**AIR CONDITIONING UNITS AT 106-108 CROMER STREET**

**LONDON, WC1H 8BZ**

# NOISE IMPACT ASSESSMENT

**On behalf of:**

**GRAZIE MILLE LONDON LTD**

**DYNAMIC RESPONSE**
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Report No. DYN060516_2A/3
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**NOISE IMPACT ASSESSMENT**

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On behalf of:
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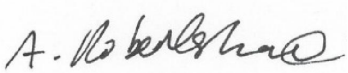
**This Report Is Believed To Be Accurate And True. However, Should A Mistake Be Found, Please Report It To Us As Soon As Possible. Distance Measurements Have Been Used From Online Mapping Solutions Where Necessary. However, The Accuracy Can Not Be Validated By Us.**



**CONTENTS**

## 1.0 INTRODUCTION

1.1 Dynamic Response was commissioned by 'Grazie Mille London Ltd' to assess the levels of noise emanating from 2 no. air conditioning units adjacent to existing noise sensitive receptors, located rear of '106-108 Cromer Street, London, WC1H 8BZ', in connection with a planning application.

1.2 At this juncture, we understand that the external air conditioning condenser units are used at the premises between approximately 09:00 – 22:00 hours. We further understand that the Local Authority has specified that noise from the air conditioning units must comply with policy DP28 of the 'Camden Local Development Framework, Adopted Version 2010'.

1.3 Prior to our noise survey, 'Obote Hope' from the Local Authority was contacted with regard to an acceptable representative noise survey duration in the absence of a secure noise monitoring location, where a complete 24-hour automated noise survey could be carried out. As a result, it was agreed that short-term representative noise monitoring during the proposed trading hours would be acceptable in principle, provided it represents the equipment operational periods in question.

1.4 In terms of the nearest likely to be affected residential dwelling facade/noise sensitive facade, we understand that the nearest potentially openable residential window is approximately 2.7m distance above the closest installed air conditioning condenser unit. This can be seen in Image 1 below.

**IMG-1 – Nearest Residential Façade And Installed Air Conditioning Condenser Units**

1.5 The assessment has included:

- An inspection of the site and surroundings;

- Measurements of the existing ambient background noise levels;
- Calculations/predictions of fixed plant air conditioning condenser noise;
- An assessment of resultant noise in accordance with policy DP28 of the 'Camden Local Development Framework, Adopted Version 2010';
- Recommendation of an appropriate mitigation scheme, if necessary and possible.

1.6 Noise levels referred to in this report, with exception of measurement results where deemed applicable, have been rounded to the nearest whole decibel (dB) as fractions of decibels are imperceptible.

## 2.0 EXISTING AMBIENT BACKGROUND NOISE LEVELS

2.1 Measurements of the existing ambient background noise climate were carried out on Thursday 7th/Friday 8th July 2016 during the proposed operational hours, representative of 1m distance from the nearest noise sensitive receptor window/facade identified in Section 1.0, with air conditioning equipment switched off.

2.2 Access to the nearest existing residential dwelling/noise sensitive receptor was not available during our survey. Therefore, the background noise measurements were measured at the rear building façade adjacent to the actual façade, measured from a staircase balcony. The position was deemed representative of the nearest likely to be affected residential dwelling/noise sensitive receptor.

2.3 The noise surveys were carried out using a Norsonic NOR-140 Type 1 Sound Level Meter (Serial No. 1403571). The calibration level of the meter was checked before and after the surveys with a Norsonic Type 1251 sound calibrator (Serial No. 31829) with no variation in level observed. The microphone had a windshield fitted.

2.4 The weather conditions at the measurement location were dry, warm (ranging between approximately 18-22ºC) and with a light breeze (<3 m/s) during the daytime measurements. The dominant noise sources throughout the background noise survey appeared to be intermittent local road traffic, occasional aircraft movements, distant city construction/development works and resident/neighbourhood noise.

2.5 The lowest hourly results of the background noise survey have been summarised in Table 1, with the complete survey results detailed in Appendix II.

