ground Level

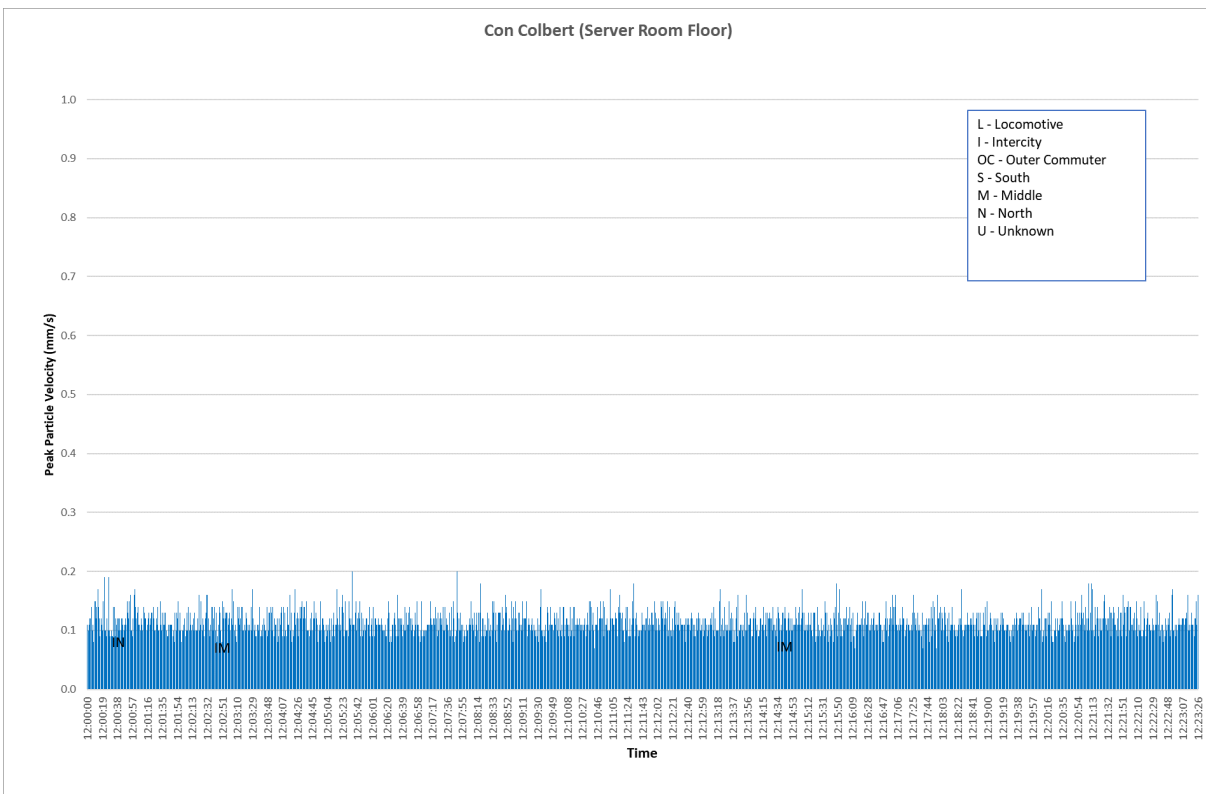


Figure A14-7 PPV Con Colbert House – Server Room Floor

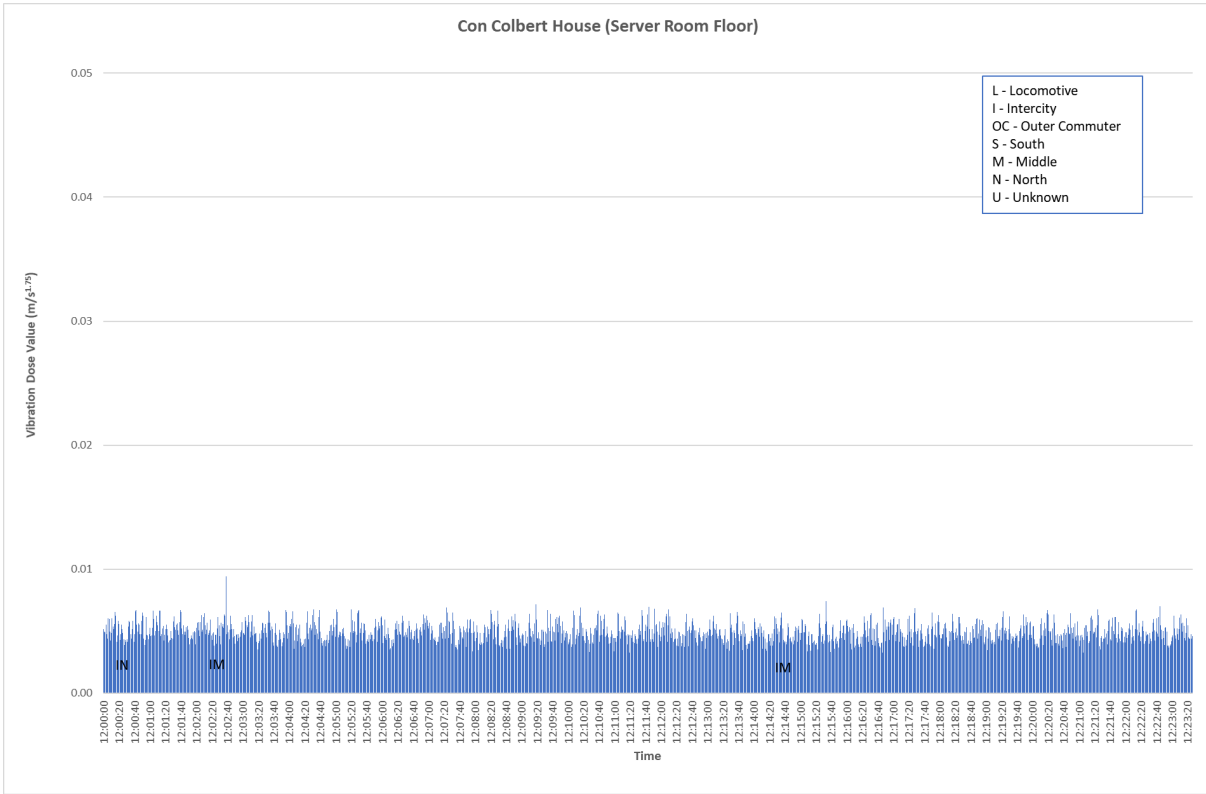


Figure A14-8 VDV Con Colbert House – Server Room Floor

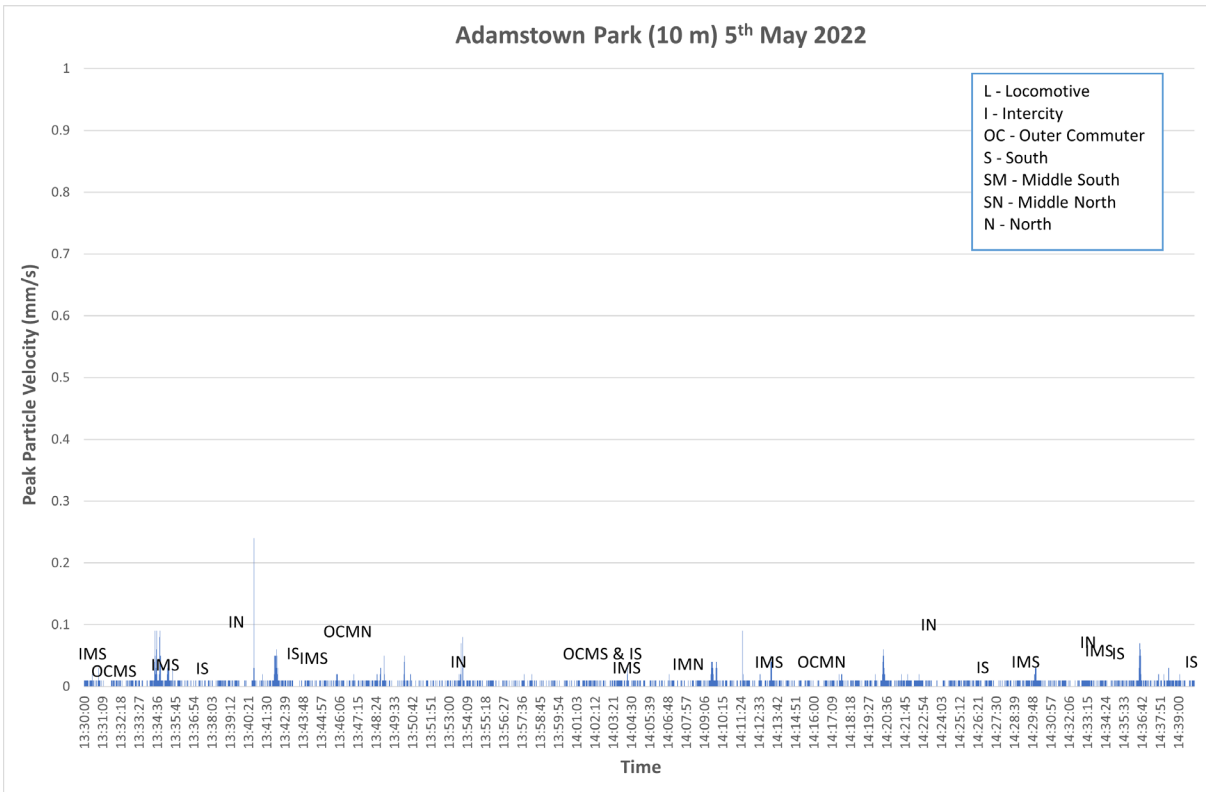


Figure A14-9 PPV Adamstown Park – 10 m

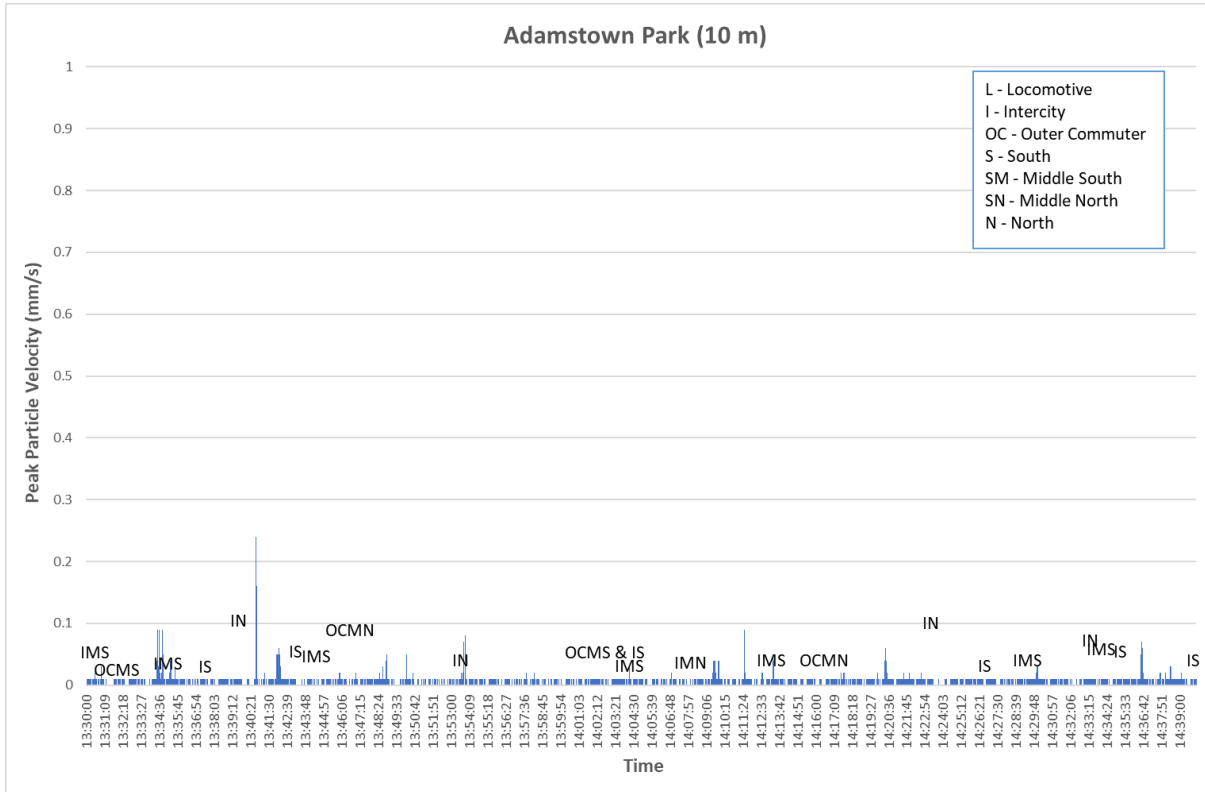


Figure A14-10 VDV Adamstown Park – 10 m

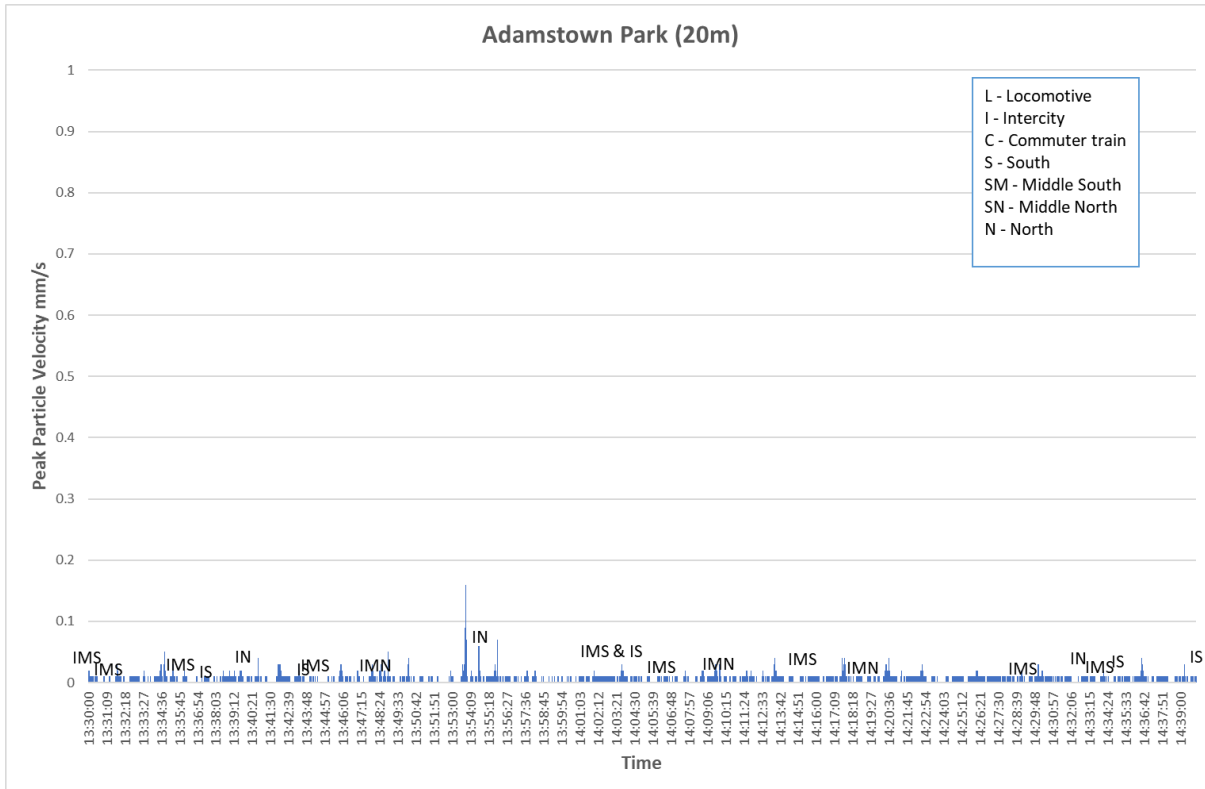


Figure A14-11 PPV Adamstown Park – 20 m

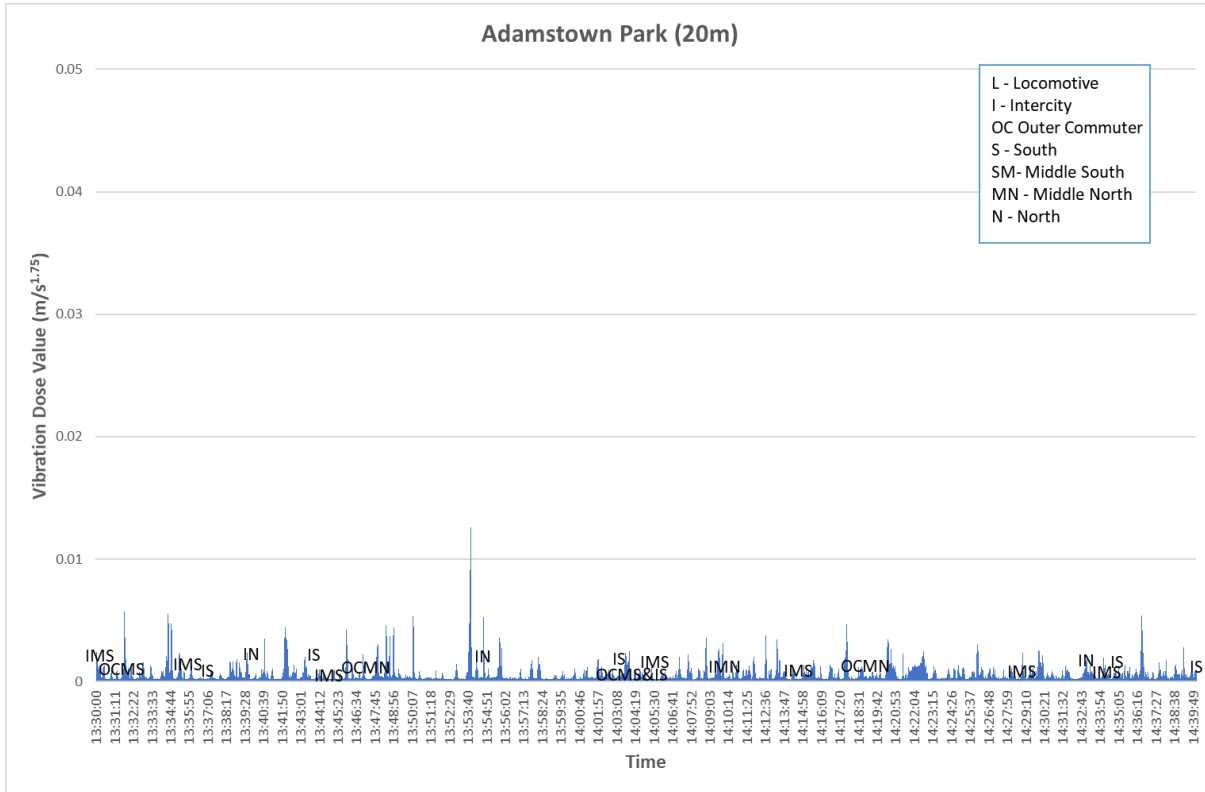


Figure A14-12 VDV Adamstown Park – 20 m

