

## **APPENDIX 13.1: SURVEY METHOD**

## APPENDIX 13.1 SURVEY METHOD

### SURVEY EQUIPMENT

Noise monitoring was undertaken using the following equipment:

**Table 13.1 Monitoring Equipment**

| Equipment                 | Type       | Serial number | Calibration date |
|---------------------------|------------|---------------|------------------|
| Class 1 Sound Level Meter | RION NL-52 | 976246        | 19/12/2019       |
|                           |            | 976250        | 19/12/2019       |
|                           |            | 386770        | 08/12/2020       |
|                           |            | 1043373       | 15/04/2021       |
|                           |            | 643029        | 06/11/2019       |
|                           |            | 876025        | 06/11/2019       |
| Acoustic Calibrator       | RION NC-75 | 34291338      | 23/06/2020       |
| Vibration Meter           | RION XV-2P | 1270050       | 07/01/2020       |

All noise measurements were undertaken in accordance with the requirements detailed in BS 7745, with the microphone positioned away from reflecting surfaces and (at least) 1.5 m above the ground height.

The calibration of each sound level meter was checked before and after the measurements, using the acoustic calibrator at 94 dB at 1 kHz; no significant calibration drift was noted.

The sound level meters used conform to the requirements of BS EN 61672-1:2013 and the calibrator used conforms to the requirements of BS EN 60942:2018. The equipment used has a calibration history that is traceable to a certified calibration institution. Measurements were logged in 15-minute samples (with supplementary 1 second Lp data) and obtained in third-octave bands (UL1 to UL4) and broadband mode (UL1 to UL6), providing the following broadband indices;  $L_{Aeq}$ ,  $L_{A10}$ ,  $L_{A90}$  and  $L_{AFmax}$ .

### WEATHER CONDITIONS

Representative local weather conditions during the monitoring were obtained from <https://www.timeanddate.com/weather/@2656295> (Barnet Weather Station) and are summarised below:

**Table 13.2 Summary of Weather Data**

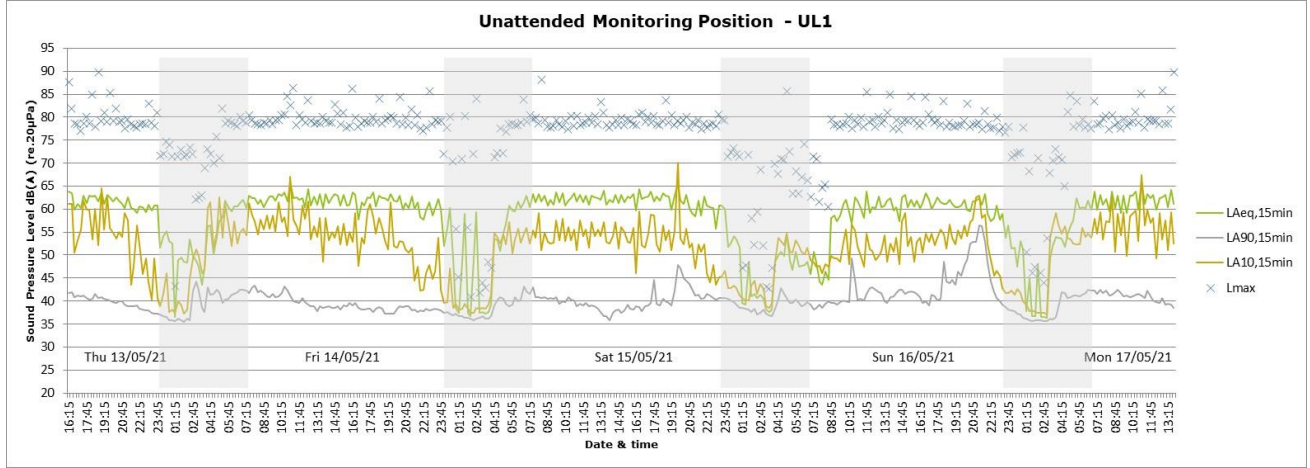
| <b>Date/Time</b>        | <b>Average Temperature / °C</b> | <b>Average Wind Speed / ms-1</b> | <b>Dominant Wind Direction</b> | <b>Weather Conditions</b>   |
|-------------------------|---------------------------------|----------------------------------|--------------------------------|-----------------------------|
| 13/05/2021<br>1200-1800 | 10 – 14                         | 4.2                              | E                              | Partly sunny                |
| 14/05/2021<br>0000-0600 | 8 – 10                          | 3.6                              | NE                             | Passing clouds              |
| 14/05/2021<br>1200-1800 | 10 – 12                         | 2.5                              | NNW                            | Partly sunny                |
| 15/05/2021<br>0000-0600 | 8 – 10                          | 2.5                              | ESE                            | Passing clouds              |
| 15/05/2021<br>1200-1800 | 12 – 15                         | 2.5                              | WSW                            | Partly sunny                |
| 16/05/2021<br>0000-0600 | 7 – 9                           | 1.7                              | SW                             | Passing clouds              |
| 16/05/2021<br>1200-1800 | 11 – 15                         | 4.4                              | SSW                            | Sprinkles.<br>Broken clouds |
| 17/05/2021<br>0000-0600 | 10                              | 3.1                              | WNW                            | Passing clouds              |
| 17/05/2021<br>1200-1800 | 10 – 17                         | 3.3                              | N                              | Broken clouds               |

Weather conditions noted above are considered suitable for monitoring purposes in accordance with BS 7445.

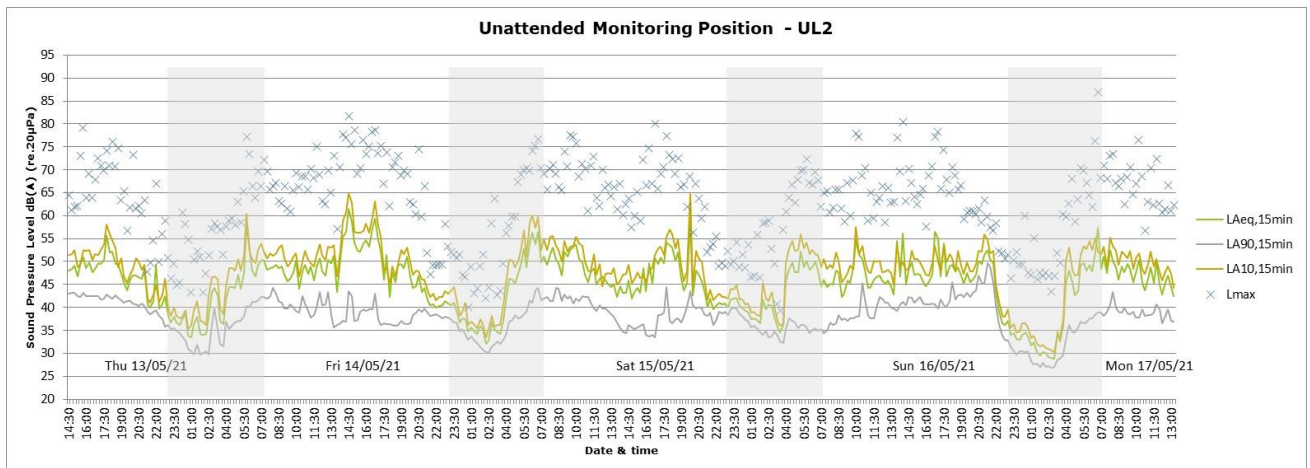
## **APPENDIX 13.2: NOISE SURVEY RESULTS**

## APPENDIX 13.2 NOISE SURVEY RESULTS

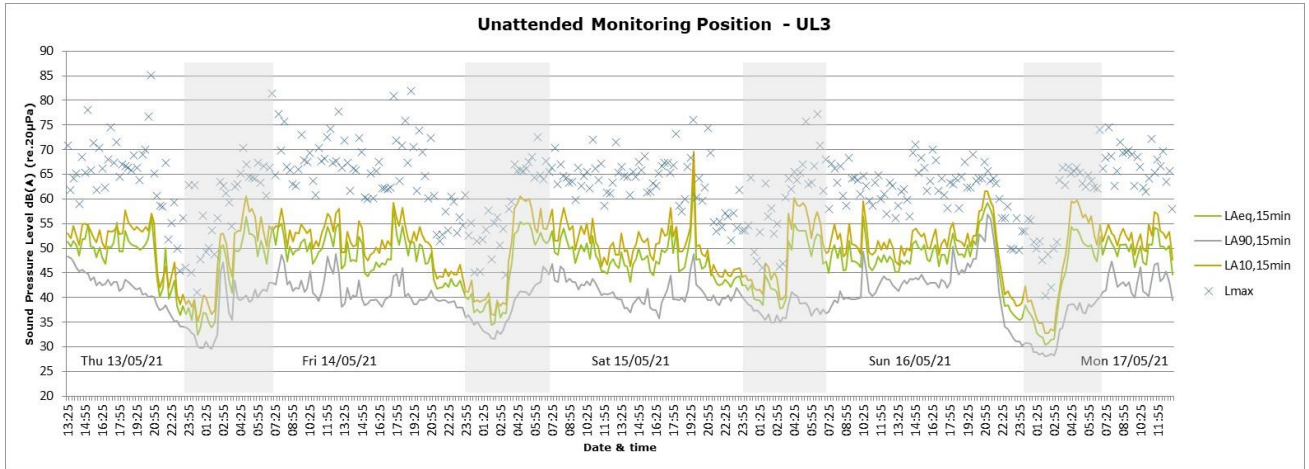
**Figure 13.1 Noise Survey Results – Unattended Monitoring  
Position UL1**



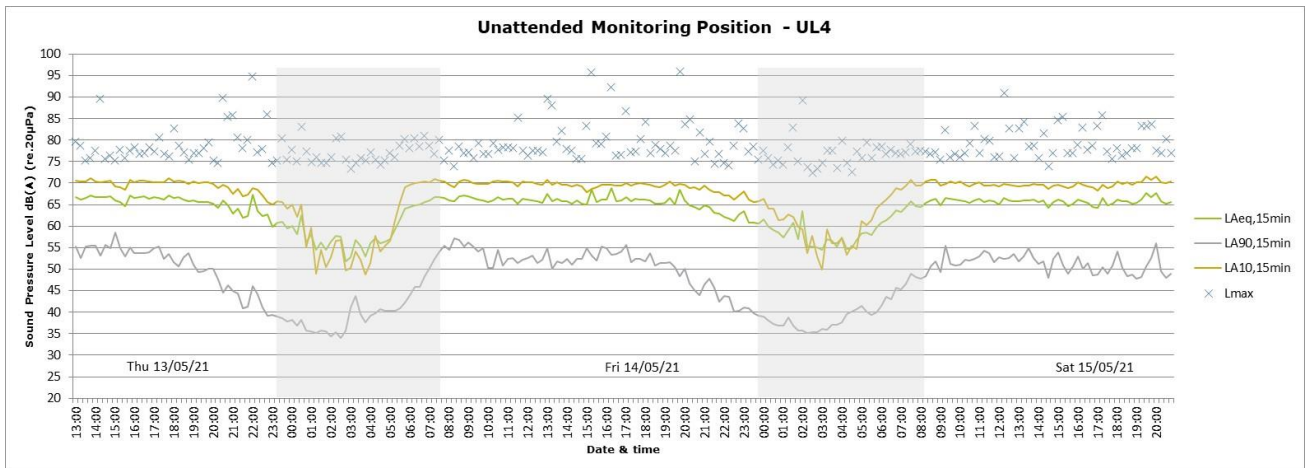
**Figure 13.2 Noise Survey Results – Unattended Monitoring  
Position UL2**



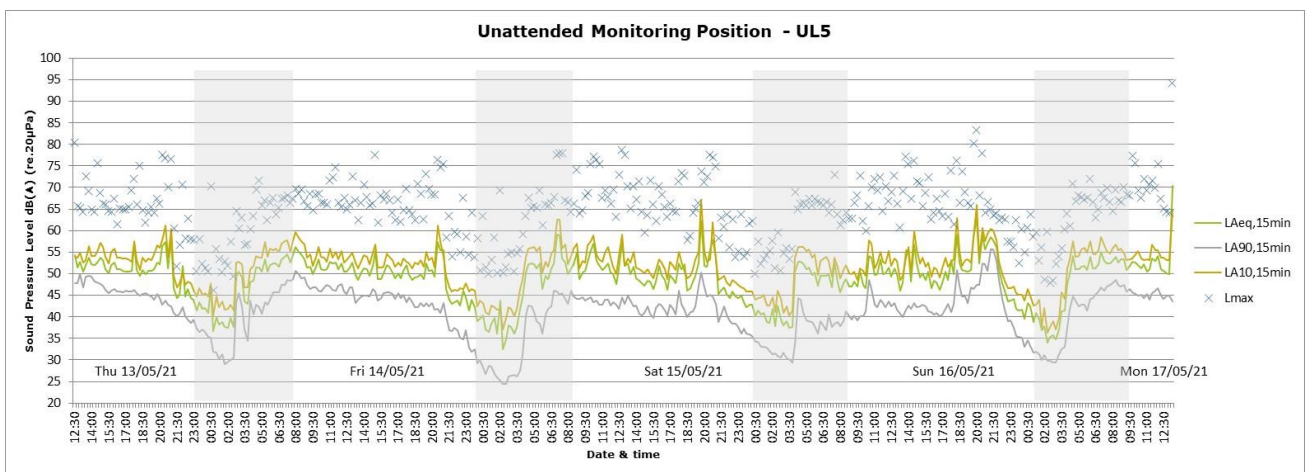
**Figure 13.3 Noise Survey Results – Unattended Monitoring  
Position UL3**