**Table 1: Existing Ambient Noise Levels**

| Time (Hours) | Noise Levels, dB | | | Measurement Location |
|---|---|---|---|---|
| | $L_{Aeq}$ | $L_{Amax}$ | $L_{A90}$ | |
| 09:00 – 10:00 | 56 | 71 | 47 | Representative of 1m From NSR Building Window/Facade |
| 12:00 – 13:00 | 53 | 71 | 48 | |
| 15:00 – 16:00 | 57 | 85 | 49 | |
| 18:00 – 19:00 | 59 | 82 | 48 | |
| 21:00 – 22:00 | 50 | 74 | 44 | |

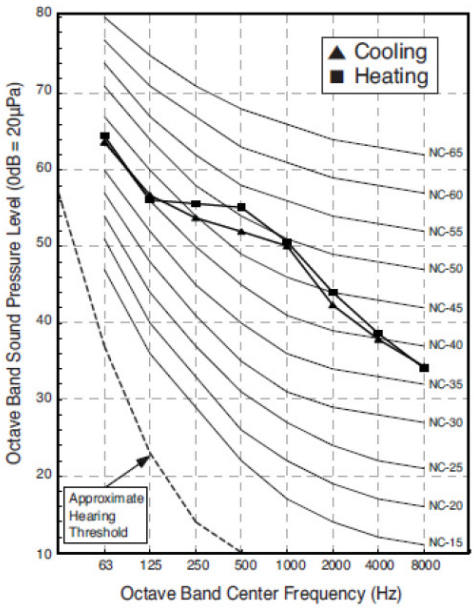
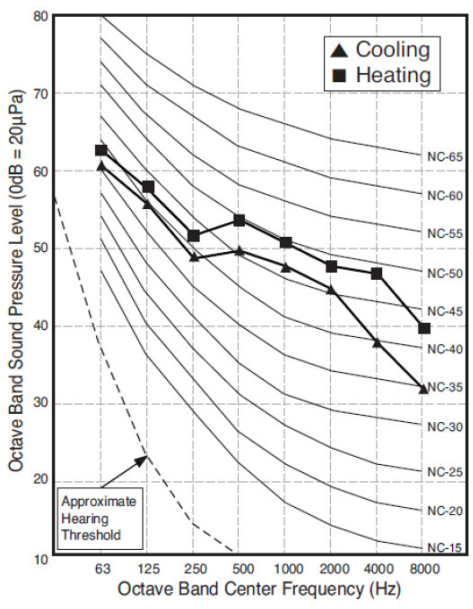
2.6 In this case, the lowest background noise level during the most noise sensitive equipment operational period was 44 dB $L_{A90(15\ minute)}$. Therefore, the background sound level of 44 dB $L_{A90}$ has been used as a basis for our noise assessment in Section 4.0. As the Local Authority criteria assesses any noise levels at 1m from the nearest façade, no façade correct has been applied, as reflections should be included.

## 3.0 FIXED PLANT NOISE LEVELS

3.1 As previously mentioned, the fixed plant equipment requiring assessment as seen in Image 1 of Section 1.0, consists of 2 no. external condenser units mounted approximately 3.0m above ground level at the rear of '106-108 Cromer Street'.

3.2 Considering the location of the external condensers above ground level, and the nearest sensitive façade, measurements of noise from the units in-situ were not possible. Therefore, it is necessary to calculate/predict the resultant noise levels in relation to the manufacturer data, as seen in Table 2.

**Table 2: Manufacturer Provided Maximum Noise Levels**

| Measurement Location And Description | Manufacturer Specification(s) | |
|---|---|---|
| At 1m Distance | A5UW30GFA1 [MU5M30 U43]   **LG MU5M30 (Left Unit In Image 1)**<br>53 dB(A) Heating<br>51 dB(A) Cooling | AUUW186D2 [UU18W UE2]   **LG UU18W (Right Unit In Image 1)**<br>51 dB(A) Heating<br>48 dB(A) Cooling |

3.3 The noise levels as seen in Table 2, have been used as the basis for our noise impact assessment, as outlined in Section 4.0.

## 4.0 NOISE ASSESSMENT AND RECOMMENDATION(S)

4.1 Similar to British Standard 4142: 2014, 'Methods for rating and assessing industrial and commercial sound', we understand that the 'London Borough Of Camden Local Development Plan 2010' states that 'Noise at 1 metre external to a sensitive façade' during the day, evening and night i.e. 00:00 – 24:00 hours must be 5 dB(A)< (**less than the**) $L_{A90}$. However, if the noise itself 'has a distinguishable discrete continuous note (whine, hiss, screech, hum),' or if it 'has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade', then it must be 10 dB(A)< (**less than the**) $L_{A90}$. Therefore, based on the likely intermittency etc., we would recommend that any fixed plant meet the second limit value of 10 dB(A) less than the existing background noise level $L_{A90}$.