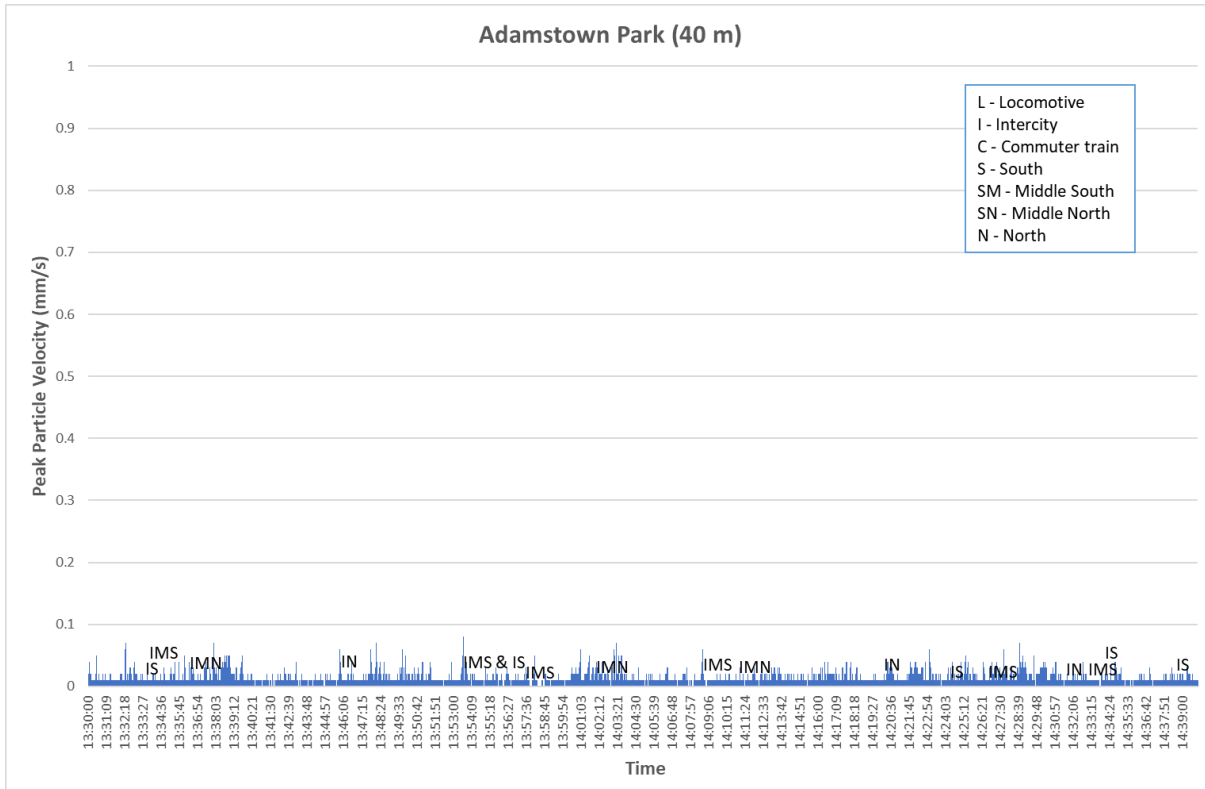


Figure A14-13 PPV Adamstown Park – 40 m

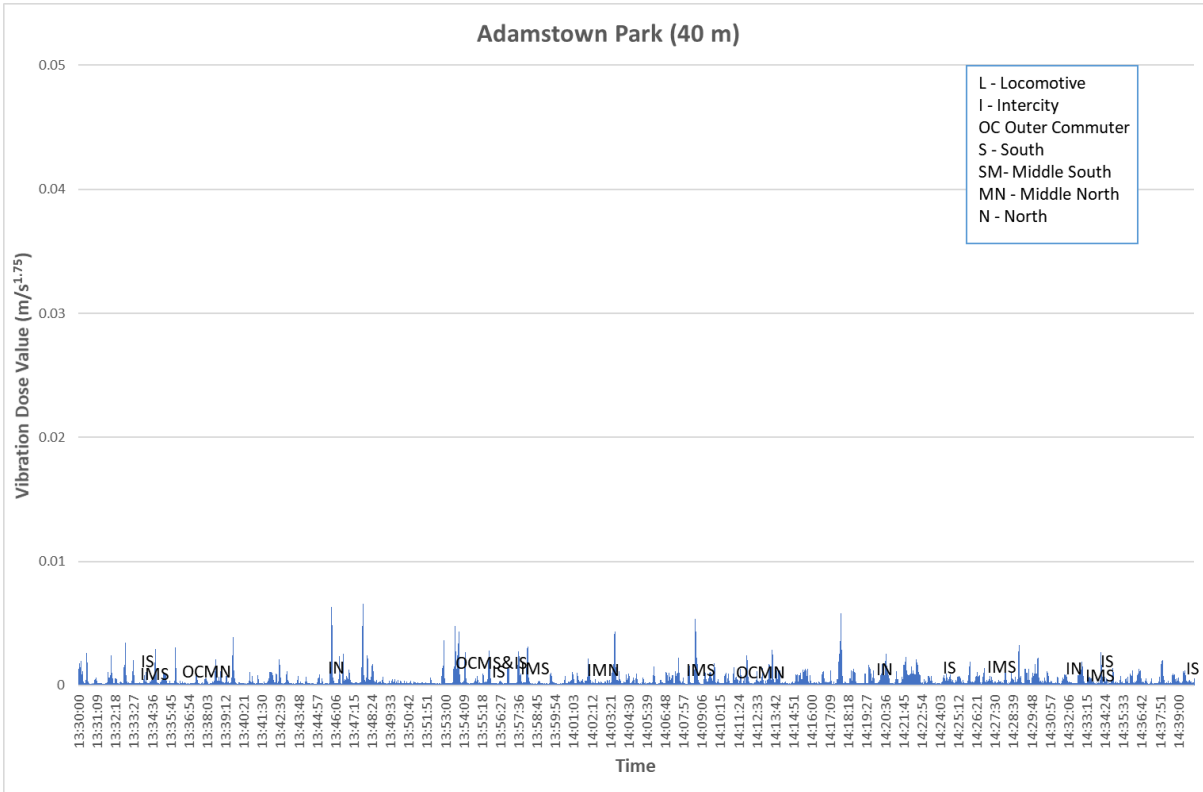


Figure A14-14 VDV Adamstown Park – 40 m

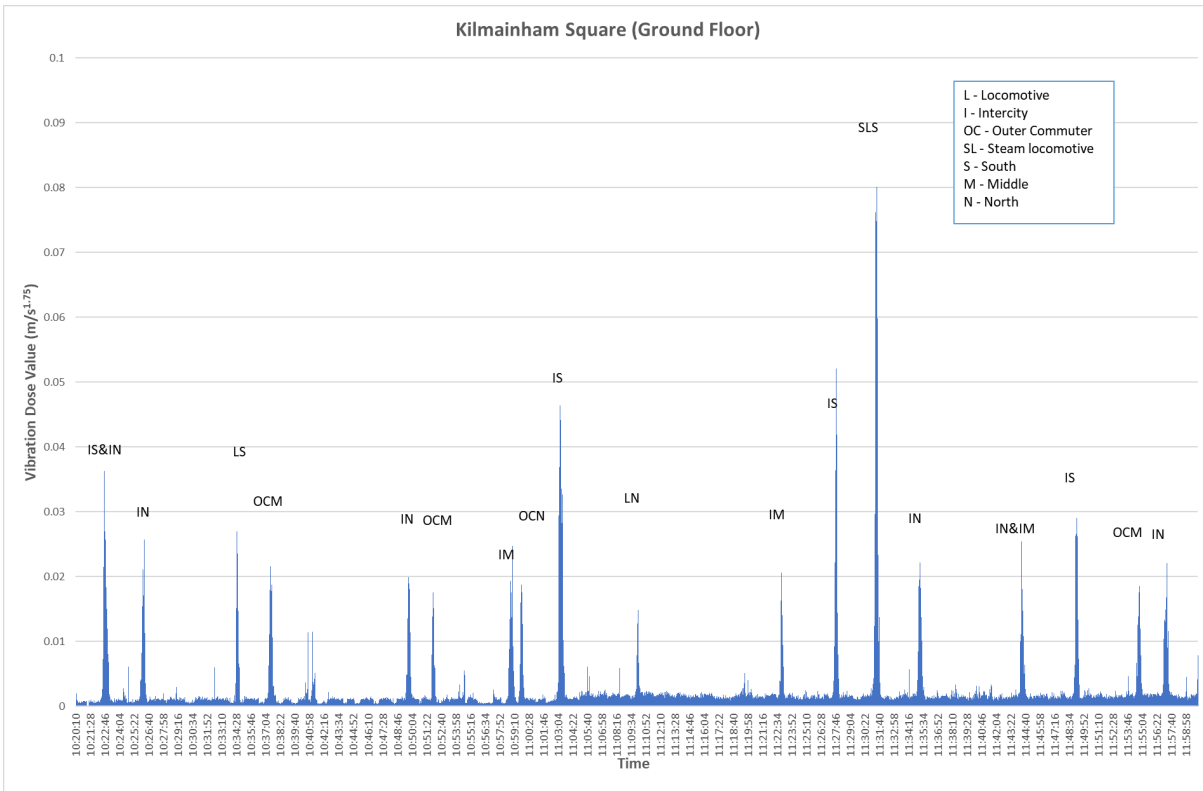


Figure A14-15 PPV Kilmainham Square – Ground Floor

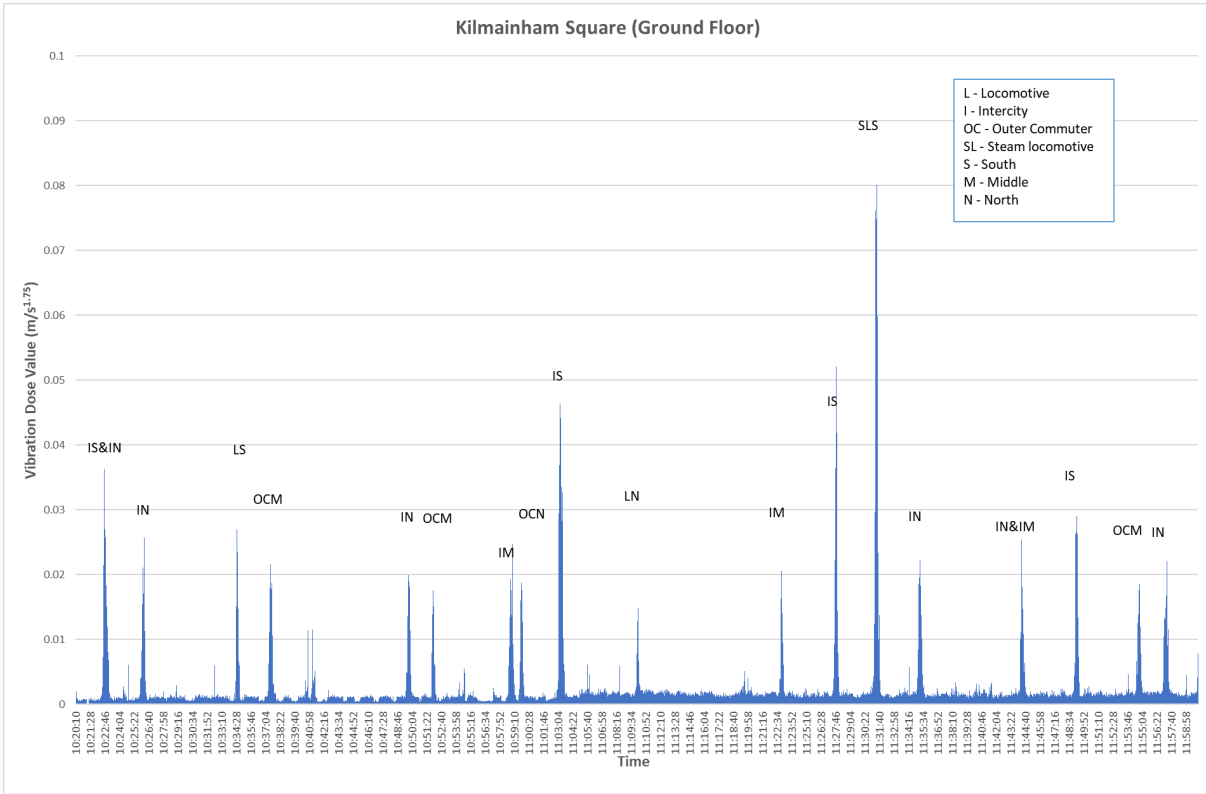


Figure A14-16 VDV Kilmainham Square – Ground Floor

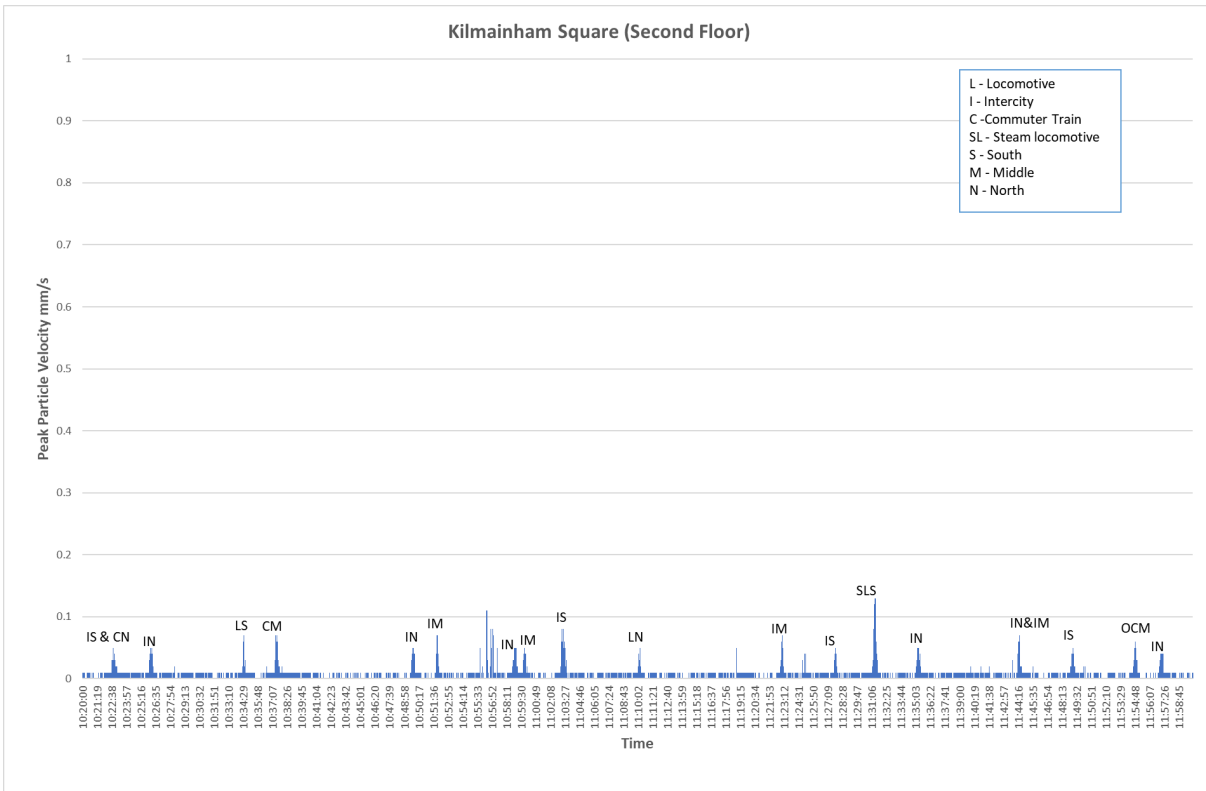


Figure A14-17 PPV Kilmainham Square – Second Floor

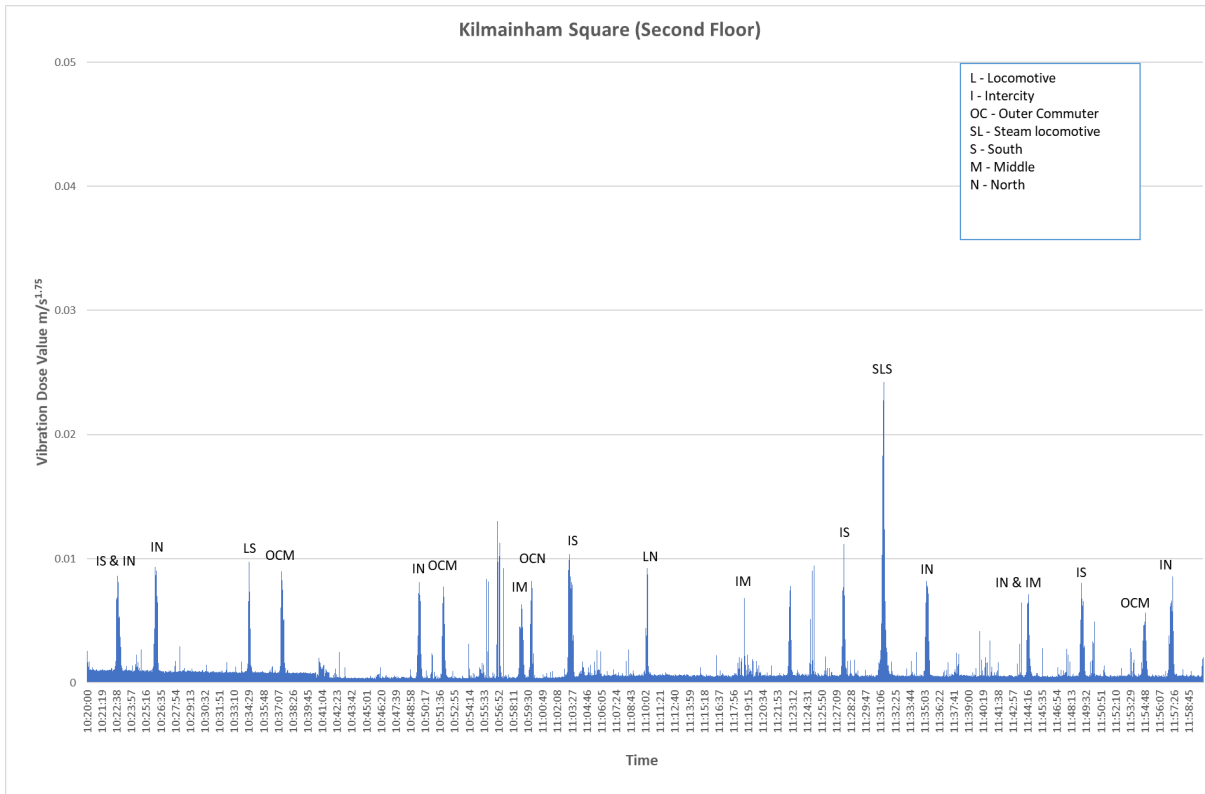


Figure A14-18 VDV Kilmainham Square – Second Floor

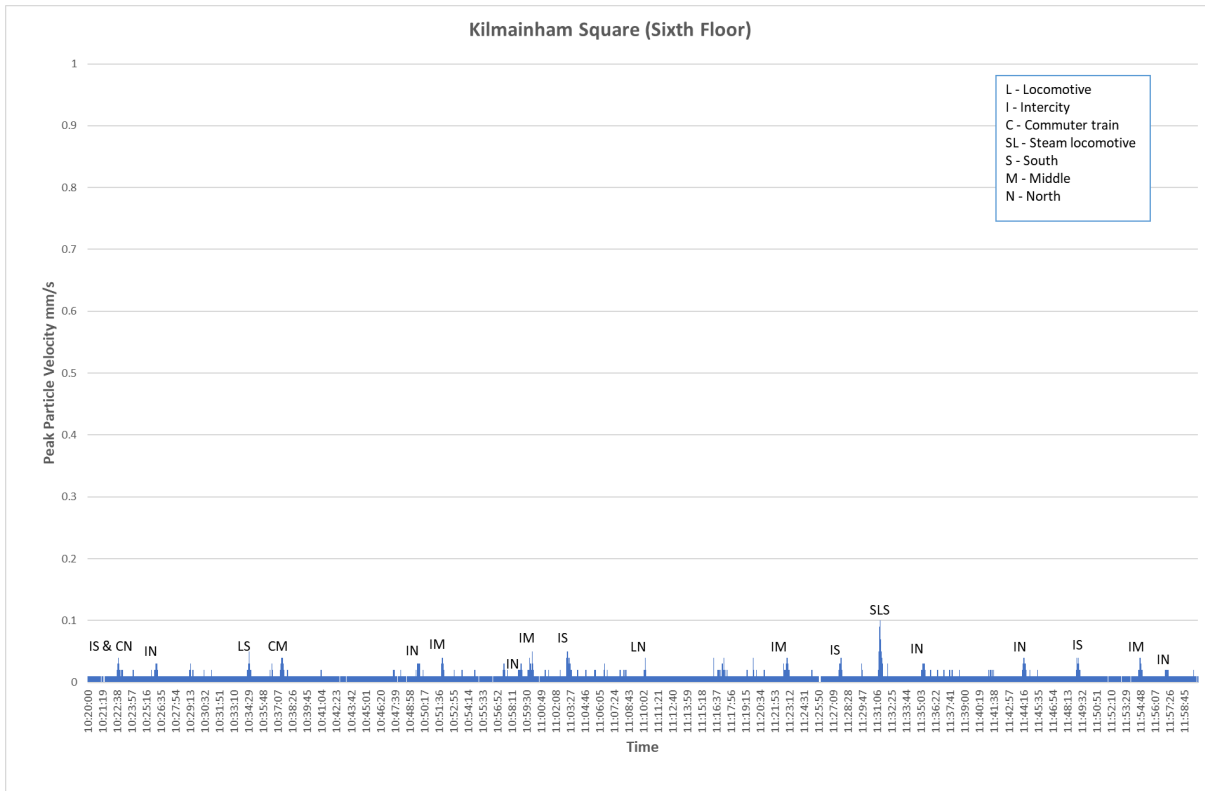