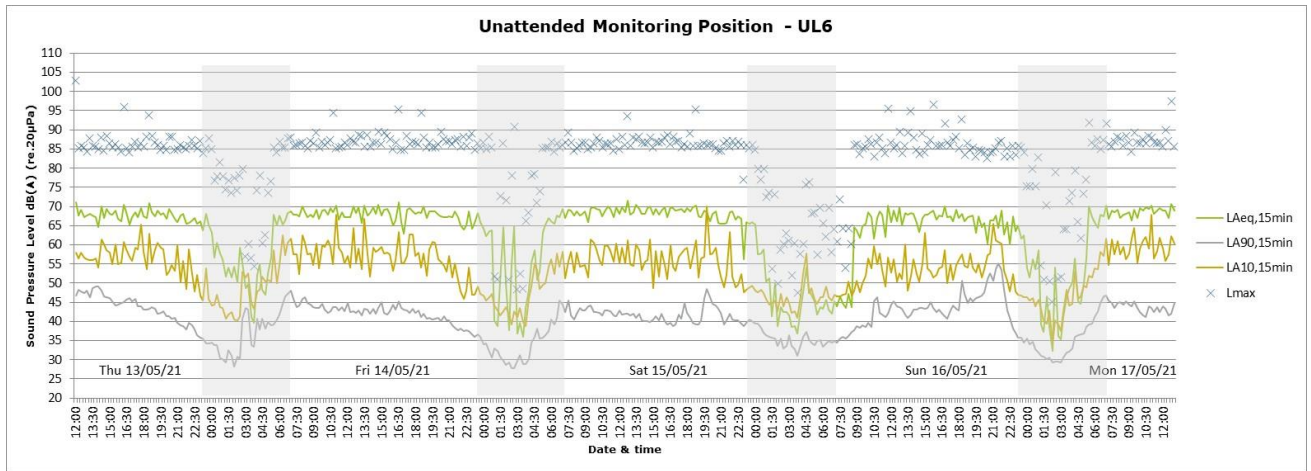
**Figure 13.4 Noise Survey Results – Unattended Monitoring  
Position UL4**



**Figure 13.5 Noise Survey Results – Unattended Monitoring  
Position UL5**



**Figure 13.6 Noise Survey Results – Unattended Monitoring  
Position UL6**



## **APPENDIX 13.3: BACKGROUND NOISE STATISTICAL ANALYSIS**



## APPENDIX 13.3 BACKGROUND NOISE STATISTICAL ANALYSIS

Figure 13.7 UL1 Daytime Background Noise Histogram

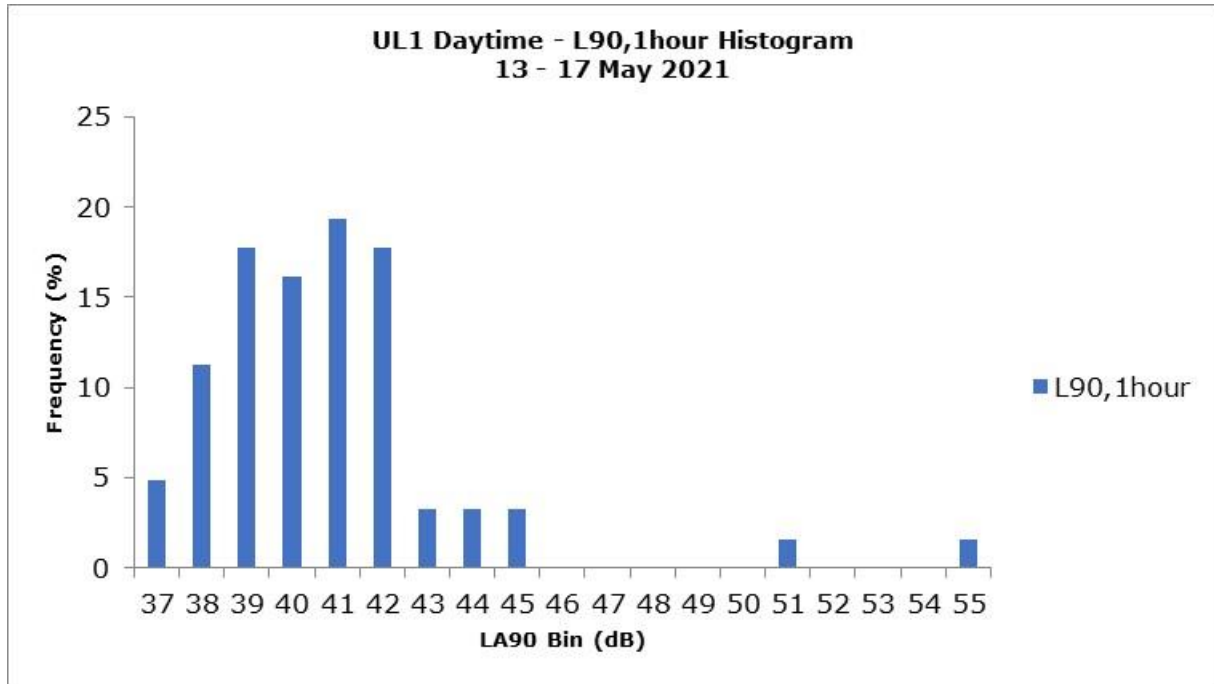
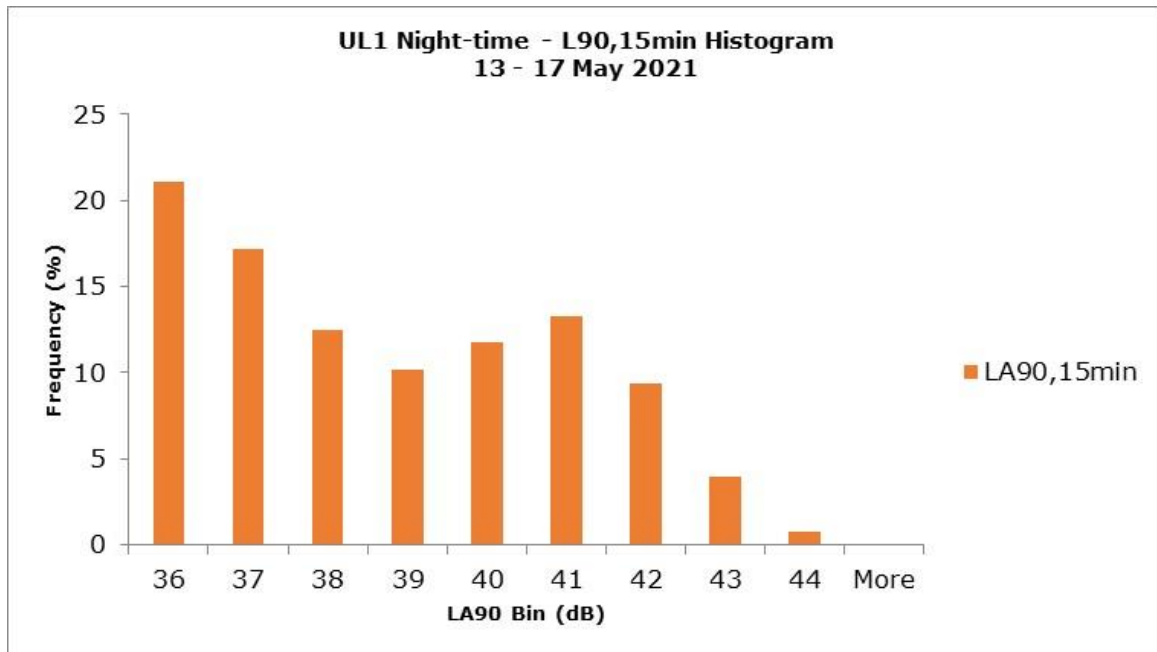
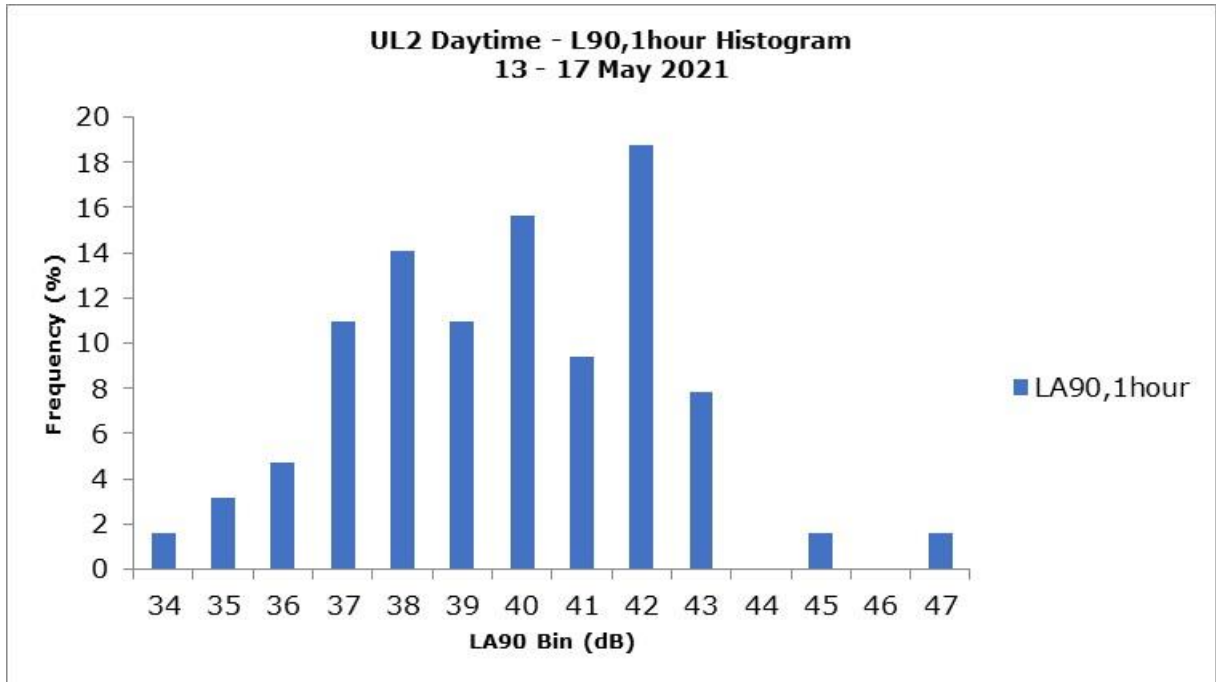