4.2 From Section 2.6, the lowest existing background noise level $L_{A90}$ during the proposed equipment operating hours representative of 1m from the nearest noise sensitive façade was 44 dB $L_{A90(15\ minute)}$. Therefore, noise at 1 m from the noise sensitive facade, should be less than 34 dB(A) in accordance with the methodology above to demonstrate compliance.

4.3 Considering point source sound propagation regarding a +/- 6 dB increase/decrease per doubling of distance, we have calculated the following noise levels at the nearest noise sensitive window/façade to be as seen in Table 3.

**Table 3: Calculated Noise Levels**

| Item | Noise Level $L_{Aeq}$ @1m | Distance To Façade/ Window | Distance Correction | Resultant Noise @1m From Window/Facade |
|---|---|---|---|---|
| **LG MU5M30** | 53 dB(A) | 2.7m | -8.6 | 44.4 dB(A) |
| **LG UU18W** | 51 dB(A) | 3.0m | -9.5 | 41.5 dB(A) |
| Combined Noise Level | | | | 46.2 dB(A) |
| Façade Correction +3 | | | | 49.2 dB(A) |

4.4 The results of our calculations/predictions indicate a resultant noise level of 49.2 dB(A) at 1m distance from the window/façade (including façade reflections), which is above the maximum noise emission target of 34 dB(A). Therefore, we would recommend that an appropriate acoustic enclosure or screen be constructed around the air condition condenser units which provides a minimum insertion loss of 16 dB. This should reduce the resultant noise levels to be less than the 34 dB maximum noise emission target.

4.5 Acoustic enclosures or acoustic screens are manufactured by a range of suppliers, tailored to specific noise reduction characteristics. We understand that 'Environ' contactable at www.environ.co.uk, Tel: 0870 383 3344 have provided a tender for such an enclosure/screen to the client considering the Environlite ELV1.1.25AC (acoustic enclosure), which provides a transmission loss/insertion loss of 26 dB(A), as per the data sheets below. (Permission obtained by the client from Environ, for inclusion in this report)

4.6 Such an enclosure should reduce the predicted/calculated noise levels to be below the 34 dB maximum noise emission target. Therefore, complying with the Local Authority planning policy detailed in this report.

## environlite ELV1.1.25AC Acoustic Performance Data (March 2010)

### Noise Measurement Information:

Test: Environ Lite Acoustic Enclosure — W 1700mm x D 1000mm x H 1550mm

### Test Standard:

BS EN ISO 140-3 Acoustics - Measurement of Sound Insulation in Buildings and of Building Elements - Part 1: Airborne Sound Insulation

### Sound Level Measuring Equipment:

Norsonic 830 RTA Precision Sound Analyser Type 1
CEL 284/2 Acoustic Calibrator Type 1
JBL Loudspeaker driven by CEL Loudspeaker driven by 830 White Noise Source

### Transmission Loss Data:

| Transmission Loss — Environ ELV1.1.25AC Acoustic Enclosure | | | | | | | |
|---|---|---|---|---|---|---|---|
| Octave Frequency in Hertz (dB ref 2 x $10^{-5}$ Pascal's) | | | | | | | |
| **63** | **125** | **250** | **500** | **1K** | **2K** | **4K** | **8K** |
| 14 | 16 | 23 | 30 | 37 | 39 | 38 | 39 |
| **Summary** Transmission Loss Equates to an Overall Reduction of 26 dB(A) | | | | | | | |

environ
Tel: 0870 383 3344
www.environ.co.uk

**SELECTION MATRIX**

## environlite 1.1.25AC S3

Acoustic enclosures for Split AC & Small Condensers

| CUSTOMER: | SITE / LOCATION / REFERENCE |
|---|---|
| | |

**ORIGINAL EQUIPMENT MANUFACTURERS PUBLISHED DATA**

**MAKE, MODEL, DIMENSIONS, AIR FLOW & SOUND PRESSURE LEVEL @1.0M FREE FIELD**

| MAKE: | MODEL: | AIR IN | AIR OUT |
|---|---|---|---|
| LG | UU18W.UE2 | Front | Rear/Side |