Figure A14-19 PPV Kilmainham Square – Sixth Floor

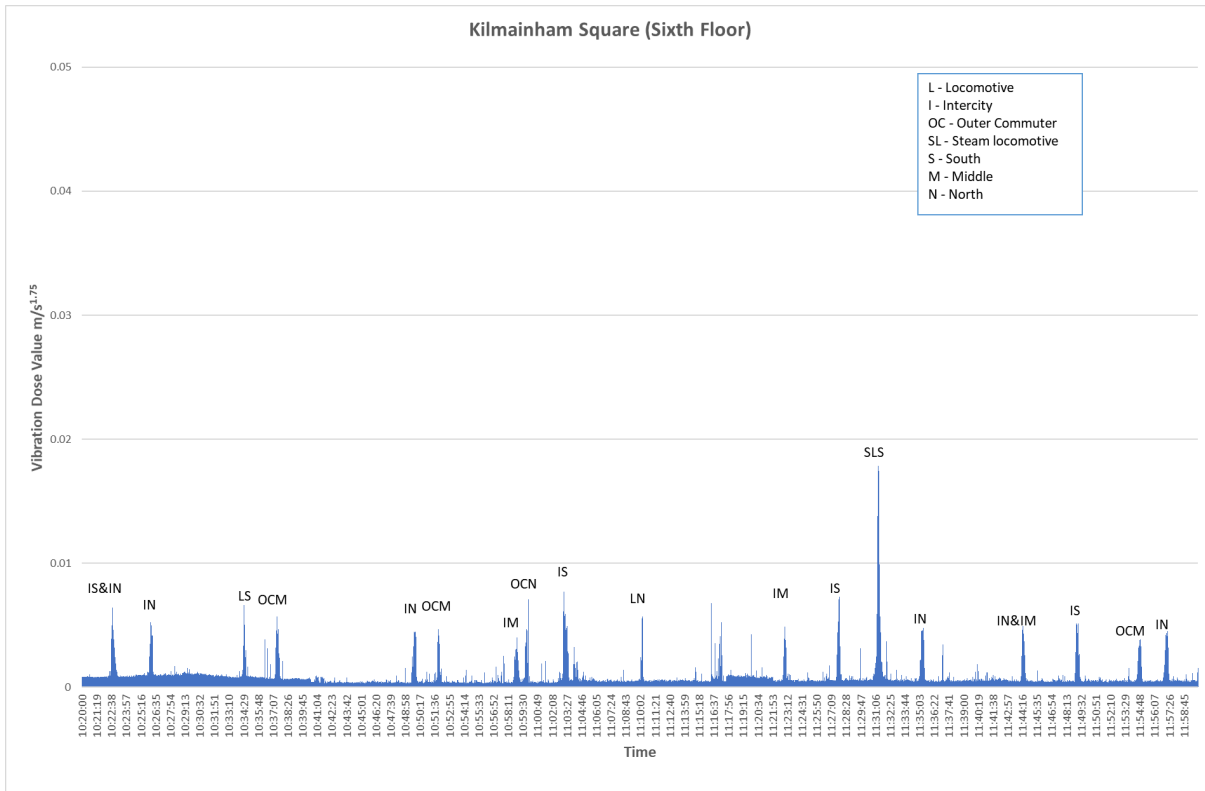


Figure A14-20 VDV Kilmainham Square – Sixth Floor

A.3. Baseline Noise Survey

Baseline noise survey were carried out at representative locations over the length of the proposed Project. The purpose of the baseline monitoring was to determine existing baseline noise levels across the study area. With an extensive national road network close to the proposed Project many locations currently experience significant levels of road traffic noise.