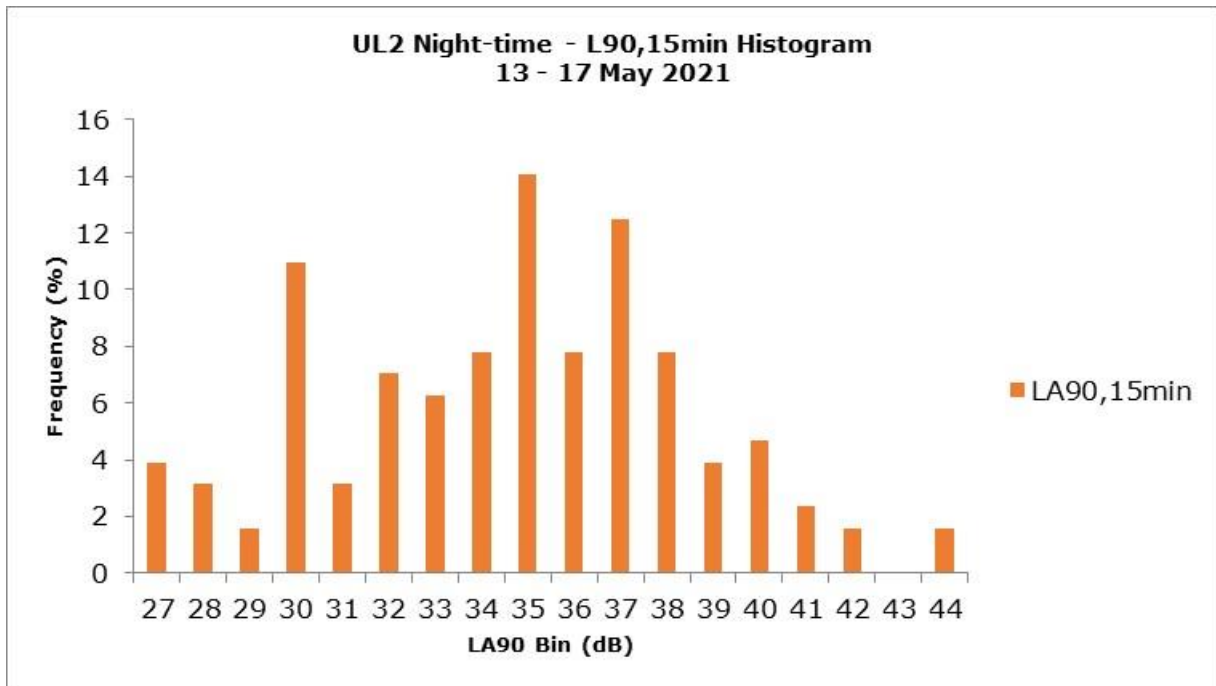
Figure 13.8 UL1 Night-time Background Noise Histogram



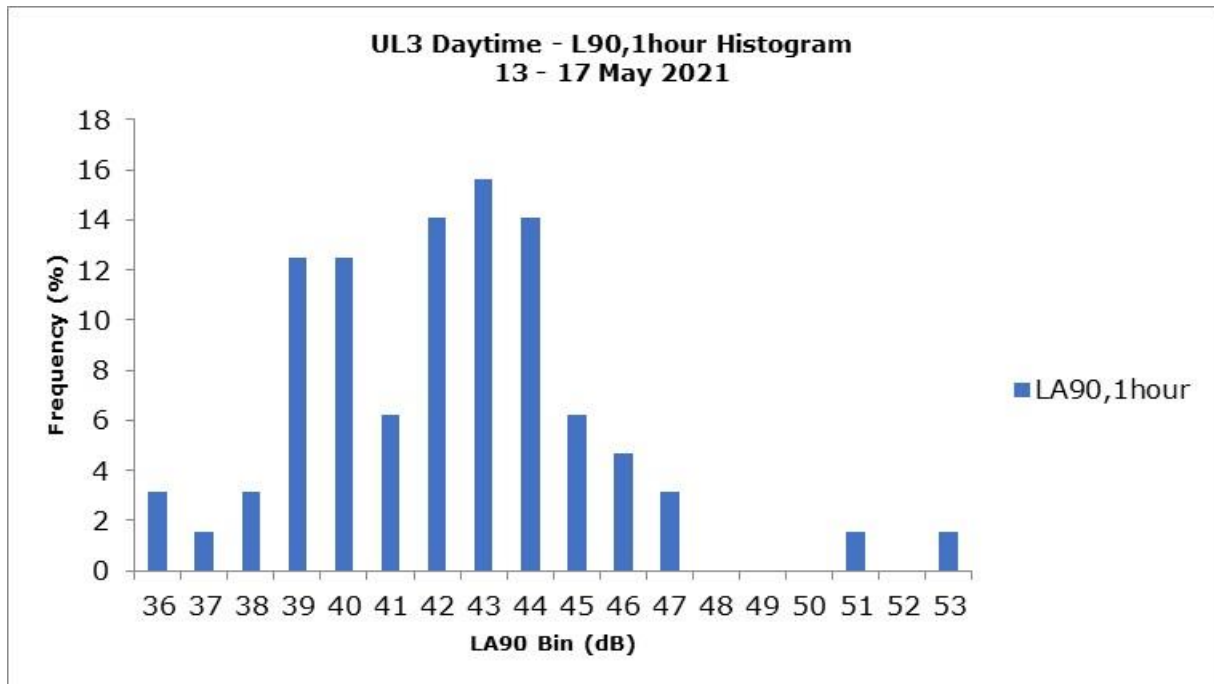
**Figure 13.9 UL2 Daytime Background Noise Histogram**



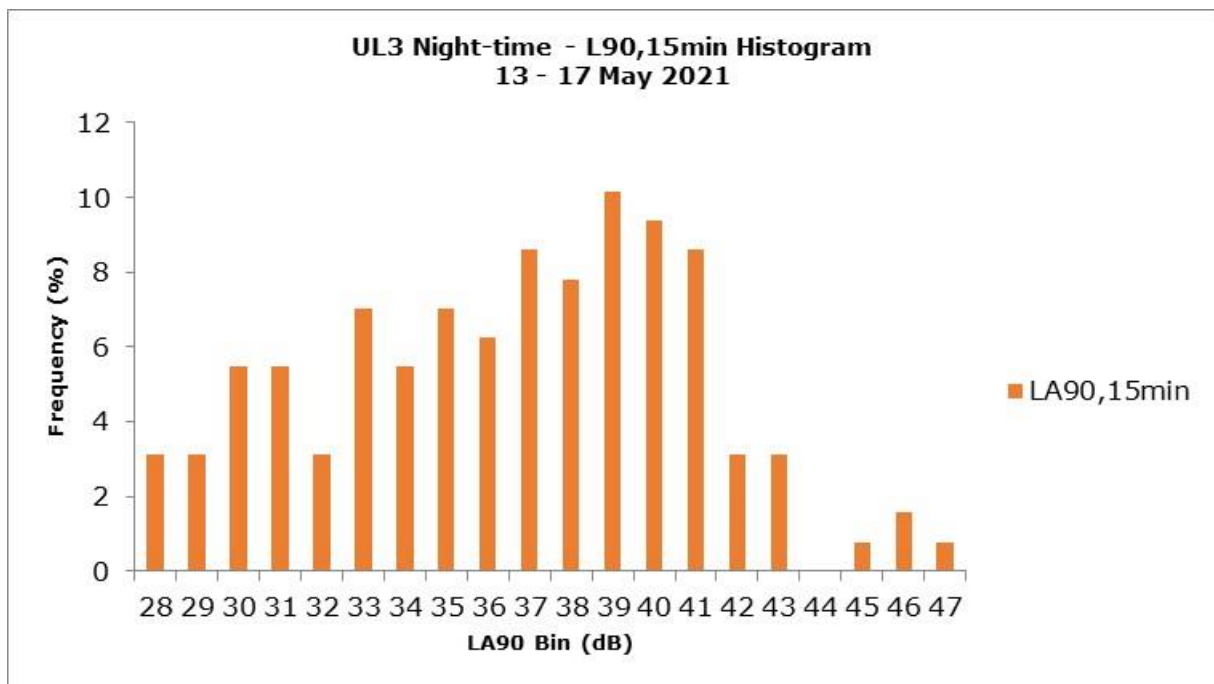
**Figure 13.10 UL2 Night-time Background Noise Histogram**



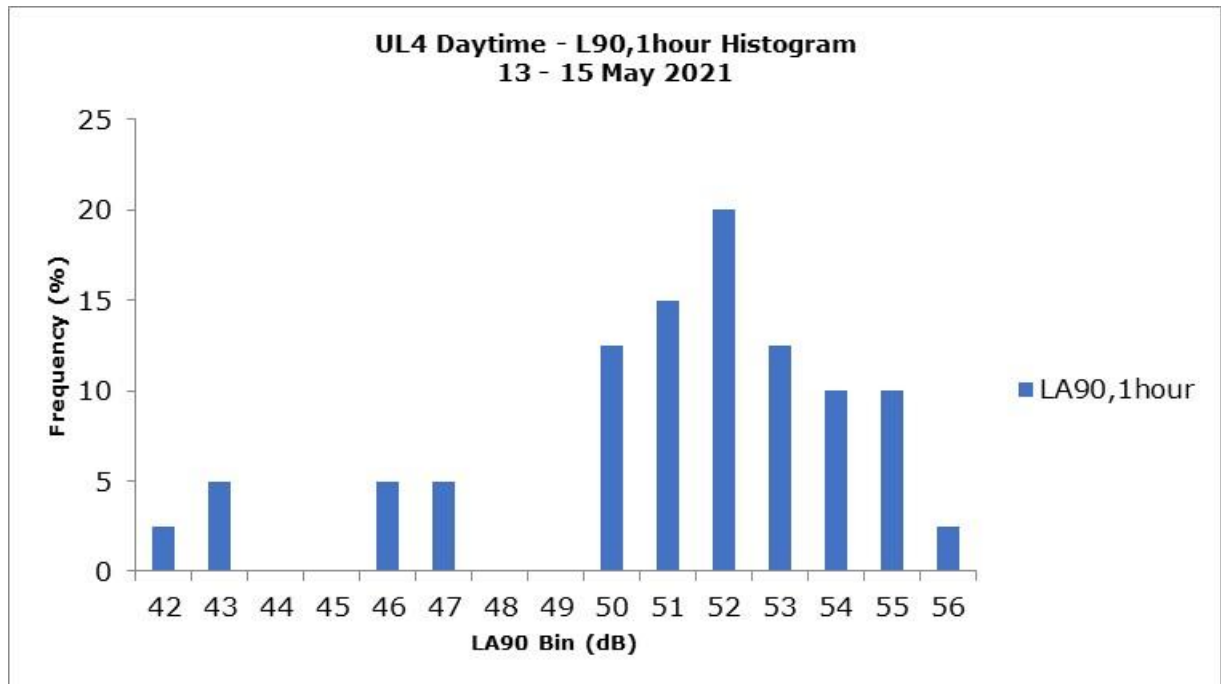
**Figure 13.11 UL3 Daytime Background Noise Histogram**