| WIDTH (MM) | DEPTH (MM) | HEIGHT (MM) | AIRFLOW ($M^3S^{-1}$) | SPL dB(A) | DISTANCE (M) |
|---|---|---|---|---|---|
| 870 | 320 | 655 | 0.83 | 51 | 1 |

| INNER CUBE DIMENSIONS | | |
|---|---|---|
| 1050 | 400 | 935 |
| WIDTH (MM) | DEPTH (MM) | HEIGHT (MM) |
| 0.83 | 1.0 | 51 |
| AIRFLOW ($M^3S^{-1}$) | DISTANCE (M) | SPL dB(A) |

| ENCLOSURE DETAIL | | |
|---|---|---|
| 1650 | 950 | 1000 |
| WIDTH (MM) | DEPTH (MM) | HEIGHT (MM) |
| 0.83 | 1.0 | 25 |
| AIRFLOW ($M^3S^{-1}$) | DISTANCE (M) | SPL dB(A) |

| INLET AIRWAYS | | |
|---|---|---|
| 935 | 250 | 1 |
| WIDTH (MM) | HEIGHT (MM) | NO. |

| DESIGN CRITERIA | | |
|---|---|---|
| OK | OK | OK |
| UNIT SIZE | OUTLET | INLET |

| OUTLET AIRWAYS | | |
|---|---|---|
| 250 | 935 | 1 |
| WIDTH (MM) | HEIGHT (MM) | NO. |

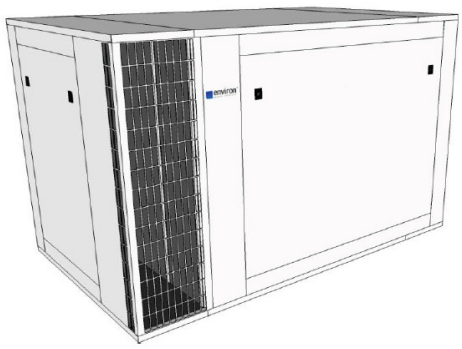
| AIRFLOW INFORMATION | | |
|---|---|---|
| 15 | 3.6 | 3.6 |
| PD ($NM^{-2}$) | OUTLET ($MS^{-1}$) | INLET ($MS^{-1}$) |

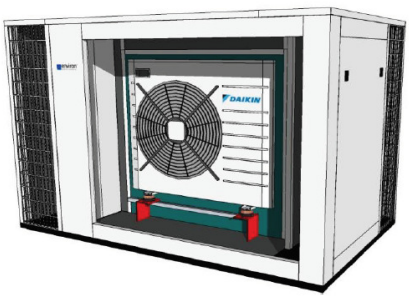
Select Inlet & Outlet Airway Sizes to Ensure Airflows are kept Below 6.0m/s

| ENCLOSURE INFORMATION | WIDTH (MM) | DEPTH (MM) | HEIGHT (MM) |
|---|---|---|---|
| INLET AIRWAY | 250 | | 935 |
| OUTLET AIRWAY | 250 | | 935 |
| EXTERNAL SIZE | 1650 | 950 | 1000 |
| Indicative SOUND LEVEL RANGE @ 1.0m (FREE FIELD) | 25 | SPL dB(A) SOUND PRESSURE | |

**NOTES CONCERNING ENCLOSURE DESIGN**

Approx Enclosure Weight 75kg





Tel: 0870 383 3344
www.environ.co.uk

**SELECTION MATRIX**

## environlite 1.1.25AC T4-1200

Acoustic enclosures for Split AC Unit Applications

**Monday, 29 January 18**

| CUSTOMER: | SITE / LOCATION / REFERENCE |
|---|---|
| | |

**ORIGINAL EQUIPMENT MANUFACTURERS PUBLISHED DATA**

MAKE, MODEL, DIMENSIONS, AIR FLOW & SOUND PRESSURE LEVEL @1.0M FREE FIELD

| MAKE: | MODEL: | AIR IN | AIR OUT |
|---|---|---|---|
| LG | MU5M30-U42 | Front | Rear/Side |

| WIDTH (MM) | DEPTH (MM) | HEIGHT (MM) | AIRFLOW ($M^3S^{-1}$) | SPL dB(A) | DISTANCE (M) |
|---|---|---|---|---|---|
| 950 | 330 | 834 | 1.00 | 53 | 1 |