A.3.1. Baseline Noise Survey - Monitoring Locations

Eighteen noise monitoring locations were identified along the length of the scheme. Baseline noise measurements were carried out at each of these locations for a 24-hour period. This allowed a measurement of the 18-hour (day) and the 8-hour (night) to be determined at each location. The following parameters were reported for each location.

Table A14.3: Baseline noise survey reporting criteria

Criteria	Reported
LAeq	LAeq 16-hour, L _{day} , L _{evening} , L _{night}
LAF90	LAF90 16 hour, LAF90 day, LAF90 evening, LAF _{night}

Where the day, evening and night periods are as determined by the Environmental Noise Directive.

Photographs of the monitoring locations and results for each location are presented below.



Plate 14-1: Noise Monitoring Location NML



Plate 14-2: Noise Monitoring Location NML2



Plate 14.3: Noise Monitoring Location NML3



Plate 14-4: Noise Monitoring Location NML4



Plate 14-5: Noise Monitoring Location NML5



Plate 14-6: Noise Monitoring Location NML6



Plate 14-7: Noise Monitoring Location NML7



Plate 14-8: Noise Monitoring Location NML8



Plate 14-9: Noise Monitoring Location NML9



Plate 14-10: Noise Monitoring Location NML10



Plate 14-11: Noise Monitoring Location NML11



Plate 14-12: Noise Monitoring Location NML12



Plate 14-13: Noise Monitoring Location NML13



Plate 14-14: Noise Monitoring Location NML14



Plate 14-15: Noise Monitoring Location NML15



Plate 14-16: Noise Monitoring Location NML16



Plate 14-17: Noise Monitoring Location NML17



Plate 14-18: Noise Monitoring Location NML18

A.3.2. Baseline Noise Survey – Results

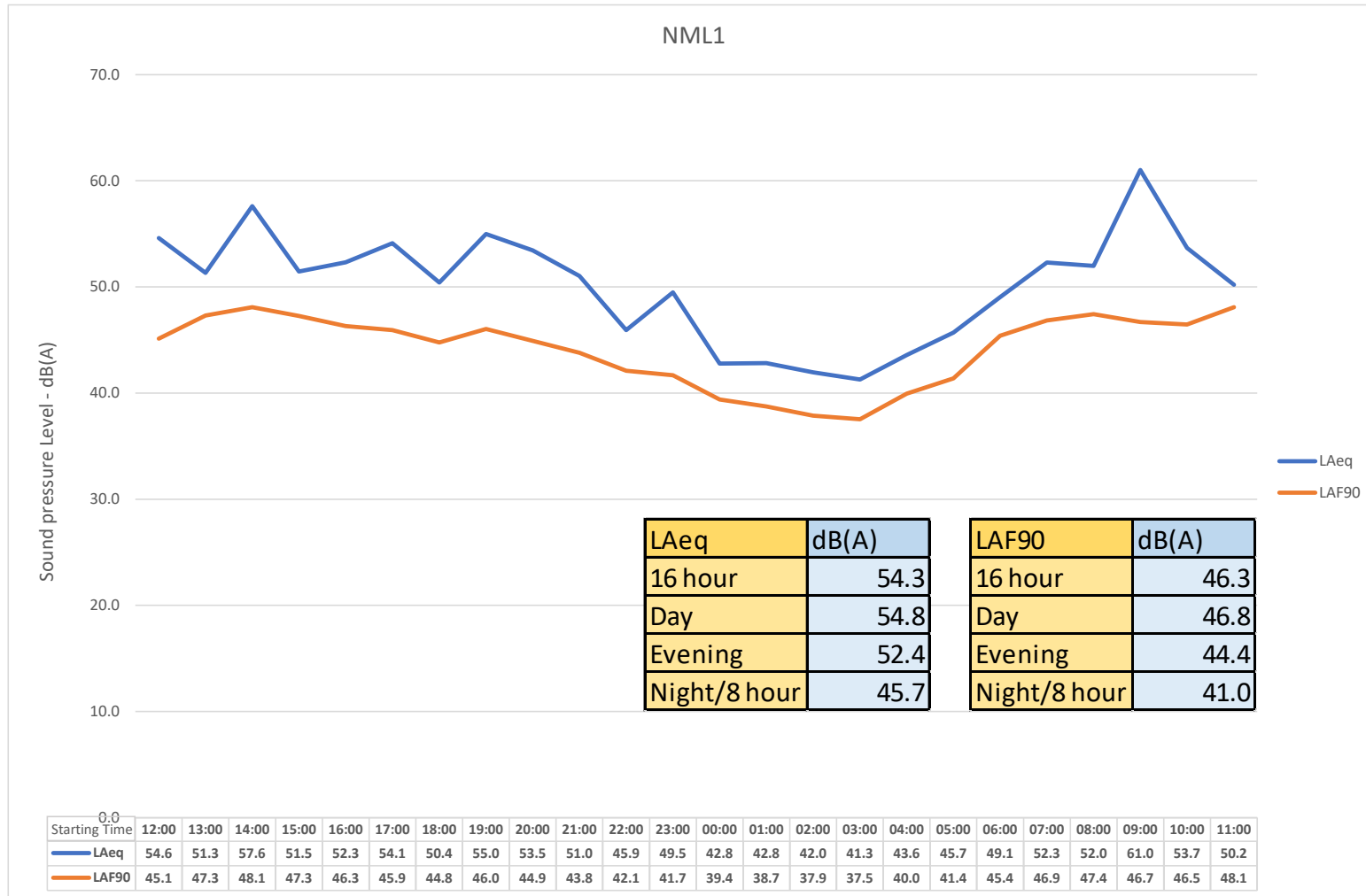


Figure A14-21: Results NML1

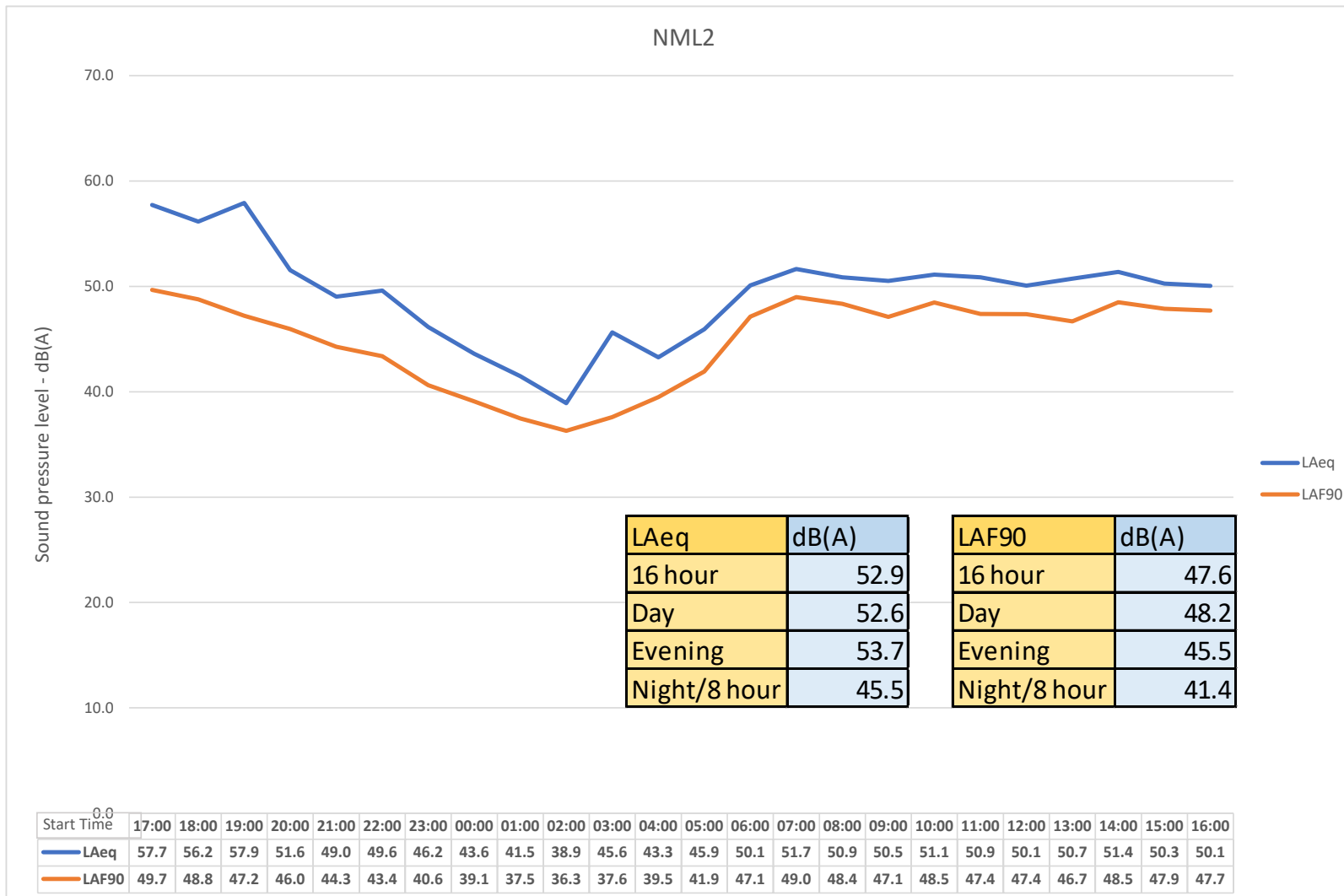