**Figure 13.12 UL3 Night-time Background Noise Histogram**



**Figure 13.13 UL4 Daytime Background Noise Histogram**



**Figure 13.14 UL4 Night-time Background Noise Histogram**

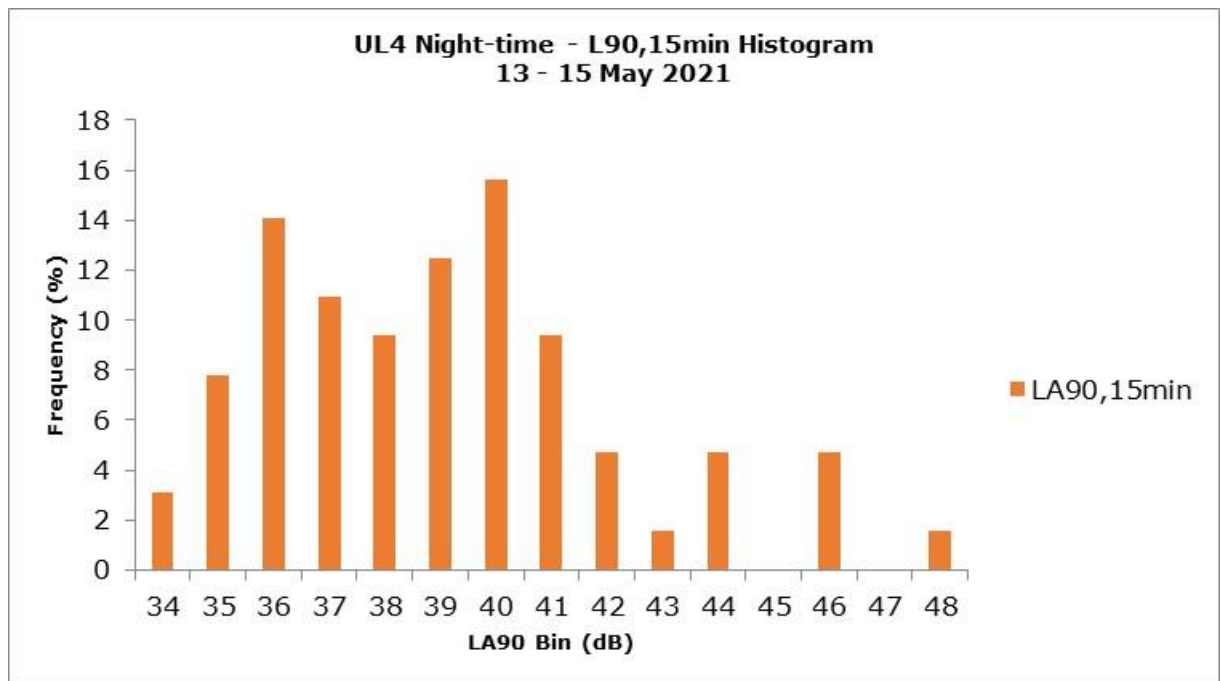


Figure 13.15 UL5 Daytime Background Noise Histogram

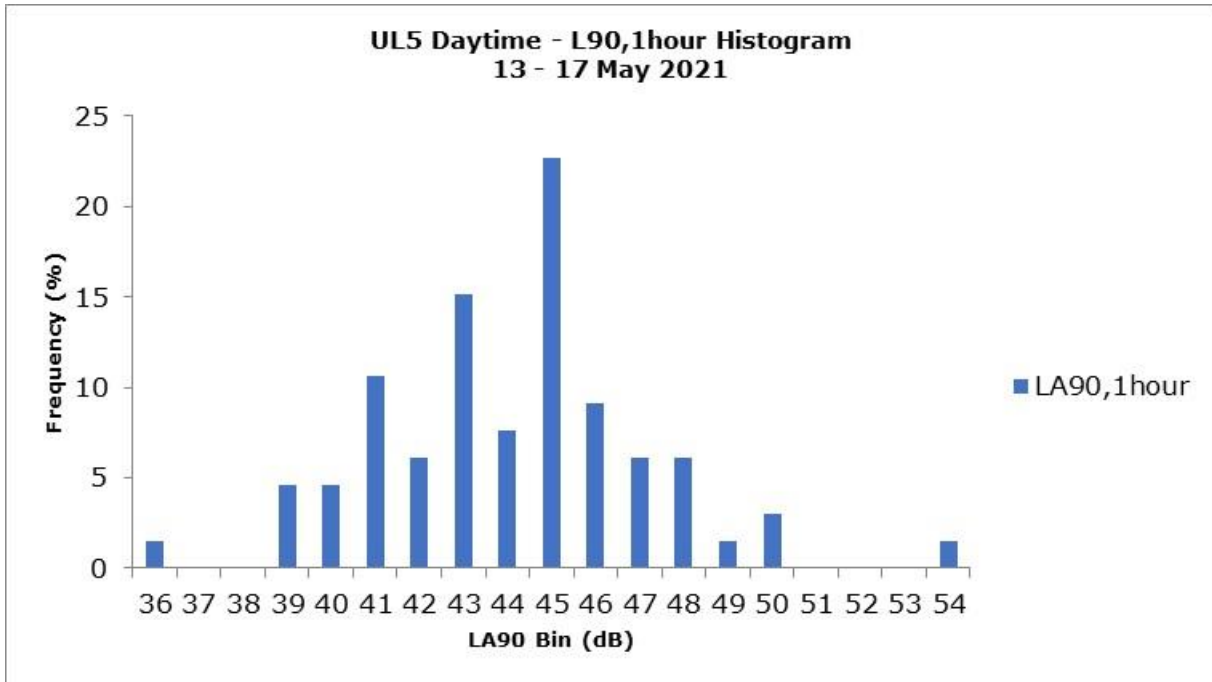
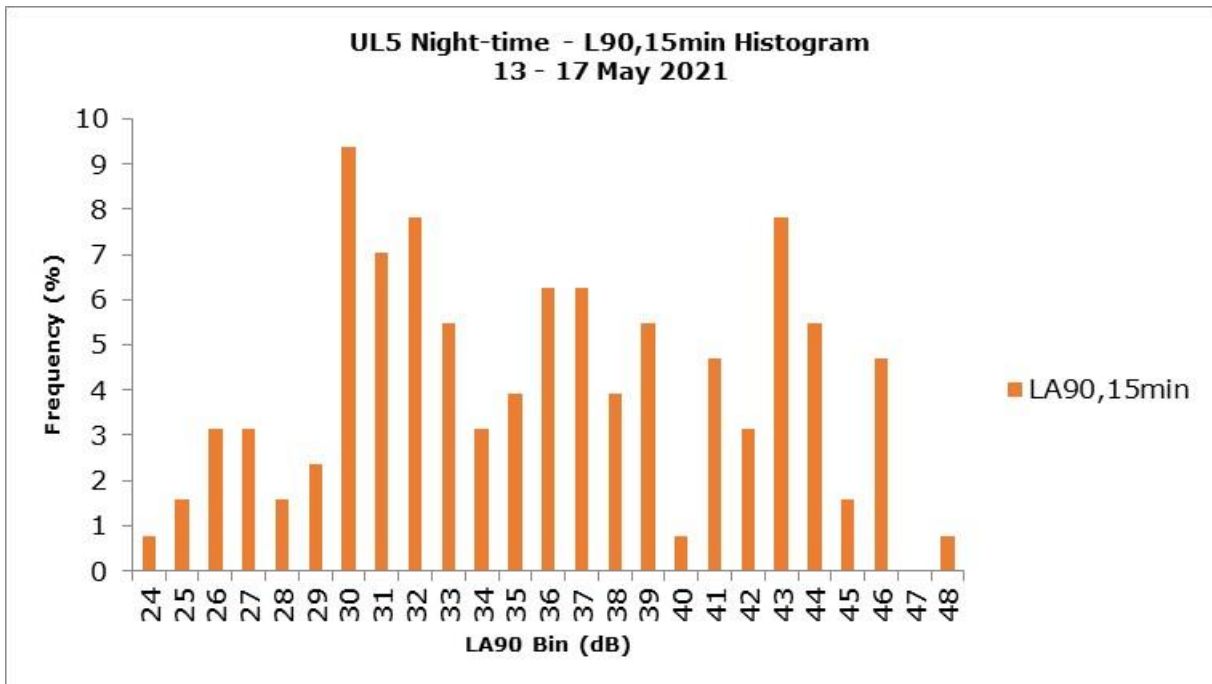
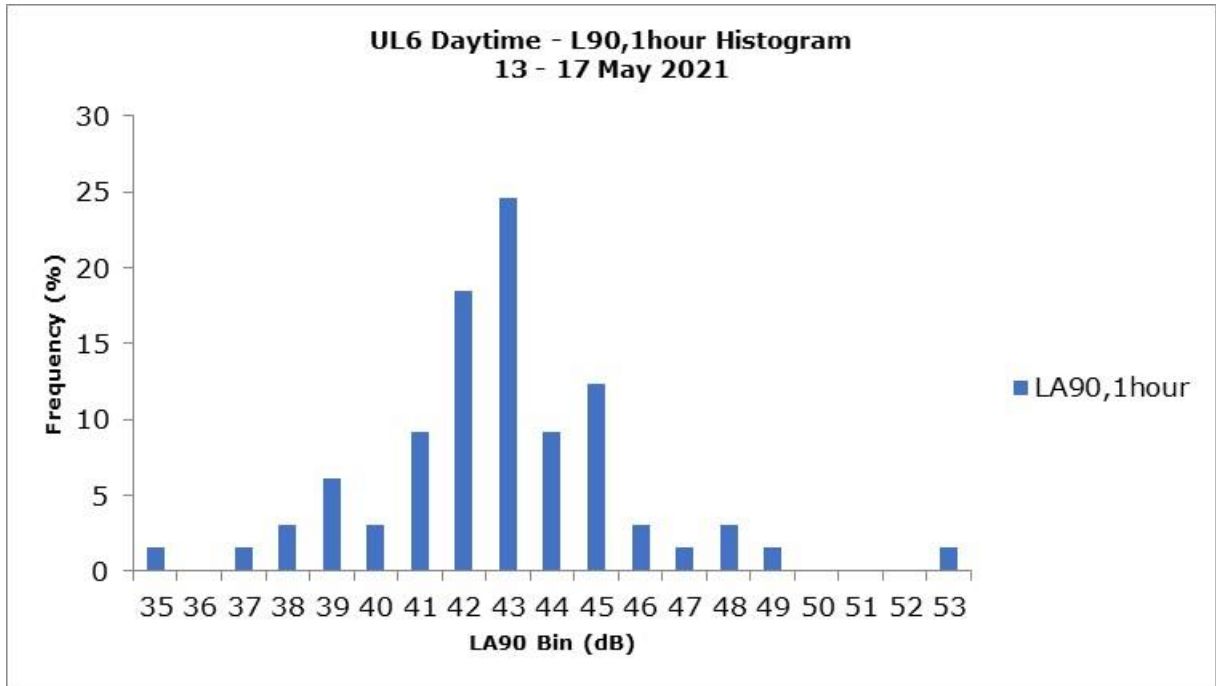


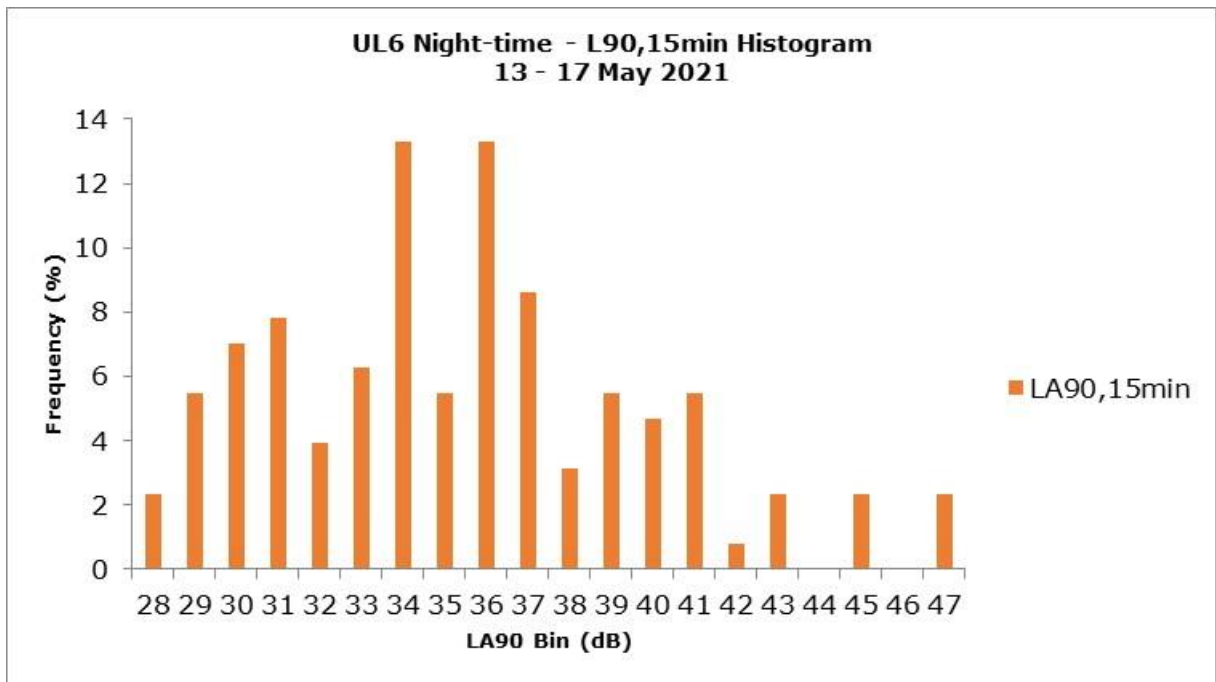
Figure 13.16 UL5 Night-time Background Noise Histogram



**Figure 13.17 UL6 Daytime Background Noise Histogram**



**Figure 13.18 UL6 Night-time Background Noise Histogram**



## **APPENDIX 13.4: ROAD TRAFFIC COUNT DATA**

## APPENDIX 13.4 ROAD TRAFFIC COUNT DATA

| Road Link   | Two-way Flows             |   | Noise Level Change, dB L <sub>A10, 18hr</sub> |
|---|---------------------------|---|---|
|   | 2025 Baseline + Committed | 2025 Baseline + Committed + Development | Short Term                                    |
| Brunswick Park Road   | 15,705                    | 15,335                                  | -0.1  |
| * Data reproduced from North London Business Park, Noise Assessment Report – Addendum, The EQUUS Partnership Ltd, 2018. |                           |   |   |



## **APPENDIX 13.5: DAYTIME NOISE CONTOUR MAPS**

## APPENDIX 13.5 DAYTIME NOISE CONTOUR MAPS

Figure 13.19 Daytime Grid Noise Map (Ground Floor)