| INNER CUBE DIMENSIONS | | |
|---|---|---|
| 1050 | 450 | 1135 |
| WIDTH (MM) | DEPTH (MM) | HEIGHT (MM) |
| 1.00 | 1.0 | 53 |
| AIRFLOW ($M^3S^{-1}$) | DISTANCE (M) | SPL dB(A) |

| ENCLOSURE DETAIL | | |
|---|---|---|
| 1650 | 1000 | 1200 |
| WIDTH (MM) | DEPTH (MM) | HEIGHT (MM) |
| 1.00 | 1.0 | 27 |
| AIRFLOW ($M^3S^{-1}$) | DISTANCE (M) | SPL dB(A) |

| INLET AIRWAYS | | |
|---|---|---|
| 1135 | 250 | 1 |
| WIDTH (MM) | HEIGHT (MM) | NO. |

| DESIGN CRITERIA | | |
|---|---|---|
| OK | OK | OK |
| UNIT SIZE | OUTLET | INLET |

| OUTLET AIRWAYS | | |
|---|---|---|
| 250 | 1135 | 1 |
| WIDTH (MM) | HEIGHT (MM) | NO. |

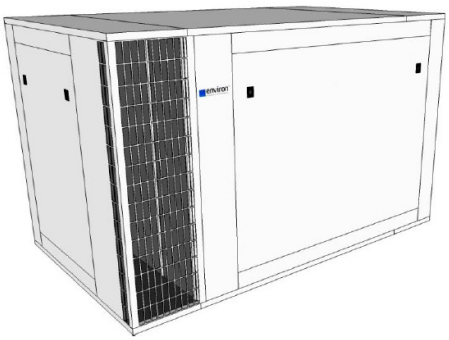
| AIRFLOW INFORMATION | | |
|---|---|---|
| 15 | 3.5 | 3.5 |
| PD ($NM^{-2}$) | OUTLET ($MS^{-1}$) | INLET ($MS^{-1}$) |

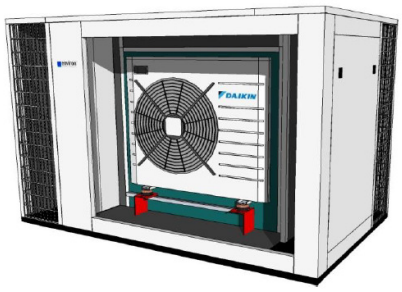
Select Inlet & Outlet Airway Sizes to Ensure Airflows are kept Below 6.0m/s

| ENCLOSURE INFORMATION | WIDTH (MM) | DEPTH (MM) | HEIGHT (MM) |
|---|---|---|---|
| INLET AIRWAY | 250 | | 1135 |
| OUTLET AIRWAY | 250 | | 1135 |
| EXTERNAL SIZE | 1650 | 1000 | 1200 |
| indicative SOUND LEVEL RANGE @ 1 M (Free Field | 27 | SPL dB(A) SOUND PRESSURE | |

**NOTES CONCERNING ENCLOSURE DESIGN**

Enclosure Weight 90kg





## 5.0 SUMMARY AND CONCLUSION(S)

5.1 Dynamic Response was commissioned by 'Grazie Mille London Ltd' to assess the levels of noise emanating from 2 no. air conditioning units adjacent to existing noise sensitive receptors, located rear of '106-108 Cromer Street, London, WC1H 8BZ', in connection with a planning application.

5.2 This has involved carrying out a background noise survey representative of 1m from the nearest likely to be affected existing residential dwelling facade/noise sensitive receptor facade, the calculation/prediction of the resultant noise levels which could be likely to affect nearby residents, and an assessment of the noise impact in accordance with the 'London Borough Of Camden Local Development Plan 2010, DP28 – Table E'.

5.3 The result of our assessment concludes that the resultant noise emanating from the 2 no. air conditioning condenser units mounted rear of '106-108 Cromer Street', is not likely to meet the Local Authority noise criteria in its current state. Therefore, we have recommended that an appropriate acoustic enclosure/screen is erected around the fixed plant units, with a minimum insertion loss of 16 dB. This should ensure that resultant noise levels are controlled to comply with the Local Authority acoustic criteria.