Figure A14-22: Results NML2

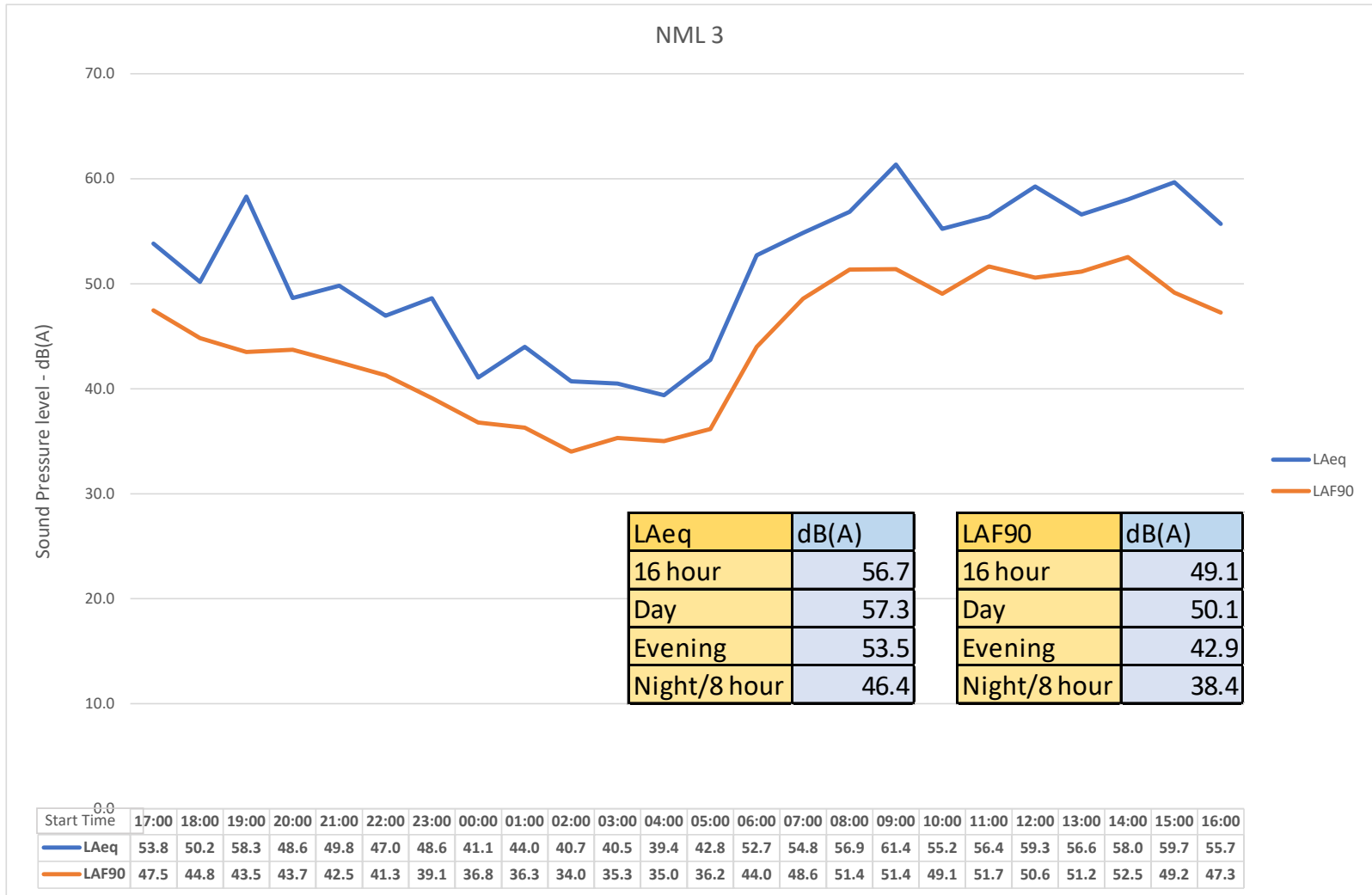


Figure A14-23: Results NML3

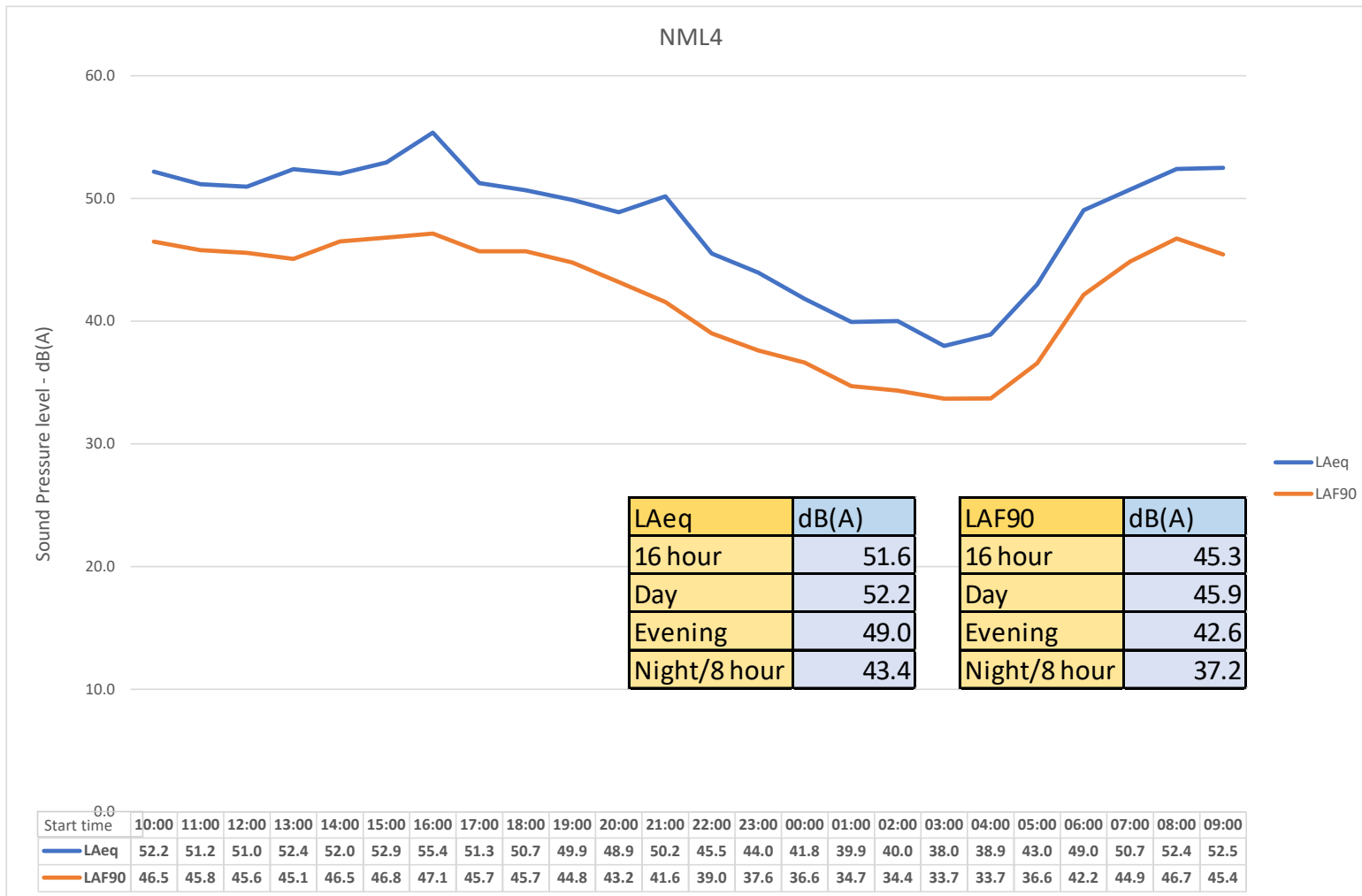


Figure A14-24: Results NML4

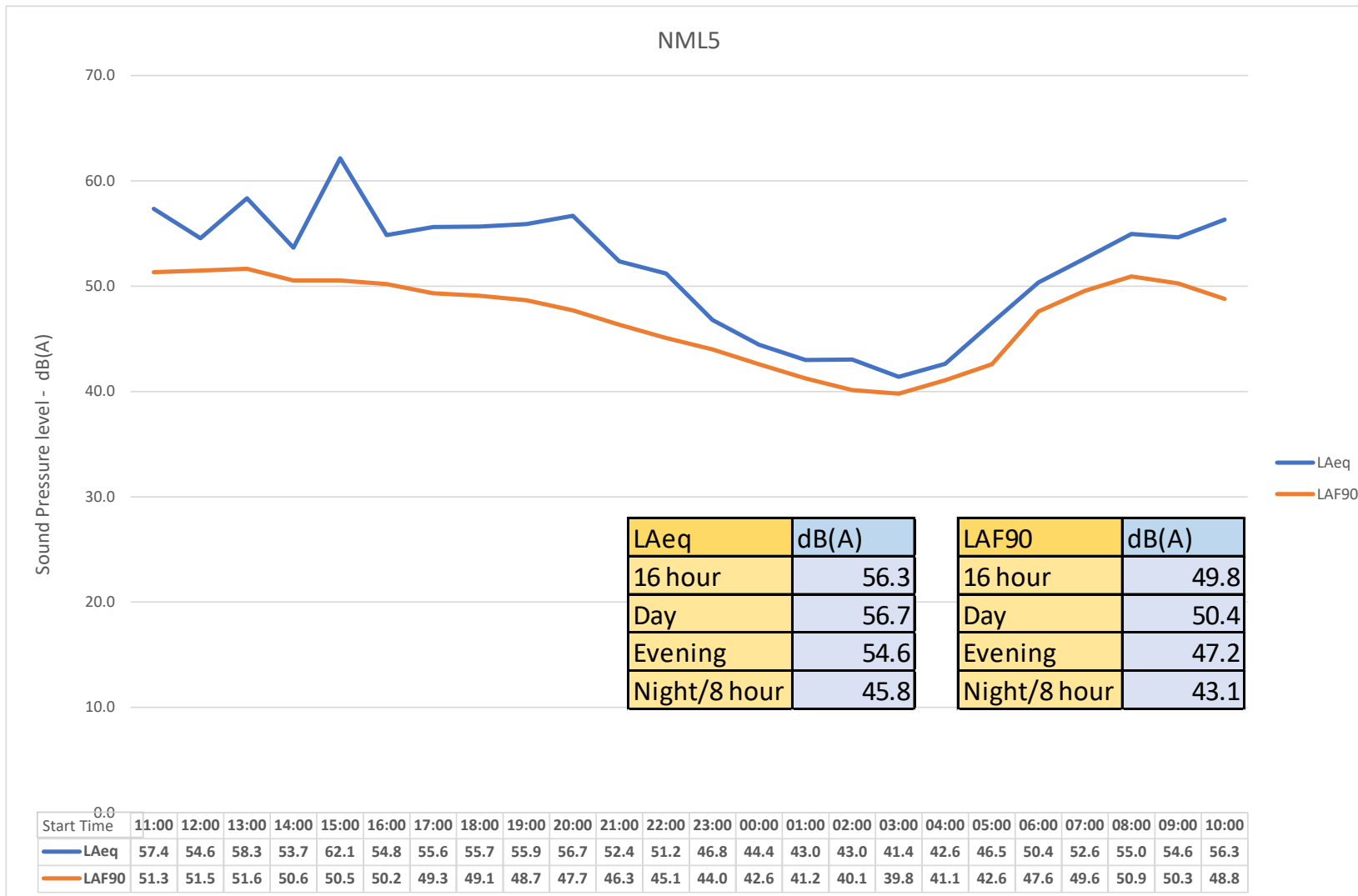


Figure A14-25: Results NML5

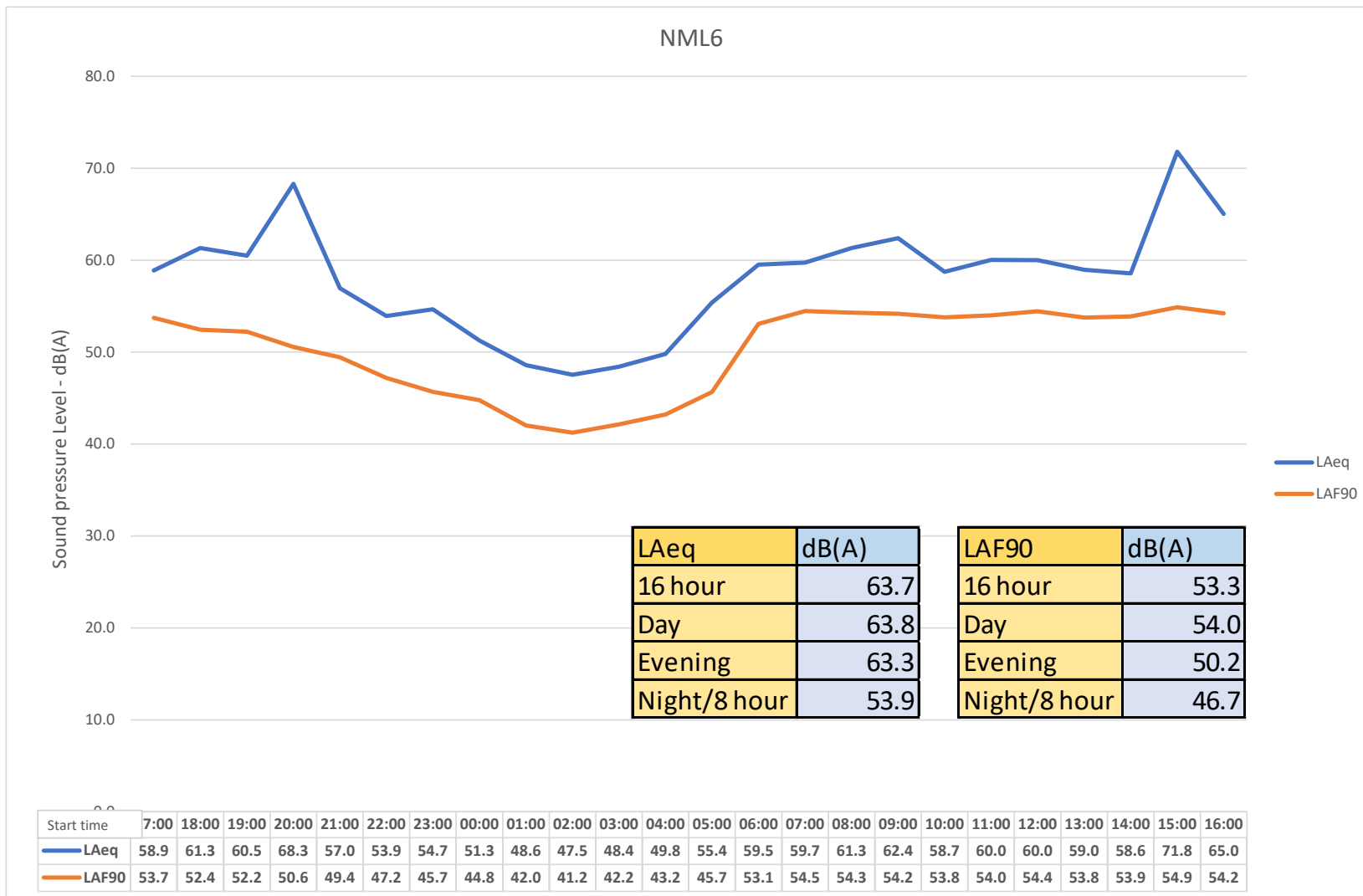


Figure A14-26: Results NML6

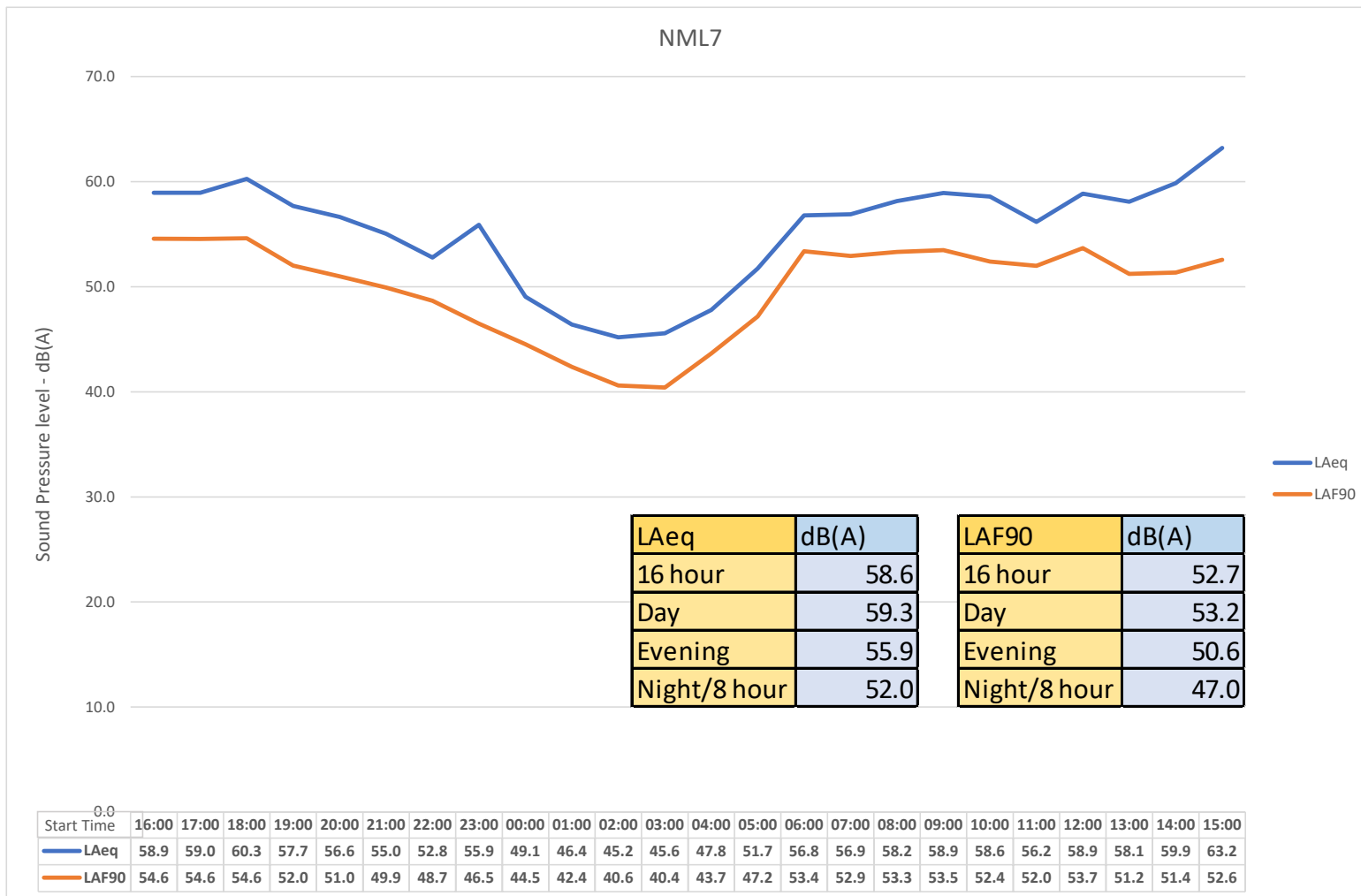


Figure A14-27: Results NML7

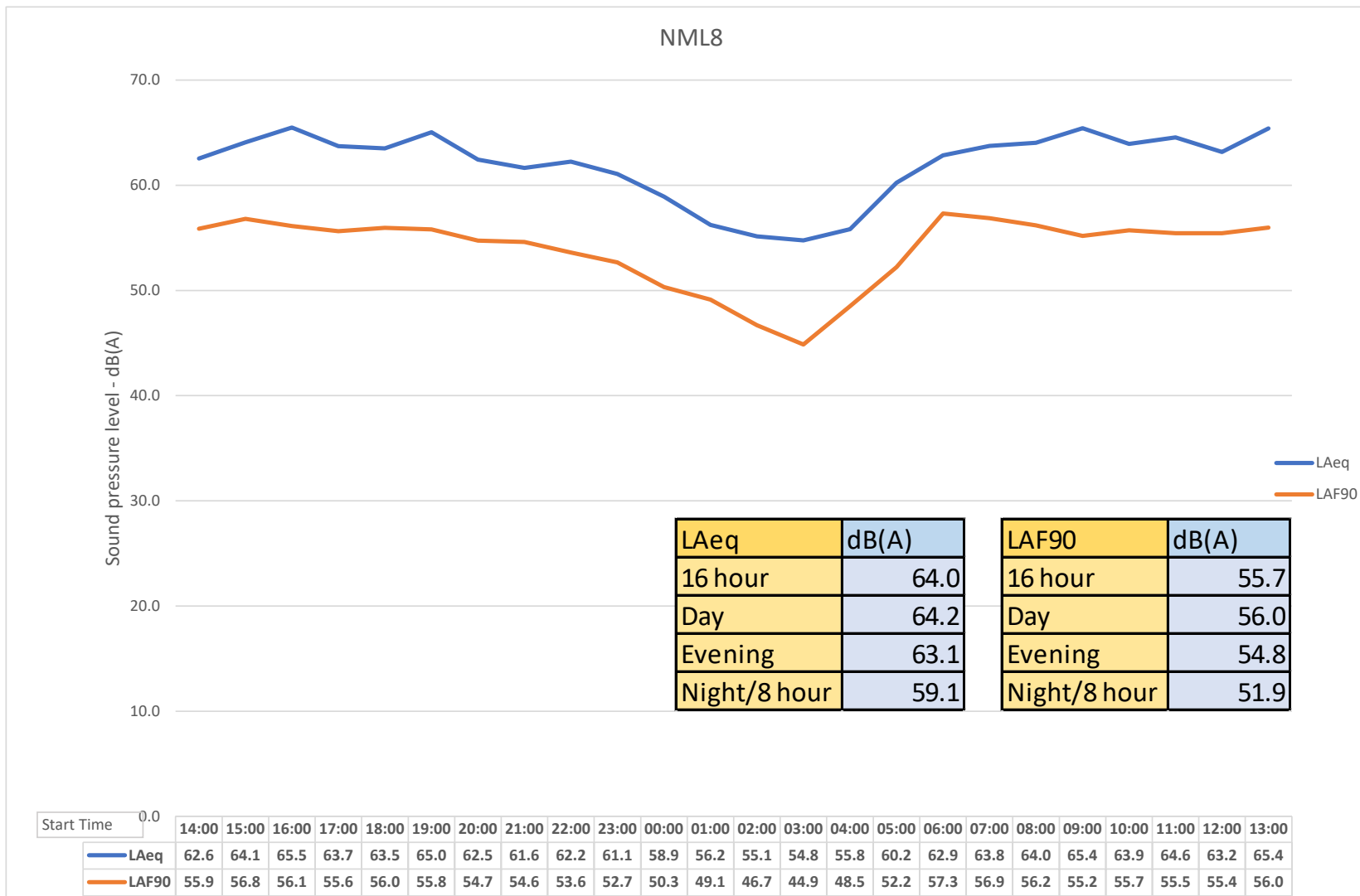


Figure A14-28: Results NML8

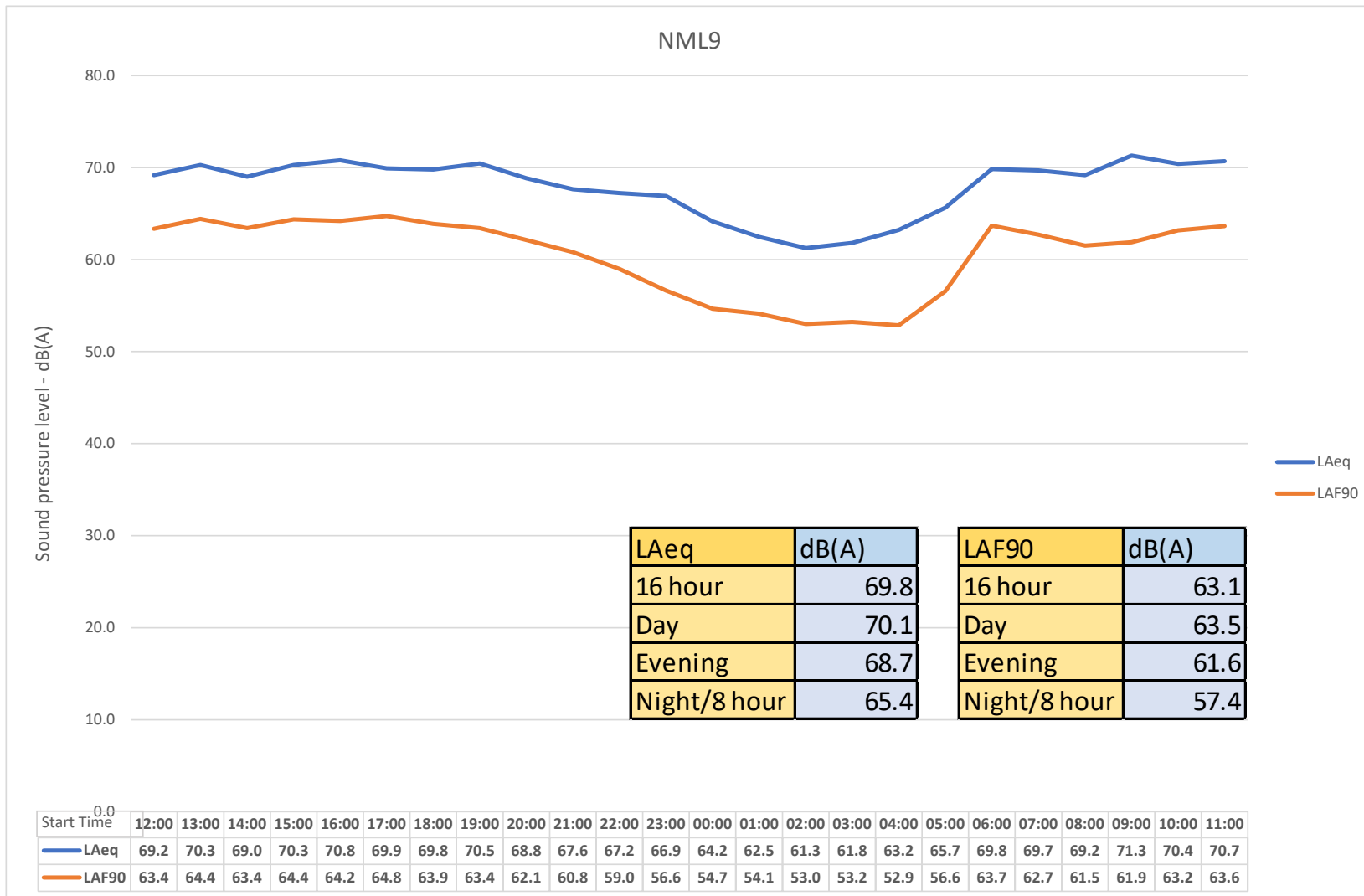


Figure A14-29: Results NML9

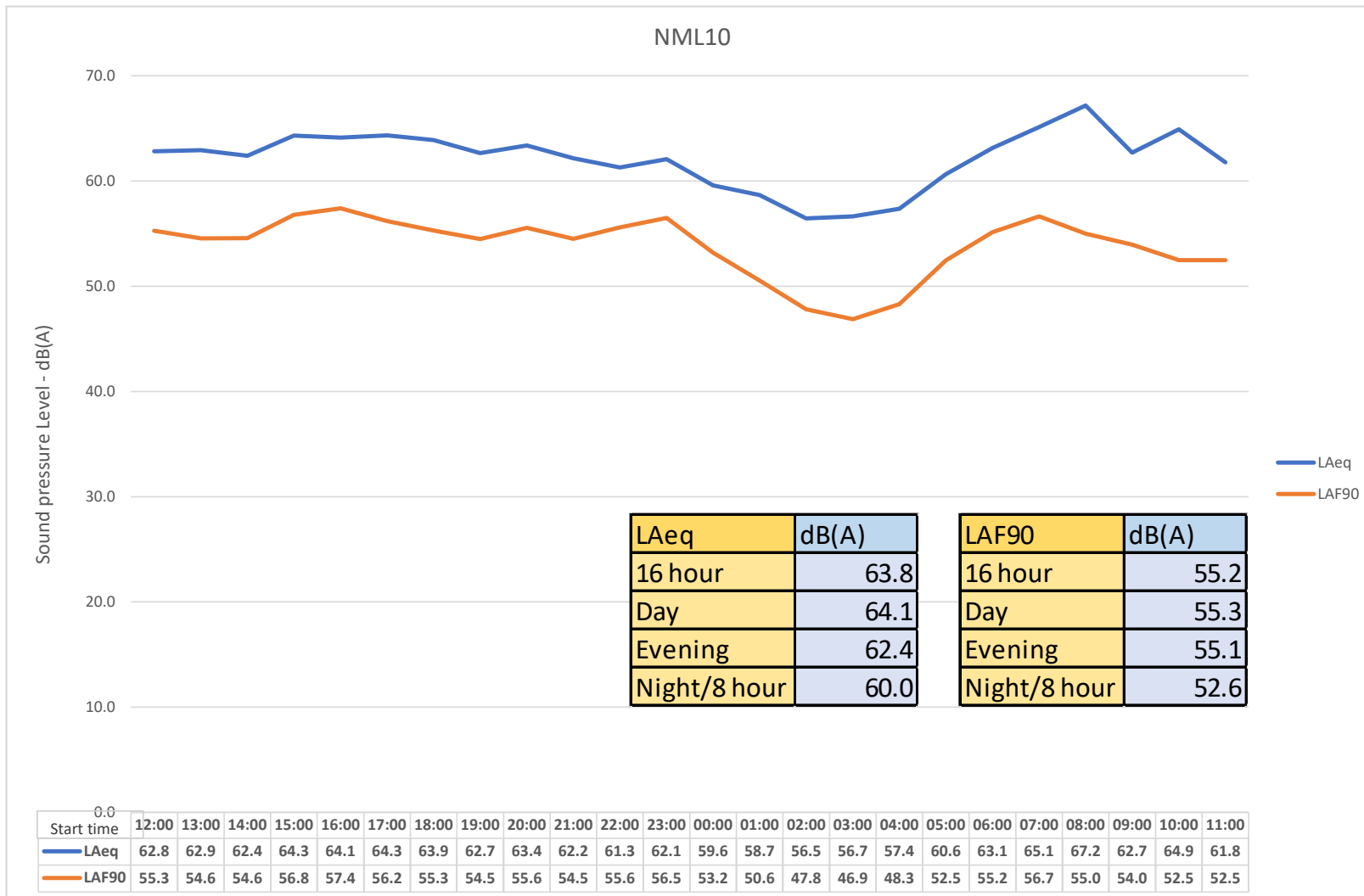


Figure A14-30: Results NML10