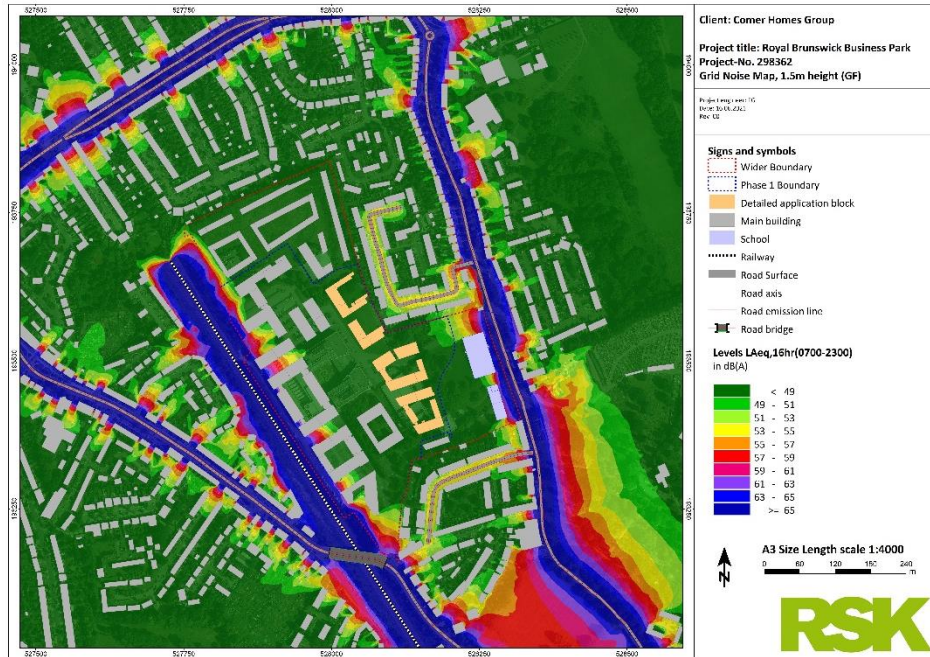


Figure 13.20 Daytime Grid Noise Map (First Floor)

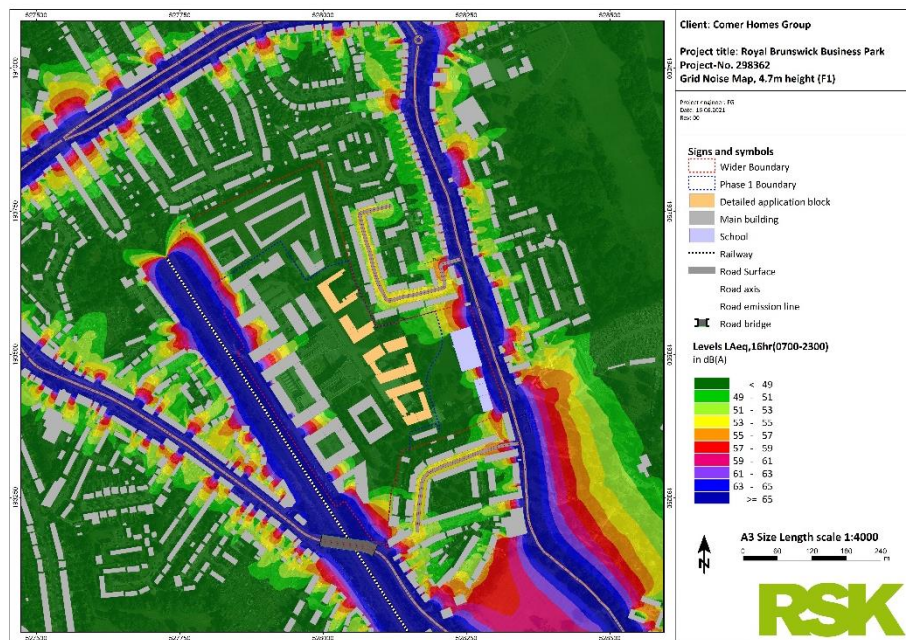


Figure 13.21 Daytime Grid Noise Map (Fifth Floor)

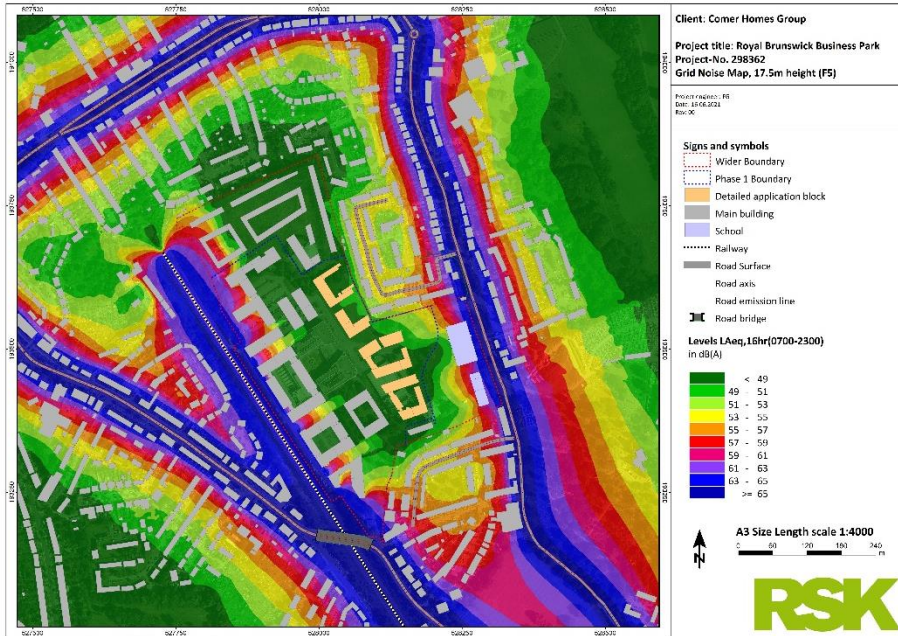
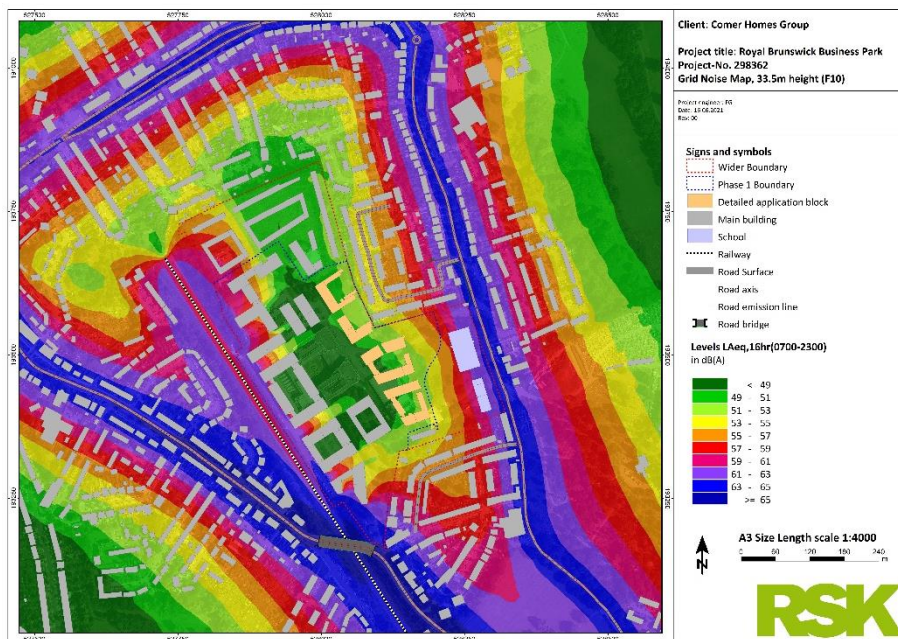


Figure 13.22 Daytime Grid Noise Map (10-th Floor)



## **APPENDIX 13.6: NIGHT-TIME NOISE CONTOUR MAPS**



## APPENDIX 13.6 NIGHT-TIME NOISE CONTOUR MAPS

Figure 13.23 Night-time Grid Noise Map (First Floor)

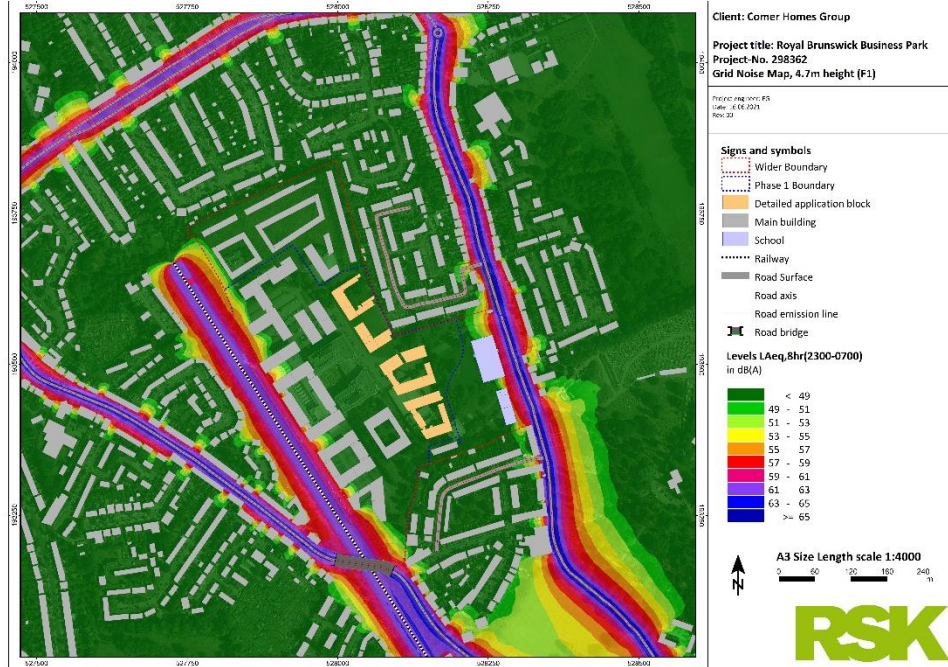


Figure 13.24 Night-time Grid Noise Map (Fifth Floor)

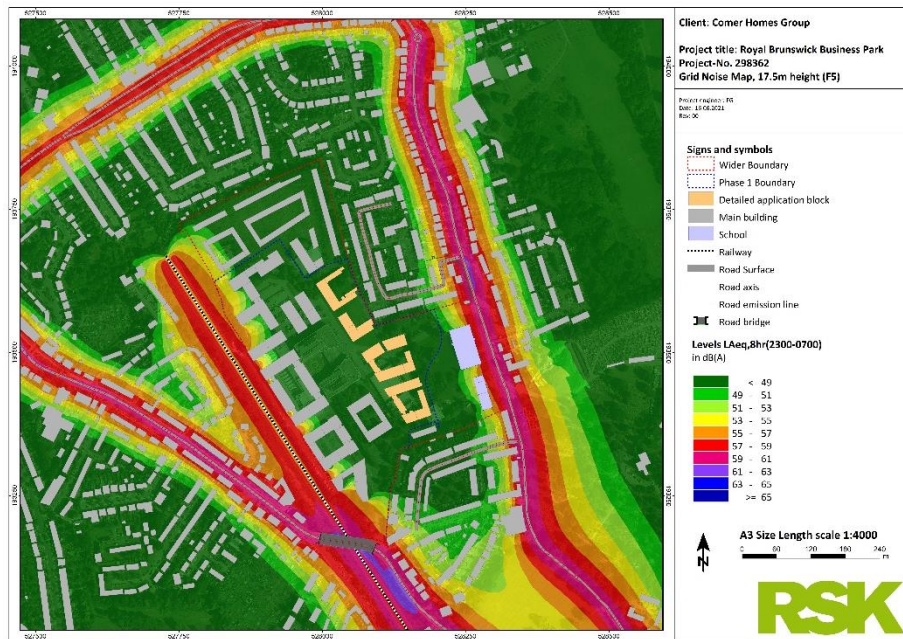
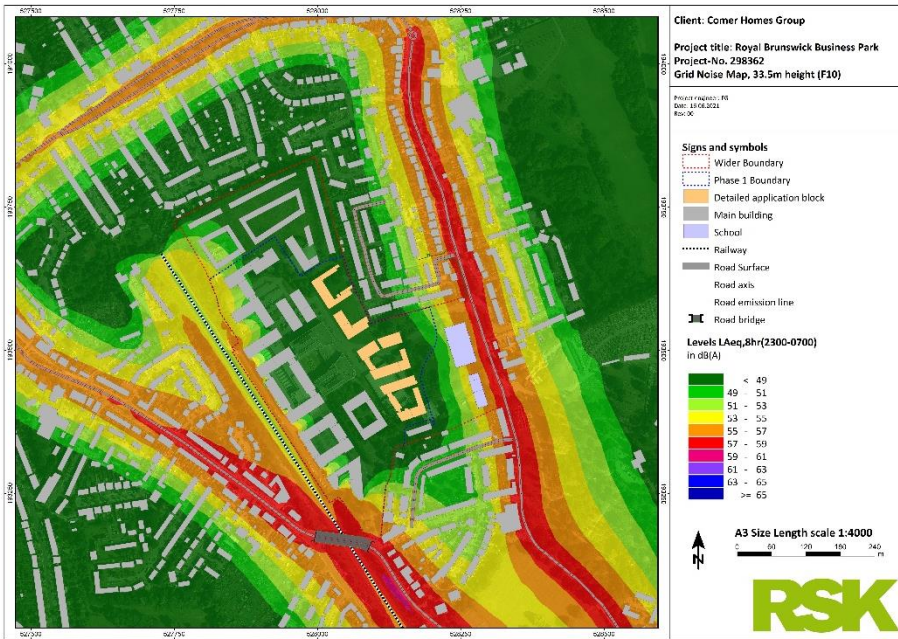