5.4 Attention to detail is vital with any sound proofing works and care must be taken to seal any holes or gaps in various constructions with the appropriate acoustic mastic or similar. Failure to do this may result in the predicted noise reduction not being achieved.

5.5 If any equipment/activity or the position/arrangement of any equipment/activity, enclosure constructions and/or structures etc., alter or differ from those detailed in this report for whatever reason, the noise impact at the nearest nearby residential dwelling/noise sensitive receptor should be re-assessed accordingly. Any recommendations in this report have been given for acoustical reasons only. Therefore, if relevant, any other requirements, for example structural, fire or otherwise, should be checked by the relevant professional.

## APPENDIX I – NOISE UNITS AND INDICES

**dB**

The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. When measuring sound (or noise) levels, it usually ranges from 0 dB (the threshold of hearing) to 140 dB (the threshold of pain).

**dB(A)**

Are decibels measured using a sound level meter using a frequency rating which relates sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) generally agree with peoples assessment of loudness.

**Hz**

Is a unit of frequency which is equal to one cycle per second. The frequency is related to the pitch of a sound.

**$L_{Aeq}$**

This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period.

**$L_{Amax}$**

This is the maximum A-weighted noise level that was recorded during the monitoring period.

**$L_{A10}$**

Is the A-weighted noise level exceeded for 10% of the measurement duration (T).

**$L_{A90}$**

Is the A-weighted noise level exceeded for 90% of the measurement duration (T) and is generally used to define the background noise level.

**SEL**

This is the 'sound exposure level' of a single event (such as a passing train) and is the $L_{Aeq}$ value of the whole event normalised to a 1 second period level of a sound.

**Insertion Loss**

This is the measure of the effectiveness of an enclosure, silencer or product/device, in dB, considering the difference between the noise level with and without the product/device present.

## APPENDIX II – RESULTS OF NOISE SURVEYS

**Dates:** Thursday 7th/Friday 8th July 2016

**Equipment:** Norsonic NOR-140 Type 1 Sound Level Meter (Serial No. 1403571)

**Weather:** Dry, warm (ranging between18-22$^{o}$C) and with a light breeze (<3 m/s)

**Measurement Location(s):** See Below

**Table A1: Background Noise Levels**

| Location | Time | $L_{Aeq}$ | $L_{Amax}$ | $L_{A90}$ | Comments |
|---|---|---|---|---|---|
| Rear Of The '106-108 Cromer Street' Building Façade, Adjacent To The Nearest Window/Façade. | 09:00 – 09:15 | 63.2 | 80.9 | 49.5 | Dominant Noise Sources Appeared To Be Intermittent Local Road Traffic, Occasional Aircraft Movements, Distant City Construction / Development Works And Resident / Neighbourhood Noise. |
| | 09:15 – 09:30 | 59.7 | 72.2 | 48.7 | |
| | 09:30 – 09:45 | 59.4 | 67.4 | 50.8 | |
| | 09:45 – 10:00 | 56.2 | 71.2 | 46.8 | |
| | 12:00 – 12:15 | 56.6 | 71.3 | 49.4 | |
| | 12:15 – 12:30 | 53.2 | 71.0 | 48.2 | |
| | 12:30 – 12:45 | 55.1 | 80.0 | 48.8 | |
| | 12:45 – 13:00 | 53.4 | 68.3 | 49.1 | |
| | 15:00 – 15:15 | 57.4 | 82.3 | 50.4 | |
| | 15:15 – 15:30 | 57.4 | 76.0 | 50.1 | |
| | 15:30 – 15:45 | 56.1 | 78.1 | 49.7 | |
| | 15:45 – 16:00 | 57 | 84.7 | 48.5 | |
| | 18:00 – 18:15 | 58.8 | 83.8 | 48.8 | |
| | 18:15 – 18:30 | 59.2 | 82.4 | 47.6 | |
| | 18:30 – 18:45 | 58.2 | 81.4 | 48.9 | |

| | | | | | |
|---|---|---|---|---|---|
| | 18:45 – 19:00 | 57.3 | 79.1 | 48.6 | |
| | 21:00 – 21:15 | 49.8 | 73.7 | 44.2 | |
| | 21:15 – 21:30 | 50.8 | 77.6 | 43.6 | |
| | 21:30 – 21:45 | 52.6 | 77.6 | 44.5 | |
| | 21:45 – 22:00 | 51.7 | 75.7 | 44.2 | |