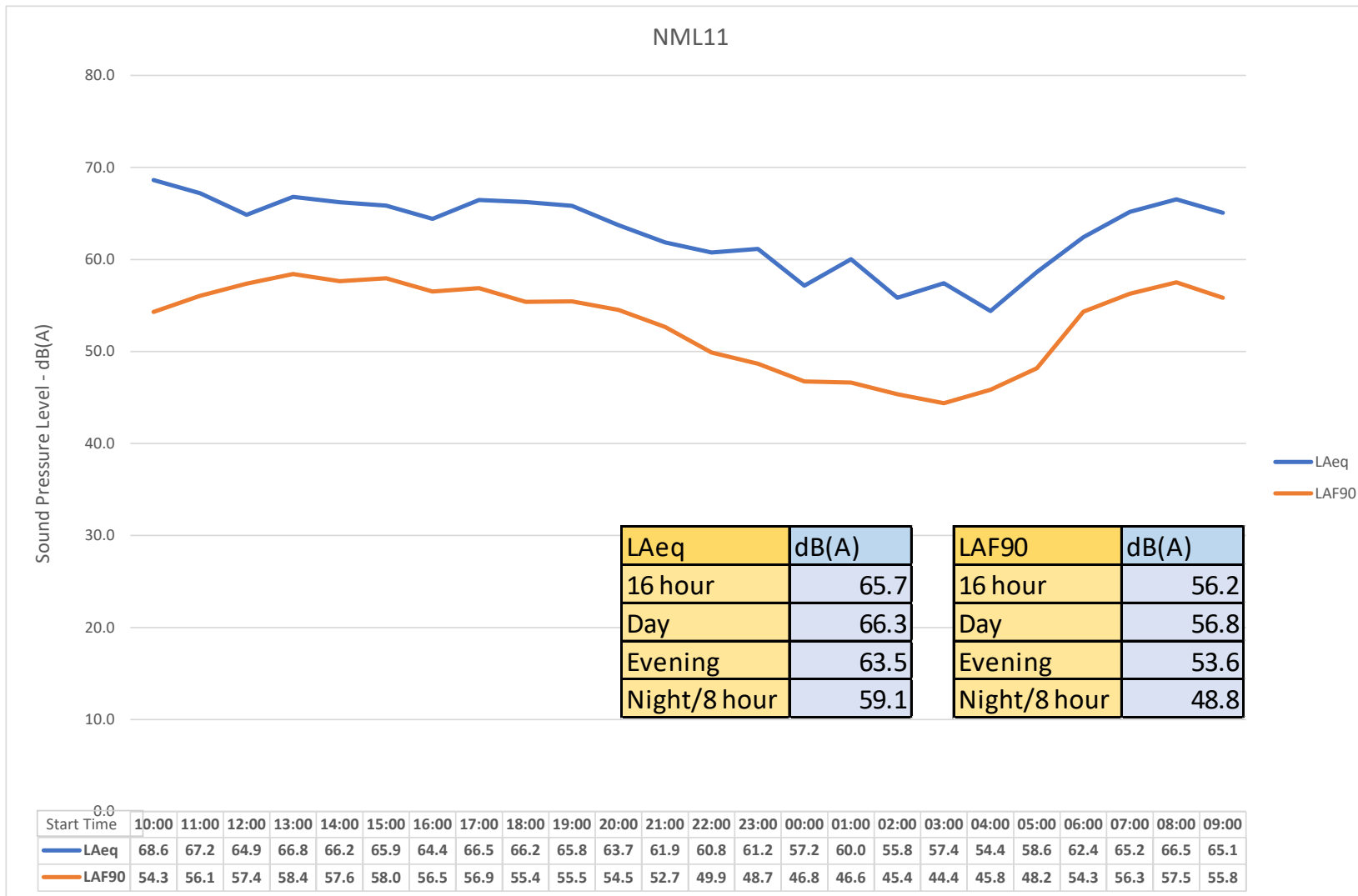


Figure A14-31: Results NML11

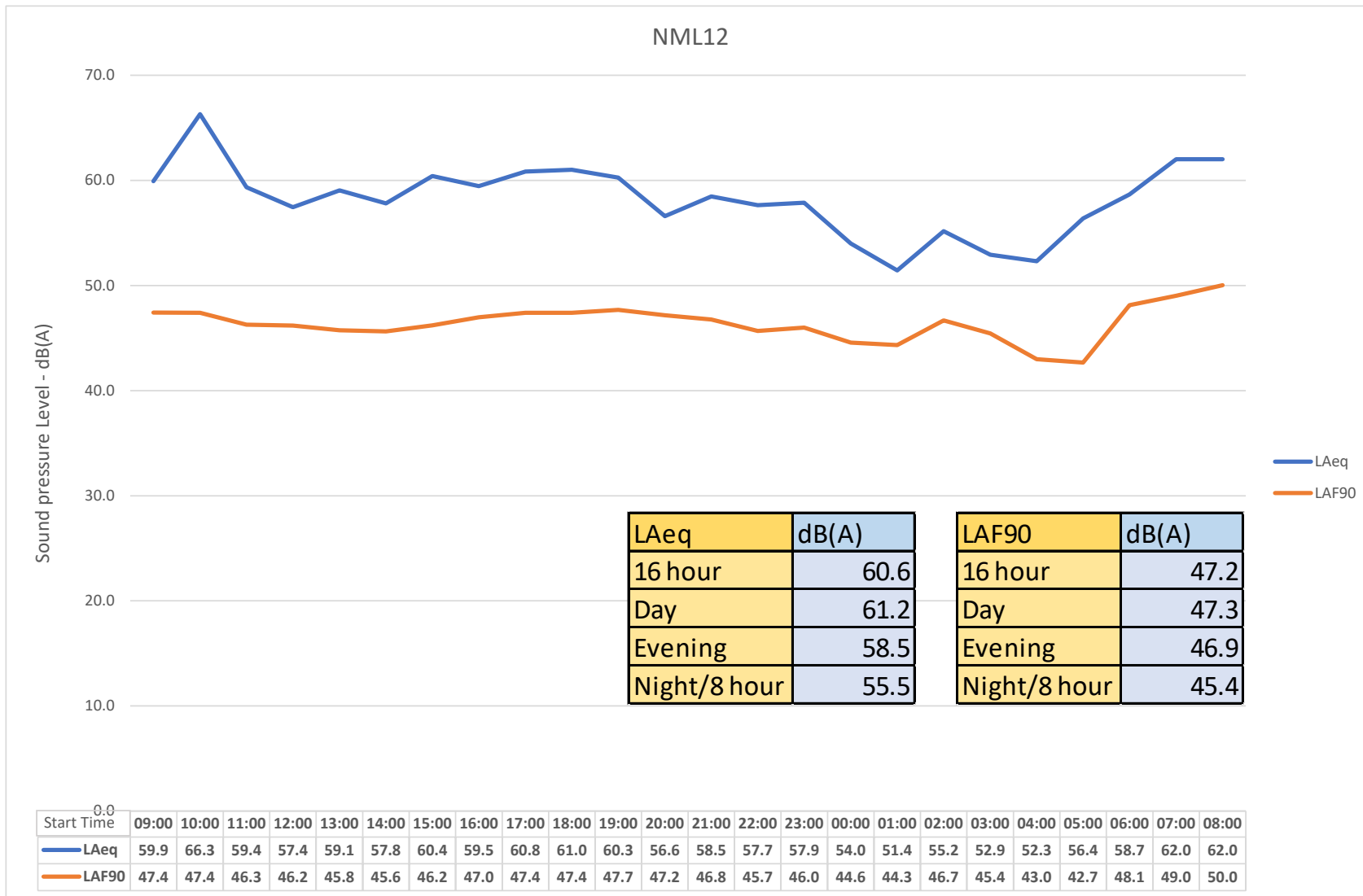


Figure A14-32: Results NML12

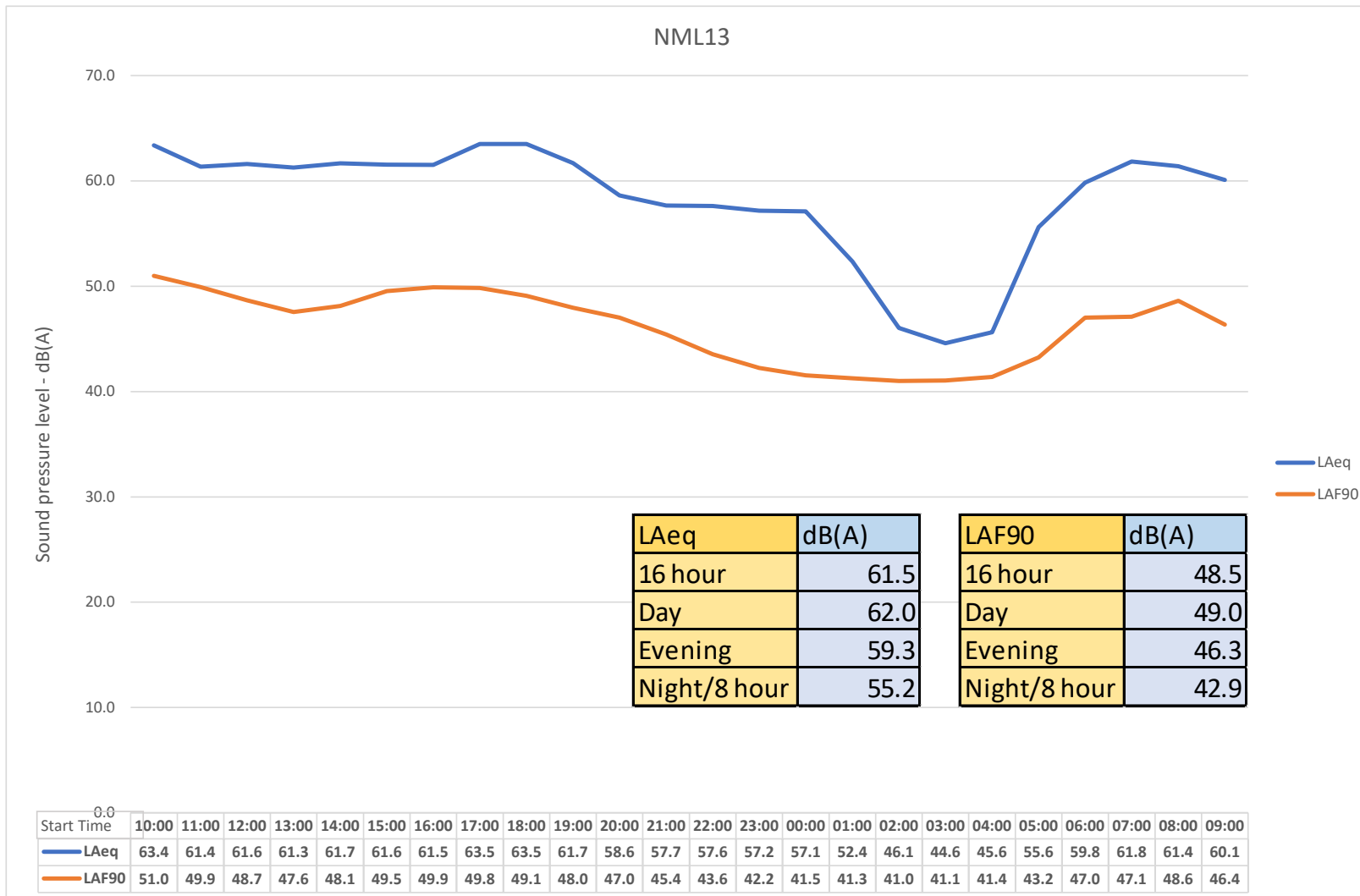


Figure A14-33: Results NML13

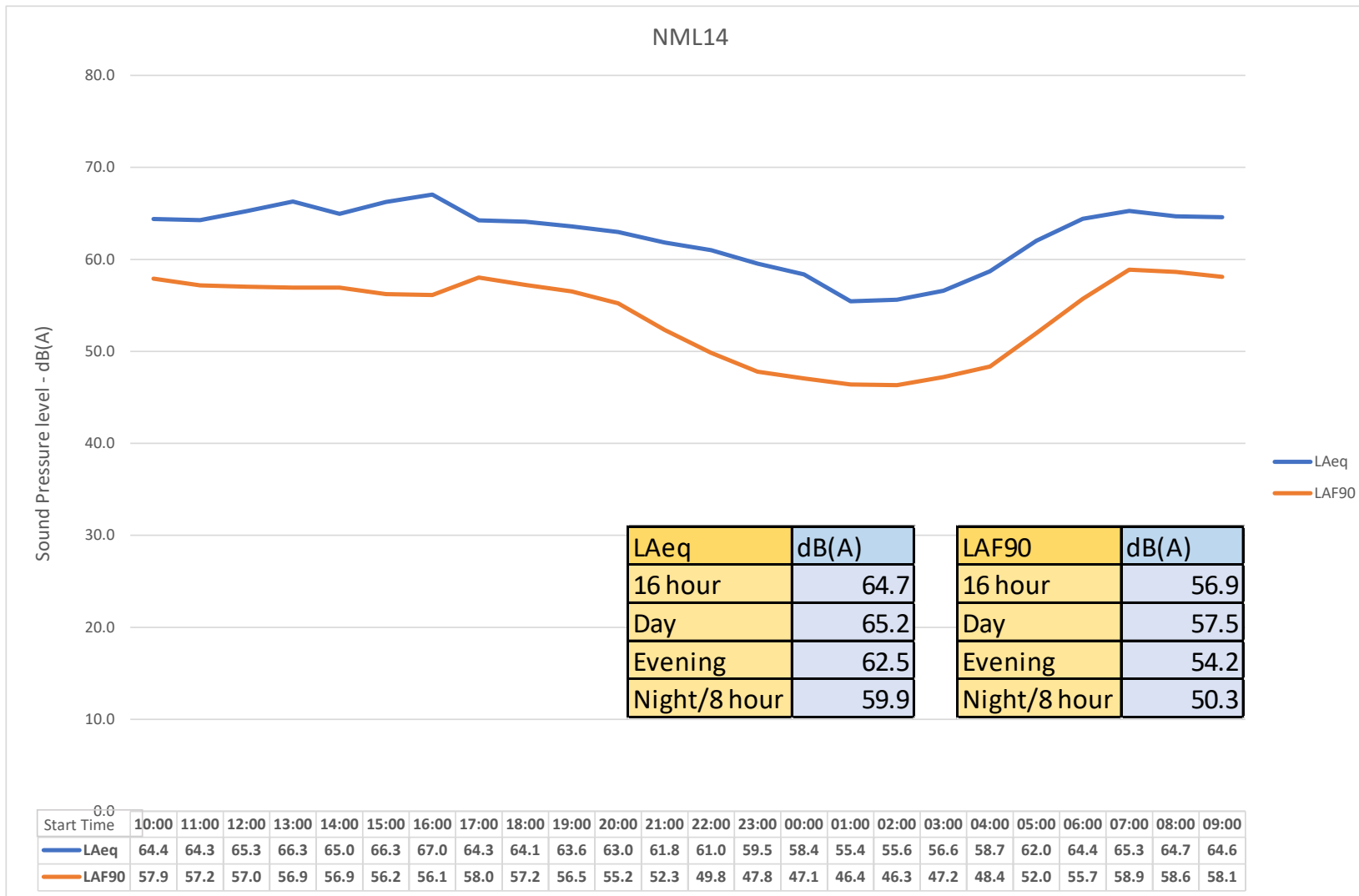


Figure A14-34: Results NML14

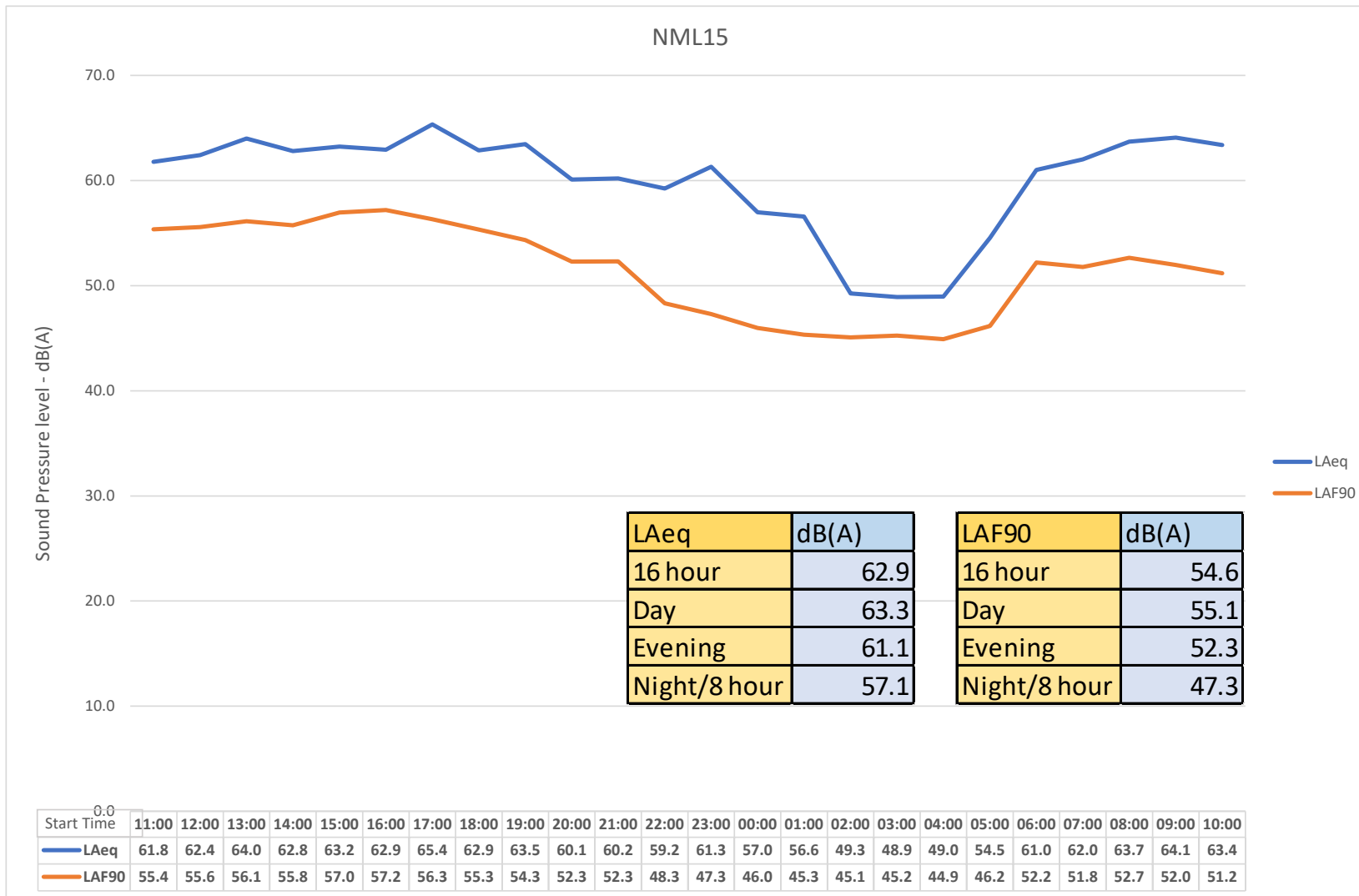


Figure A14-35: Results NML15

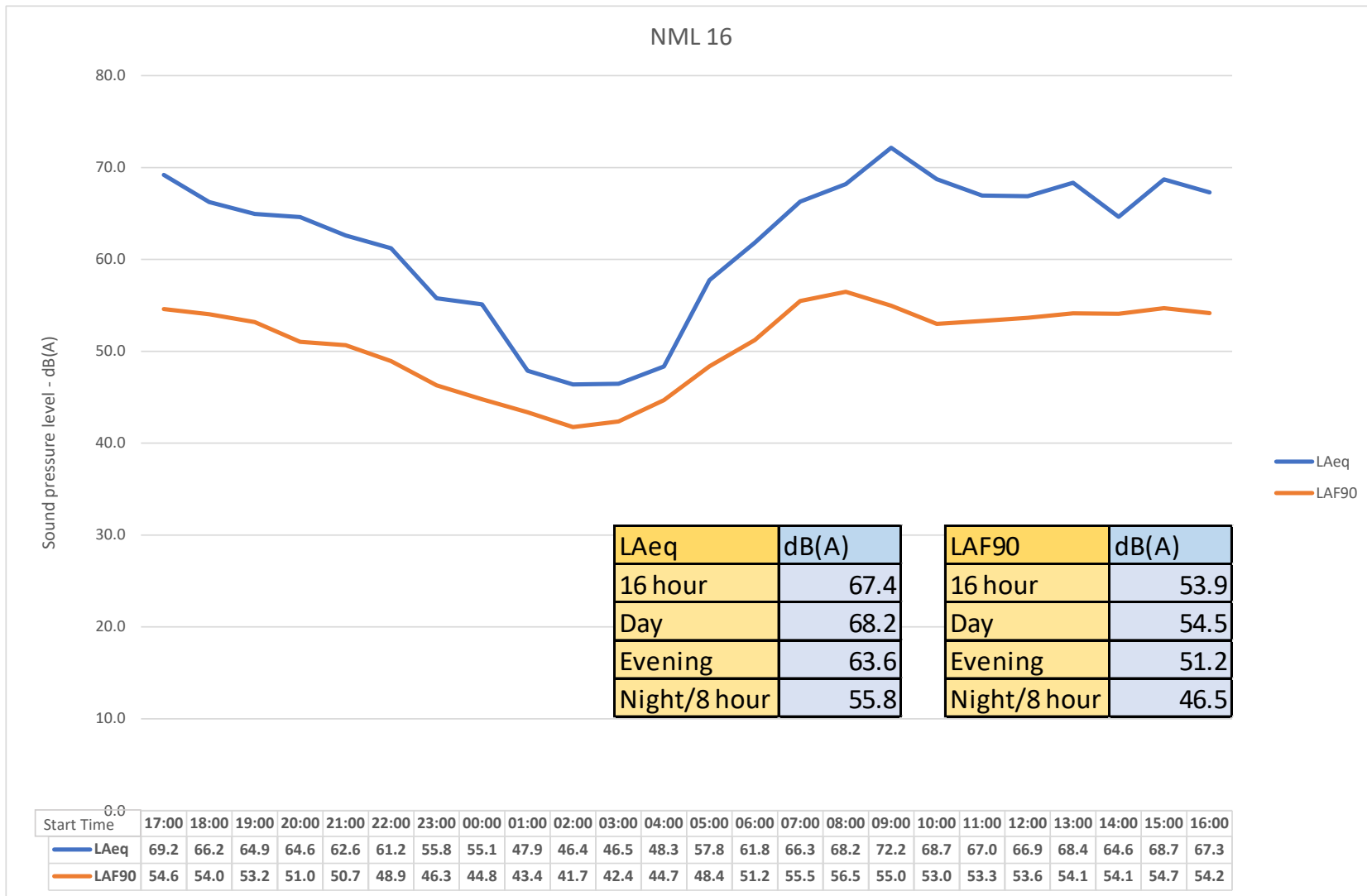


Figure A14-36: Results NML16

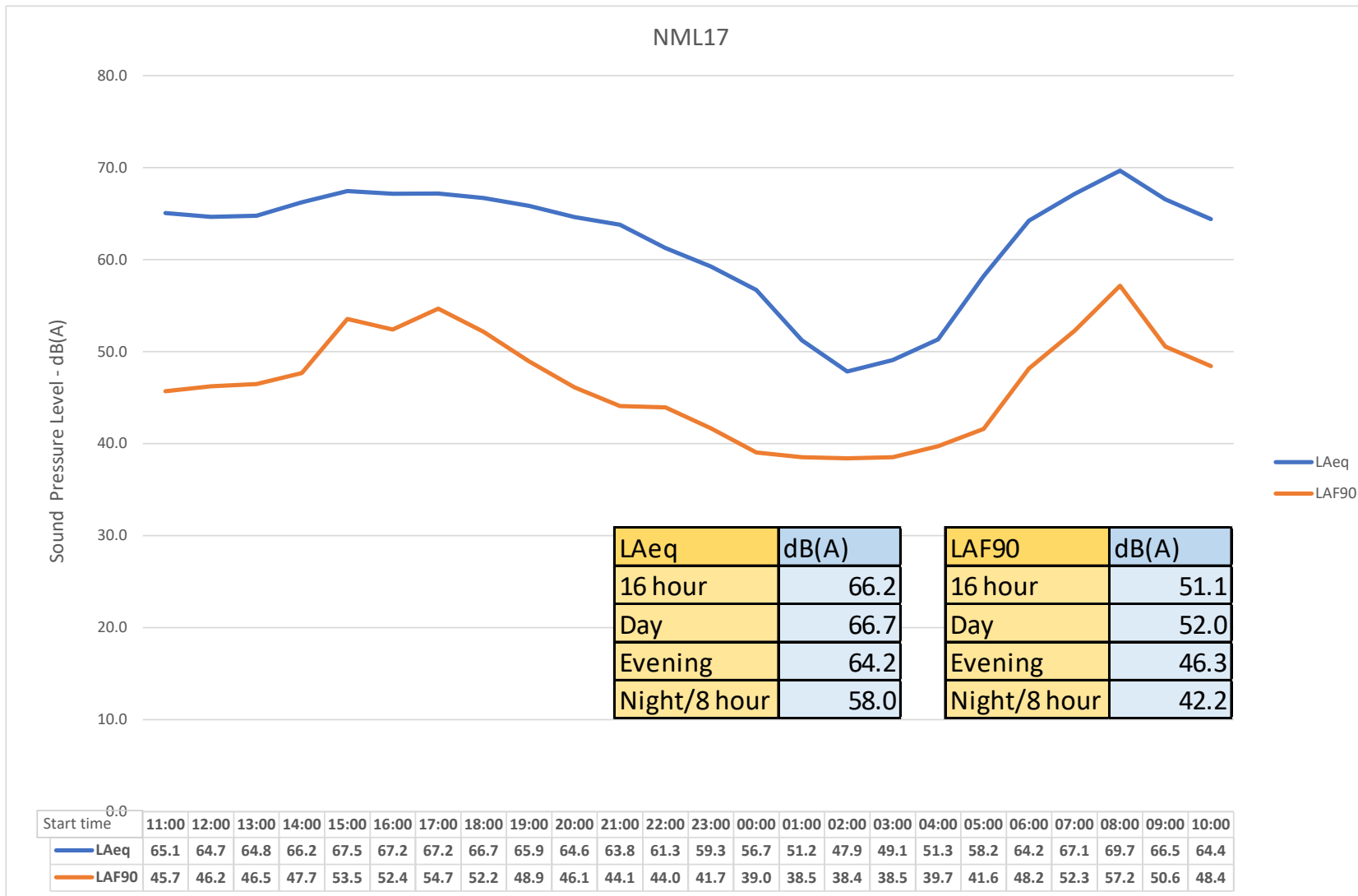


Figure A14-37: Results NML17

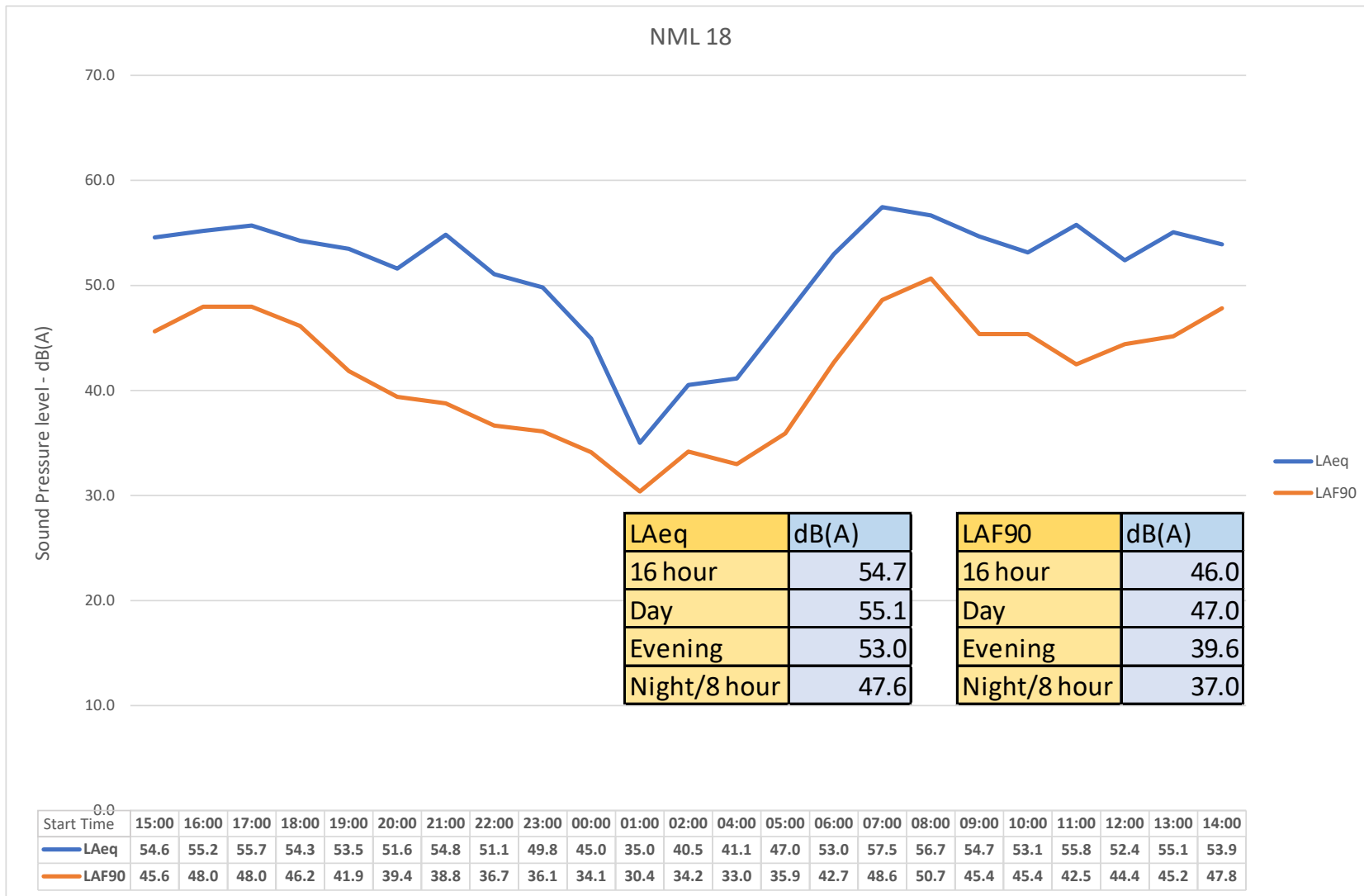


Figure A14-38: Results NML18