Figure 13.25 Night-time Grid Noise Map (10-th Floor)



## **APPENDIX 13.7: FAÇADE NOISE MAPS**



## APPENDIX 13.7 FAÇADE NOISE MAPS

Figure 13.26 Daytime Facade Noise Map



Figure 13.27 Night-time Facade Noise Map





## **APPENDIX 13.8: NOISE BREAK-IN CALCULATIONS**

## APPENDIX 13.8 NOISE BREAK-IN CALCULATIONS

Figure 13.28 Break-in Noise: Block 1C

| RSK<br>ACOUSTICS                           |   | BS 8233:2014 Façade Calculation   |                                |           |                 |                                |                                    |   |
|--|---|-----------------------------------|--------------------------------|-----------|-----------------|--------------------------------|------------------------------------|---|
| SETTINGS                                   |   |                                   |                                |           |                 |                                |                                    |   |
| <b>Plot</b>                                | 1869BLK 1CF 9E-F 9-E                                      | <b>Target</b>                     | <b>dB L<sub>Aeq,16hr</sub></b> | <b>35</b> | <b>Measured</b> | <b>dB L<sub>Aeq,16hr</sub></b> | <b>52</b>                          | <b>Mitigation Option</b><br>A - 27 dB Rw+Ctr / 1no. 29 Dn,e,w+Ctr<br>Standard Roof - 39 dB Rw+Ctr |
| <b>Room</b>                                | Bedroom 1   |                                   | <b>dB L<sub>Aeq,8hr</sub></b>  | <b>30</b> |                 | <b>dB L<sub>Aeq,8hr</sub></b>  | <b>45</b>                          |   |
|  |   |                                   | <b>dB L<sub>AFmax</sub></b>    | <b>45</b> |                 | <b>dB L<sub>AFmax</sub></b>    | <b>63</b>                          |   |
| EXTERNAL NOISE LEVELS                      |   |                                   |                                |           |                 |                                |                                    |   |
|  |   | Octave band centre frequency (Hz) |                                |           |                 |                                |                                    |   |
|  |   | 125                               | 250                            | 500       | 1 000           | 2 000                          |                                    |   |
| Assessment spectrum (dB lin)               |   | -14                               | -9                             | -6        | -3              | -6                             | dB(A)                              |   |
| Derived level for calculation (free-field) |   | 50                                | 54                             | 57        | 60              | 58                             | 63                                 |   |
| RESULT                                     |   |                                   |                                |           |                 |                                |                                    |   |
|  |   | 125                               | 250                            | 500       | 1 000           | 2 000                          |                                    |   |
| Internal noise level                       |   | 32                                | 38                             | 35        | 36              | 31                             | <b>39 dB(A) ±2</b>                 |   |
| ROOM PARAMETERS                            |   |                                   |                                |           |                 |                                |                                    |   |
| Term                                       | Description   | Value                             |                                |           |                 |                                |                                    |   |
|  |   | m <sup>2</sup> / m <sup>3</sup>   |                                |           |                 |                                |                                    |   |
| S <sub>f</sub>                             | Façade area (including window)                            | 6.6                               |                                |           |                 |                                |                                    |   |
| S <sub>wi</sub>                            | Window area   | 5.9                               |                                |           |                 |                                |                                    |   |
| S <sub>ew</sub>                            | S <sub>f</sub> - S <sub>wi</sub>                          | 0.7                               |                                |           |                 |                                |                                    |   |
| S <sub>rr</sub>                            | Area of ceiling   | 11.4                              |                                |           |                 |                                |                                    |   |
| S  | S <sub>f</sub> + S <sub>rr</sub>                          | 18.0                              |                                |           |                 |                                |                                    |   |
| A <sub>0</sub>                             | Reference absorption area (BS EN ISO 10140-2)             | 10.0                              |                                |           |                 |                                |                                    |   |
| V  | Volume  | 28.5                              |                                |           |                 |                                |                                    |   |
| Term                                       | Description   | Octave band centre frequency      |                                |           |                 |                                | dB R <sub>w</sub> +C <sub>tr</sub> |   |
|  |   | 125                               | 250                            | 500       | 1 000           | 2 000                          |                                    |   |
| L <sub>eq,ff</sub>                         | Free field noise level                                    | 50                                | 54                             | 57        | 60              | 58                             | -                                  |   |
| D <sub>n,e</sub>                           | Trickle ventilator  | 33                                | 32                             | 29        | 28              | 30                             | 30 (-1)                            |   |
| R <sub>wi</sub>                            | Glazing unit  | 23                                | 18                             | 26        | 38              | 41                             | 30 (-4)                            |   |
| R <sub>ew</sub>                            | External wall (brick and block external wall)             | 40                                | 44                             | 45        | 51              | 56                             | 51 (-4)                            |   |
| R <sub>rr</sub>                            | Roof/ceiling (tiled / slate roof, 12.5mm p/b ceiling + 2) | 26                                | 39                             | 46        | 50              | 51                             | 47 (-8)                            |   |
| A  | Equivalent absorption area                                | 8                                 | 9.2                            | 9.2       | 9.2             | 9.2                            | -                                  |   |
| <i>(red indicates weakest element)</i>     |   |                                   |                                |           |                 |                                |                                    |   |
| CALCULATION                                |   |                                   |                                |           |                 |                                |                                    |   |
| Ref.                                       | Term from equation (G.1)                                  | Octave band centre frequency      |                                |           |                 |                                | Contribution                       |   |
|  |   | 125                               | 250                            | 500       | 1 000           | 2 000                          | dB(A)                              |   |
| B  | $\frac{A_0}{S} 10^{-\frac{D_{n,e}}{10}}$                  | 0.00029                           | 0.00038                        | 0.00068   | 0.00080         | 0.00054                        | 38                                 |   |
| C  | $\frac{S_{wi}}{S} 10^{-\frac{R_{wi}}{10}}$                | 0.00164                           | 0.00518                        | 0.00082   | 0.00005         | 0.00003                        | 33                                 |   |
| D  | $\frac{S_{ew}}{S} 10^{-\frac{R_{ew}}{10}}$                | 0.00000                           | 0.00000                        | 0.00000   | 0.00000         | 0.00000                        | 5                                  |   |
| E  | $\frac{S_{rr}}{S} 10^{-\frac{R_{rr}}{10}}$                | 0.00159                           | 0.00008                        | 0.00002   | 0.00001         | 0.00001                        | 19                                 |   |
| F  | 10log(B + C + D + E)                                      | -24.53                            | -22.5                          | -28.2     | -30.7           | -32.4                          |                                    |   |
| G  | 10log $\frac{S}{A}$                                       | 3.72                              | 2.9                            | 2.9       | 2.9             | 2.9                            |                                    |   |
| L <sub>eq,2</sub>                          | A+F+G+3   | 32.00                             | 37.6                           | 34.9      | 35.7            | 31.4                           | 38.92                              |   |

**Figure 13.29 Break-in Noise: Block 1D**

|  |   | SETTINGS                          |         |                   |         |   | BS 8233:2014 Façade Calculation |
|--|---|-----------------------------------|---------|-------------------|---------|---|---------------------------------|
|  |   | Target                            |         | Measured          |         | Mitigation Option   |                                 |
| Plot                                       | 74BLK 1DF 9E-F 9-E  | $dB L_{Aeq,16hr}$                 | 35      | $dB L_{Aeq,16hr}$ | 52      | A - 27 dB Rw+Ctr / 1no. 29 Dn,e,w+Ctr<br>Standard Roof - 39 dB Rw+Ctr |                                 |
| Room                                       | Bedroom 1   | $dB L_{Aeq,8hr}$                  | 30      | $dB L_{Aeq,8hr}$  | 46      |   |                                 |
|  |   | $dB L_{AFmax}$                    | 45      | $dB L_{AFmax}$    | 64      |   |                                 |
| EXTERNAL NOISE LEVELS                      |   |                                   |         |                   |         |   |                                 |
| Assessment spectrum (dB lin)               |   | Octave band centre frequency (Hz) |         |                   |         |   | dB(A)                           |
|  |   | 125                               | 250     | 500               | 1 000   | 2 000   |                                 |
| Derived level for calculation (free-field) |   | -14                               | -9      | -6                | -3      | -6  | 64                              |
| RESULT                                     |   |                                   |         |                   |         |   |                                 |
| Internal noise level                       |   | 125                               | 250     | 500               | 1 000   | 2 000   | 41 dB(A) ±2                     |
| 33   |   | 38                                | 36      | 38                | 34      |   |                                 |
| ROOM PARAMETERS                            |   |                                   |         |                   |         |   |                                 |
| Term                                       | Description   | Value                             |         |                   |         |   |                                 |
|  |   | m <sup>2</sup> / m <sup>3</sup>   |         |                   |         |   |                                 |
| $S_f$                                      | Façade area (including window)                            | 5.5                               |         |                   |         |   |                                 |
| $S_{wi}$                                   | Window area   | 3.1                               |         |                   |         |   |                                 |
| $S_{ew}$                                   | $S_f - S_{wi}$  | 2.4                               |         |                   |         |   |                                 |
| $S_{rr}$                                   | Area of ceiling   | 7.2                               |         |                   |         |   |                                 |
| $S$  | $S_f + S_{rr}$  | 12.7                              |         |                   |         |   |                                 |
| $A_0$                                      | Reference absorption area (BS EN ISO 10140-2)             | 10.0                              |         |                   |         |   |                                 |
| $V$  | Volume  | 17.9                              |         |                   |         |   |                                 |
| Term                                       | Description   | Octave band centre frequency      |         |                   |         |   | dB Rw+Ctr                       |
|  |   | 125                               | 250     | 500               | 1 000   | 2 000   |                                 |
| $L_{eq,ff}$                                | Free field noise level                                    | 51                                | 55      | 58                | 61      | 59  | -                               |
| $D_{n,e}$                                  | Trickle ventilator  | 33                                | 32      | 29                | 28      | 30  | 30 (-1)                         |
| $R_{wi}$                                   | Glazing unit  | 23                                | 18      | 26                | 38      | 41  | 30 (-4)                         |
| $R_{ew}$                                   | External wall (brick and block external wall)             | 40                                | 44      | 45                | 51      | 56  | 51 (-4)                         |
| $R_{rr}$                                   | Roof/ceiling (tiled / slate roof, 12.5mm p/b ceiling + 2) | 26                                | 39      | 46                | 50      | 51  | 47 (-8)                         |
| $A$  | Equivalent absorption area                                | 5                                 | 5.8     | 5.8               | 5.8     | 5.8   | -                               |
| <i>(red indicates weakest element)</i>     |   |                                   |         |                   |         |   |                                 |
| CALCULATION                                |   |                                   |         |                   |         |   |                                 |
| Ref.                                       | Term from equation (G.1)                                  | Octave band centre frequency      |         |                   |         |   | Contribution<br>dB(A)           |
|  |   | 125                               | 250     | 500               | 1 000   | 2 000   |                                 |
| B  | $\frac{A_0}{S} 10^{-\frac{D_{n,e}}{10}}$                  | 0.00041                           | 0.00055 | 0.00097           | 0.00114 | 0.00077   | 41                              |
| C  | $\frac{S_{wi}}{S} 10^{-\frac{R_{wi}}{10}}$                | 0.00122                           | 0.00385 | 0.00061           | 0.00004 | 0.00002   | 33                              |
| D  | $\frac{S_{ew}}{S} 10^{-\frac{R_{ew}}{10}}$                | 0.00002                           | 0.00001 | 0.00001           | 0.00000 | 0.00000   | 13                              |
| E  | $\frac{S_{rr}}{S} 10^{-\frac{R_{rr}}{10}}$                | 0.00142                           | 0.00007 | 0.00001           | 0.00001 | 0.00000   | 20                              |
| F  | $10\log(B + C + D + E)$                                   | -25.13                            | -23.5   | -27.9             | -29.3   | -31.0   |                                 |
| G  | $10\log\frac{S}{A}$                                       | 4.21                              | 3.4     | 3.4               | 3.4     | 3.4   |                                 |
| $L_{eq,2}$                                 | A+F+G+3   | 32.70                             | 37.8    | 36.4              | 38.4    | 34.1  | 41.21                           |

**Figure 13.30 Break-in Noise: Block 1E**

|  |   | BS 8233:2014 Façade Calculation |                                |           |                                   |                                |                                    |   |       |             |
|--|---|---------------------------------|--------------------------------|-----------|-----------------------------------|--------------------------------|------------------------------------|---|-------|-------------|
|  |   | SETTINGS                        |                                |           |                                   |                                |                                    |   |       |             |
| <b>Plot</b>                                | OBLK 1EF 6NW-F 6-N  | <b>Target</b>                   | <b>dB L<sub>Aeq,16hr</sub></b> | <b>35</b> | <b>Measured</b>                   | <b>dB L<sub>Aeq,16hr</sub></b> | <b>52</b>                          | <b>Mitigation Option</b><br>A - 27 dB Rw+Ctr / 1no. 29 Dn,e,w+Ctr<br>Standard Roof - 39 dB Rw+Ctr |       |             |
| <b>Room</b>                                | Bedroom 1   |                                 | <b>dB L<sub>Aeq,8hr</sub></b>  | <b>30</b> |                                   | <b>dB L<sub>Aeq,8hr</sub></b>  | <b>45</b>                          |   |       |             |
|  |   |                                 | <b>dB L<sub>AFmax</sub></b>    | <b>45</b> |                                   | <b>dB L<sub>AFmax</sub></b>    | <b>66</b>                          |   |       |             |
| EXTERNAL NOISE LEVELS                      |   |                                 |                                |           |                                   |                                |                                    |   |       |             |
|  |   |                                 |                                |           | Octave band centre frequency (Hz) |                                |                                    |   |       |             |
|  |   |                                 |                                |           | 125                               | 250                            | 500                                | 1 000   | 2 000 | dB(A)       |
| Assessment spectrum (dB lin)               |   |                                 |                                |           | -14                               | -9                             | -6                                 | -3  | -6    |             |
| Derived level for calculation (free-field) |   |                                 |                                |           | 52                                | 56                             | 59                                 | 62  | 60    | 66          |
| RESULT                                     |   |                                 |                                |           |                                   |                                |                                    |   |       |             |
|  |   |                                 |                                |           | 125                               | 250                            | 500                                | 1 000   | 2 000 | 41 dB(A) ±2 |
| Internal noise level                       |   |                                 |                                |           | 34                                | 39                             | 37                                 | 37  | 33    |             |
| ROOM PARAMETERS                            |   |                                 |                                |           |                                   |                                |                                    |   |       |             |
| Term                                       | Description   | Value                           |                                |           |                                   |                                |                                    |   |       |             |
|  |   | m <sup>2</sup> / m <sup>3</sup> |                                |           |                                   |                                |                                    |   |       |             |
| <i>S<sub>f</sub></i>                       | Façade area (including window)                            | 9.6                             |                                |           |                                   |                                |                                    |   |       |             |
| <i>S<sub>wi</sub></i>                      | Window area   | 6.0                             |                                |           |                                   |                                |                                    |   |       |             |
| <i>S<sub>ew</sub></i>                      | <i>S<sub>f</sub></i> - <i>S<sub>wi</sub></i>              | 3.6                             |                                |           |                                   |                                |                                    |   |       |             |
| <i>S<sub>rr</sub></i>                      | Area of ceiling   | 12.2                            |                                |           |                                   |                                |                                    |   |       |             |
| <i>S</i>                                   | <i>S<sub>f</sub></i> + <i>S<sub>rr</sub></i>              | 21.8                            |                                |           |                                   |                                |                                    |   |       |             |
| <i>A<sub>0</sub></i>                       | Reference absorption area (BS EN ISO 10140-2)             | 10.0                            |                                |           |                                   |                                |                                    |   |       |             |
| <i>V</i>                                   | Volume  | 30.5                            |                                |           |                                   |                                |                                    |   |       |             |
| Term                                       | Description   | Octave band centre frequency    |                                |           |                                   |                                | dB R <sub>w</sub> +C <sub>tr</sub> |   |       |             |
|  |   | 125                             | 250                            | 500       | 1 000                             | 2 000                          |                                    |   |       |             |
| <i>L<sub>eq,ff</sub></i>                   | Free field noise level                                    | 52                              | 56                             | 59        | 62                                | 60                             | -                                  |   |       |             |
| <i>D<sub>n,e</sub></i>                     | Trickle ventilator  | 33                              | 32                             | 29        | 28                                | 30                             | 30 (-1)                            |   |       |             |
| <i>R<sub>wi</sub></i>                      | Glazing unit  | 23                              | 18                             | 26        | 38                                | 41                             | 30 (-4)                            |   |       |             |
| <i>R<sub>ew</sub></i>                      | External wall (brick and block external wall)             | 40                              | 44                             | 45        | 51                                | 56                             | 51 (-4)                            |   |       |             |
| <i>R<sub>rr</sub></i>                      | Roof/ceiling (tiled / slate roof, 12.5mm p/b ceiling + 2) | 26                              | 39                             | 46        | 50                                | 51                             | 47 (-8)                            |   |       |             |
| <i>A</i>                                   | Equivalent absorption area                                | 8                               | 9.8                            | 9.8       | 9.8                               | 9.8                            | -                                  |   |       |             |
| <i>(red indicates weakest element)</i>     |   |                                 |                                |           |                                   |                                |                                    |   |       |             |
| CALCULATION                                |   |                                 |                                |           |                                   |                                |                                    |   |       |             |
| Ref.                                       | Term from equation (G.1)                                  | Octave band centre frequency    |                                |           |                                   |                                | Contribution<br>dB(A)              |   |       |             |
|  |   | 125                             | 250                            | 500       | 1 000                             | 2 000                          |                                    |   |       |             |
| B  | $\frac{A_0}{S} 10^{-\frac{D_{n,e}}{10}}$                  | 0.00024                         | 0.00032                        | 0.00056   | 0.00066                           | 0.00045                        | 39                                 |   |       |             |
| C  | $\frac{S_{wi}}{S} 10^{-\frac{R_{wi}}{10}}$                | 0.00138                         | 0.00436                        | 0.00069   | 0.00004                           | 0.00002                        | 35                                 |   |       |             |
| D  | $\frac{S_{ew}}{S} 10^{-\frac{R_{ew}}{10}}$                | 0.00002                         | 0.00001                        | 0.00001   | 0.00000                           | 0.00000                        | 14                                 |   |       |             |
| E  | $\frac{S_{rr}}{S} 10^{-\frac{R_{rr}}{10}}$                | 0.00140                         | 0.00007                        | 0.00001   | 0.00001                           | 0.00000                        | 21                                 |   |       |             |
| F  | 10log(B + C + D + E)                                      | -25.17                          | -23.2                          | -28.9     | -31.5                             | -33.2                          |                                    |   |       |             |
| G  | 10log $\frac{S}{A}$                                       | 4.26                            | 3.5                            | 3.5       | 3.5                               | 3.5                            |                                    |   |       |             |
| <i>L<sub>eq,2</sub></i>                    | A+F+G+3   | 34.00                           | 39.5                           | 36.7      | 37.5                              | 33.2                           | 40.76                              |   |       |             |

**Figure 13.31 Break-in Noise: Block 1F**

|  |   | BS 8233:2014 Façade Calculation   |         |   |         |   |                                    |
|--|---|---|---------|---|---------|---|------------------------------------|
|  |   | SETTINGS  |         |   |         |   |                                    |
| <b>Plot</b>                                | 34BLK 1FGFNW-GF-N   | <b>Target</b><br><b>dB L<sub>Aeq,16hr</sub></b><br><b>dB L<sub>Aeq,8hr</sub></b><br><b>dB L<sub>AFmax</sub></b> | 35      | <b>Measured</b><br><b>dB L<sub>Aeq,16hr</sub></b><br><b>dB L<sub>Aeq,8hr</sub></b><br><b>dB L<sub>AFmax</sub></b> | 46      | <b>Mitigation Option</b><br>A - 27 dB Rw+Ctr / 1no. 29 Dn,e,w+Ctr<br>Standard Roof - 39 dB Rw+Ctr |                                    |
| <b>Room</b>                                | Bedroom 2   |   | 30      |   | 40      |   |                                    |
|  |   |   | 45      |   | 66      |   |                                    |
| EXTERNAL NOISE LEVELS                      |   |   |         |   |         |   |                                    |
| Assessment spectrum (dB lin)               |   | Octave band centre frequency (Hz)   |         |   |         |   | dB(A)                              |
|  |   | 125   | 250     | 500   | 1 000   | 2 000   |                                    |
| Derived level for calculation (free-field) |   | -14   | -9      | -6  | -3      | -6  | 66                                 |
| RESULT                                     |   |   |         |   |         |   |                                    |
| Internal noise level                       |   | 125   | 250     | 500   | 1 000   | 2 000   | 42 dB(A) ±2                        |
|  |   | 33  | 38      | 37  | 39      | 35  |                                    |
| ROOM PARAMETERS                            |   |   |         |   |         |   |                                    |
| Term                                       | Description   | Value   |         |   |         |   |                                    |
|  |   | m <sup>2</sup> / m <sup>3</sup>   |         |   |         |   |                                    |
| S <sub>f</sub>                             | Façade area (including window)                            | 5.3   |         |   |         |   |                                    |
| S <sub>wi</sub>                            | Window area   | 2.3   |         |   |         |   |                                    |
| S <sub>ew</sub>                            | S <sub>f</sub> - S <sub>wi</sub>                          | 3.0   |         |   |         |   |                                    |
| S <sub>rr</sub>                            | Area of ceiling   | 8.0   |         |   |         |   |                                    |
| S  | S <sub>f</sub> + S <sub>rr</sub>                          | 13.2  |         |   |         |   |                                    |
| A <sub>0</sub>                             | Reference absorption area (BS EN ISO 10140-2)             | 10.0  |         |   |         |   |                                    |
| V  | Volume  | 19.9  |         |   |         |   |                                    |
| Term                                       | Description   | Octave band centre frequency  |         |   |         |   | dB R <sub>w</sub> +C <sub>tr</sub> |
|  |   | 125   | 250     | 500   | 1 000   | 2 000   |                                    |
| L <sub>eq,ff</sub>                         | Free field noise level                                    | 52  | 56      | 59  | 63      | 60  | -                                  |
| D <sub>n,e</sub>                           | Trickle ventilator  | 33  | 32      | 29  | 28      | 30  | 30 (-1)                            |
| R <sub>wi</sub>                            | Glazing unit  | 23  | 18      | 26  | 38      | 41  | 30 (-4)                            |
| R <sub>ew</sub>                            | External wall (brick and block external wall)             | 40  | 44      | 45  | 51      | 56  | 51 (-4)                            |
| R <sub>rr</sub>                            | Roof/ceiling (tiled / slate roof, 12.5mm p/b ceiling + 2) | 26  | 39      | 46  | 50      | 51  | 47 (-8)                            |
| A  | Equivalent absorption area                                | 5   | 6.4     | 6.4   | 6.4     | 6.4   | -                                  |
| <i>(red indicates weakest element)</i>     |   |   |         |   |         |   |                                    |
| CALCULATION                                |   |   |         |   |         |   |                                    |
| Ref.                                       | Term from equation (G.1)                                  | Octave band centre frequency  |         |   |         |   | Contribution<br>dB(A)              |
|  |   | 125   | 250     | 500   | 1 000   | 2 000   |                                    |
| B  | $\frac{A_0}{S} 10^{-\frac{D_{n,e}}{10}}$                  | 0.00040   | 0.00052 | 0.00093   | 0.00109 | 0.00074   | 42                                 |
| C  | $\frac{S_{wi}}{S} 10^{-\frac{R_{wi}}{10}}$                | 0.00085   | 0.00270 | 0.00043   | 0.00003 | 0.00001   | 32                                 |
| D  | $\frac{S_{ew}}{S} 10^{-\frac{R_{ew}}{10}}$                | 0.00002   | 0.00001 | 0.00001   | 0.00000 | 0.00000   | 15                                 |
| E  | $\frac{S_{rr}}{S} 10^{-\frac{R_{rr}}{10}}$                | 0.00151   | 0.00008 | 0.00002   | 0.00001 | 0.00000   | 22                                 |
| F  | 10log(B + C + D + E)                                      | -25.55  | -24.8   | -28.6   | -29.5   | -31.2   |                                    |
| G  | 10log $\frac{S}{A}$                                       | 3.93  | 3.1     | 3.1   | 3.1     | 3.1   |                                    |
| L <sub>eq,2</sub>                          | A+F+G+3   | 33.50   | 37.8    | 37.0  | 39.4    | 35.1  | 42.09                              |

**Figure 13.32 Break-in Noise: Main School Building (Eastern Façade)**

| <b>RSK</b><br>ACOUSTICS                    |   | <b>BS 8233:2014 Façade Calculation</b> |                                     |                               |              |   |                    |
|--|---|--|-------------------------------------|-------------------------------|--------------|---|--------------------|
| <b>SETTINGS</b>                            |   |  |                                     |                               |              |   |                    |
| <b>Plot</b>                                | School  | <b>Roof?</b>                           | <input checked="" type="checkbox"/> | <b>dB L<sub>eq,16hr</sub></b> | 64           | <b>Mitigation Option</b><br>A - 29 dB Rw+Ctr<br>Roof - 47 dB Rw+Ctr |                    |
| <b>Unit</b>                                | Main Building                                 | <b>Façade</b>                          | East                                | <b>dB L<sub>eq,8hr</sub></b>  |              |   |                    |
| <b>Room</b>                                | Seminar Room                                  | <b>Floor</b>                           | F1                                  | <b>dB L<sub>AFmax</sub></b>   |              |   |                    |
| <b>EXTERNAL NOISE LEVELS</b>               |   |  |                                     |                               |              |   |                    |
|  |   | <b>Octave band centre frequency</b>    |                                     |                               |              |   |                    |
|  |   | <b>125</b>                             | <b>250</b>                          | <b>500</b>                    | <b>1 000</b> | <b>2 000</b>  | <b>dB(A)</b>       |
| Assessment spectrum                        |   | 0                                      | -7                                  | -5                            | -2           | -8  |                    |
| Derived level for calculation (free-field) |   | 64                                     | 57                                  | 59                            | 62           | 56  | 64                 |
| <b>RESULT</b>                              |   |  |                                     |                               |              |   |                    |
|  |   | <b>125</b>                             | <b>250</b>                          | <b>500</b>                    | <b>1 000</b> | <b>2 000</b>  |                    |
| Internal noise level                       |   | 46                                     | 36                                  | 27                            | 21           | 19  | <b>33 dB(A) ±2</b> |
| <b>ROOM PARAMETERS</b>                     |   |  |                                     |                               |              |   |                    |
| <b>Term</b>                                | <b>Description</b>                            | <b>Value</b>                           |                                     |                               |              |   |                    |
|  |   | $m^2 / m^3$                            |                                     |                               |              |   |                    |
| $S_f$                                      | Façade area (including window)                | 16.5                                   |                                     |                               |              |   |                    |
| $S_{wi}$                                   | Window area                                   | 3.3                                    |                                     |                               |              |   |                    |
| $S_{ew}$                                   | $S_f - S_{wi}$                                | 13.2                                   |                                     |                               |              |   |                    |
| $S_{rr}$                                   | Area of ceiling                               | 33.6                                   |                                     |                               |              |   |                    |
| $S$  | $S_f + S_{rr}$                                | 50.1                                   |                                     |                               |              |   |                    |
| $A_0$                                      | Reference absorption area (BS EN ISO 10140-2) | 10.0                                   |                                     |                               |              |   |                    |
| $V$  | Volume  | 79.0                                   |                                     |                               |              |   |                    |
| <b>Term</b>                                | <b>Description</b>                            | <b>Octave band centre frequency</b>    |                                     |                               |              |   |                    |
|  |   | <b>125</b>                             | <b>250</b>                          | <b>500</b>                    | <b>1 000</b> | <b>2 000</b>  | <b>dB Rw+Ctr</b>   |
| $L_{eq,ff}$                                | Free field noise level                        | 64                                     | 57                                  | 59                            | 62           | 56  | -                  |
| $D_{n,e}$                                  | Trickle ventilator                            | 19                                     | 22                                  | 32                            | 42           | 39  | 29                 |
| $R_{wi}$                                   | Glazing unit                                  | 19                                     | 22                                  | 32                            | 42           | 39  | 29                 |
| $R_{ew}$                                   | External wall (brick and block)               | 33                                     | 41                                  | 46                            | 50           | 48  | 44                 |
| $R_{rr}$                                   | Roof/ceiling                                  | 39                                     | 44                                  | 49                            | 52           | 48  | 47                 |
| $A$  | Equivalent absorption area                    | 21.2                                   | 25.4                                | 25.4                          | 25.4         | 25.4  | -                  |
| <b>CALCULATION</b>                         |   |  |                                     |                               |              |   |                    |
| <b>Ref.</b>                                | <b>Term from equation (G.1)</b>               | <b>Octave band centre frequency</b>    |                                     |                               |              |   |                    |
|  |   | <b>125</b>                             | <b>250</b>                          | <b>500</b>                    | <b>1 000</b> | <b>2 000</b>  | <b>dB(A)</b>       |
| B  | $\frac{A_0}{S} 10^{-\frac{D_{n,e}}{10}}$      | 0.00251                                | 0.00126                             | 0.00013                       | 0.00001      | 0.00003   |                    |
| C  | $\frac{S_{wi}}{S} 10^{-\frac{R_{wi}}{10}}$    | 0.00083                                | 0.00042                             | 0.00004                       | 0.00000      | 0.00001   |                    |
| D  | $\frac{S_{ew}}{S} 10^{-\frac{R_{ew}}{10}}$    | 0.00013                                | 0.00002                             | 0.00001                       | 0.00000      | 0.00000   |                    |
| E  | $\frac{S_{rr}}{S} 10^{-\frac{R_{rr}}{10}}$    | 0.00008                                | 0.00003                             | 0.00001                       | 0.00000      | 0.00001   |                    |
| F  | $10\log(B + C + D + E)$                       | -24.5                                  | -27.6                               | -37.4                         | -46.3        | -43.2   |                    |
| G  | $10\log\frac{S}{A}$                           | 3.7                                    | 2.9                                 | 2.9                           | 2.9          | 2.9   |                    |
| $L_{eq,2}$                                 | A+F+G+3                                       | 46                                     | 35.6                                | 27.4                          | 21.4         | 18.9  | 33.1               |

## **APPENDIX 15.1: SOCIO-ECONOMIC CALCULATIONS**

## APPENDIX 15.1 – SOCIO-ECONOMIC CALCULATIONS

**Table 1.1 Construction Phase Employment**

| Construction Turnover UK (£) | No. Of Construction Workers UK | Capital Construction Expenditure- 1 Person Year of Employment (£) | Estimated Project Construction Cost (£) | Gross Person Years of Employment over Construction Period | Permanent Jobs in the Economy |
|------------------------------|--------------------------------|---|---|---|-------------------------------|
| 2.871E+11                    | 2,360,000                      | £121,652.54   | £890,310,000                            | 7,318.47  | 731.85                        |

Construction Turnover UK 2018 taken from Annual Business Survey 2018 Revised Results

No. of construction workers UK 2018 taken from House of Commons, (2019); Construction Industry: Statistics and Policy.

Permanent Jobs in the Economy calculated using standard ratio of 10 person years of construction being equivalent to one permanent job in the economy



**Table 1.2 Construction Phase Additionality Factors**

| Factors      | Factor Values |
|--------------|---------------|
| Leakage      | 0.27          |
| Displacement | 0.25          |
| Substitution | 0             |
| Multiplier   | 1.7           |

**Table 1.3 Construction Phase Additionality Calculation**

| Legend                       | Name                                 | Calculation             | Result       |
|------------------------------|--------------------------------------|-------------------------|--------------|
| A =                          | Gross Impact                         |                         | 731.8        |
| B =                          | Estimated Leakage                    | A* Leakage Factor       | 197.6        |
| C =                          | Gross Direct Additional Local Impact | C=A-B                   | 534.2        |
| D =                          | Displacement                         | C* Displacement Factor  | 133.6        |
| E =                          | Net Direct Additional Local Impact   | E=C-D                   | 400.7        |
| S =                          | Substitution                         | E* Substitution Factor  | 0.0          |
| F =                          | Net Direct Additional Local Impact   | F=E-S                   | 400.7        |
| M =                          | Multiplier                           | F*(Multiplier Factor-1) | 280.5        |
| <b>Net Additional Impact</b> | <b>F+M</b>                           |                         | <b>681.1</b> |

**Table 1.4 Indicative Accommodation Mix used for Assessment**

|   | 1 bed      | 2 bed       | 3 bed      | 4 bed     | Total       |
|---|------------|-------------|------------|-----------|-------------|
| Detailed                                  | 166        | 202         | 88         | 10        | 466         |
| Outline                                   | 329        | 1215        | 423        | 0         | 1967        |
| <b>Total</b>                              | <b>495</b> | <b>1417</b> | <b>511</b> | <b>10</b> | <b>2433</b> |
| Assumed 20% Affordable                    | 99         | 283         | 202        | 2         | 586         |
| Social Rented (assumed 60% of affordable) | 59         | 170         | 121        | 2         | 352         |
| Market and Intermediate                   | 436        | 1247        | 390        | 8         | 2081        |

**Table 1.5 Population Yield for Proposed Development**

## GLA Population Yield Calculator

|                                      | 1 bed | 2 bed | 3 bed | 4 bed |
|--------------------------------------|-------|-------|-------|-------|
| <b>Market and Intermediate Units</b> | 436   | 1247  | 390   | 8     |
| <b>Social Units</b>                  | 59    | 170   | 121   | 2     |

|                    |             |
|--------------------|-------------|
| <b>Total Units</b> | <b>2433</b> |
|--------------------|-------------|

|                        |               |
|------------------------|---------------|
| Geographic Aggregation | <b>London</b> |
|------------------------|---------------|

|      |                 |
|------|-----------------|
| PTAL | <b>PTAL 0-2</b> |
|------|-----------------|

**Notes**

Sample size of 46 sites

Shaded cells require user input

Select both geography and PTAL

For developments in Outer London with PTAL 5-6 use (London/PTAL 5-6) or (Outer London/3-4) to calculate yield

**Yield from Development (persons)**

|                             | Market & Intermediate | Social        | Total         |
|-----------------------------|-----------------------|---------------|---------------|
| Ages 0, 1, 2, 3 & 4         | 401.9                 | 174.2         | 576.0         |
| Ages 5, 6, 7, 8, 9, 10 & 11 | 268.9                 | 136.2         | 405.1         |
| Ages 12, 13, 14 & 15        | 69.2                  | 66.0          | 135.2         |
| Ages 16 & 17                | 36.6                  | 34.9          | 71.4          |
| 18-64                       | 3626.9                | 587.2         | 4214.1        |
| 65+                         | 86.4                  | 13.7          | 100.1         |
| <b>Total Yield</b>          | <b>4489.8</b>         | <b>1012.1</b> | <b>5501.9</b> |

**Play Space Calculator**

|                |               |
|----------------|---------------|
| Total Children | <b>1187.8</b> |
|----------------|---------------|

|                        | Benchmark (m <sup>2</sup> ) | Total play space (m <sup>2</sup> ) |
|------------------------|-----------------------------|------------------------------------|
| Play space requirement | 10                          | 11877.8                            |

**Table 1.6 Population Yield for Phase 1 Only**

GLA Population Yield Calculator

|                               | 1 bed | 2 bed | 3 bed | 4 bed |
|-------------------------------|-------|-------|-------|-------|
| Market and Intermediate Units | 146   | 178   | 77    | 9     |
| Social Units                  | 20    | 24    | 11    | 1     |

|                    |            |
|--------------------|------------|
| <b>Total Units</b> | <b>466</b> |
|--------------------|------------|

|                        |        |
|------------------------|--------|
| Geographic Aggregation | London |
|------------------------|--------|

|      |          |
|------|----------|
| PTAL | PTAL 0-2 |
|------|----------|

**Notes**

- Sample size of 46 sites
- Shaded cells require user input
- Select both geography and PTAL
- For developments in Outer London with PTAL 5-6 use (London/PTAL 5-6) or (Outer London/3-4) to calculate yield

**Yield from Development (persons)**

|                             | Market & Intermediate | Social       | Total        |
|-----------------------------|-----------------------|--------------|--------------|
| Ages 0, 1, 2, 3 & 4         | 70.4                  | 21.8         | 92.2         |
| Ages 5, 6, 7, 8, 9, 10 & 11 | 47.9                  | 16.6         | 64.6         |
| Ages 12, 13, 14 & 15        | 13.6                  | 7.5          | 21.1         |
| Ages 16 & 17                | 7.2                   | 4.0          | 11.2         |
| 18-64                       | 703.6                 | 87.0         | 790.6        |
| 65+                         | 16.6                  | 2.0          | 18.6         |
| <b>Total Yield</b>          | <b>859.7</b>          | <b>138.9</b> | <b>998.6</b> |

**Play Space Calculator**

|                |       |
|----------------|-------|
| Total Children | 183.1 |
|----------------|-------|

|                        | Benchmark (m <sup>2</sup> ) | Total play space (m <sup>2</sup> ) |
|------------------------|-----------------------------|------------------------------------|
| Play space requirement | 10                          | 1830.8                             |