



# Gatwick Airport Northern Runway Project

Environmental Statement

Appendix 14.9.6: Ground Noise Baseline Report

**Book 5**

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## 1 Introduction

### 1.1. General

- 1.1.1 This document forms Appendix 14.9.6 of the Environmental Statement (ES) prepared on behalf of Gatwick Airport Limited (GAL) for the proposal to make best use of Gatwick Airport's existing runways and infrastructure (referred to within this report as 'the Project').
- 1.1.2 This document provides the Ground Noise Baseline Report for the ES for the Project.



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## **Gatwick Airport - Ground Noise**

### **Background Sound Level Measurements 2016**

**Report HM: 3086/R1  
Draft IHF1  
9 November 2016**



**GATWICK AIRPORT - GROUND NOISE,  
BACKGROUND SOUND LEVEL MEASUREMENTS 2016**

**Report HM: 3086/R1, Draft EXT1**

**9 November 2016**

**1. INTRODUCTION**

1.1 Gatwick Airport Limited have previously carried out comprehensive background sound level surveys in residential areas around the airport at three-yearly intervals in December 1998 and January/February 1999; in September 2002; in September 2005; and in August and September 2008. This report covers a fifth background sound level survey carried out in August 2016.

1.2 All previous reports have been authored by I H Flindell and A R McKenzie which has provided an ongoing continuity for comparison of the results. It is useful to compare the results of the noise survey detailed in this report with the findings in previous years in order to understand any changes in the noise environment. The four previous reports are as follows: LGW102 (dated 23<sup>rd</sup> April 1999); LGW103 (dated 20<sup>th</sup> November 2002); LGW 2005-0054 (dated 16th November 2005) and LGW 2008 – 0091 (dated 24<sup>th</sup> October 2008). Previous surveys have consisted of measurements at 12 locations around the airport; the detailed methodology was the same for each survey and the actual measurement sites chosen were either exactly the same or as close as possible given changes in access arrangements that occurred over time. This report describes the methodology and results of a fifth (2016) background sound level measurement survey which included measurements at the same 12 locations along with an additional 4 new locations to the south of the airport.

**2. MEASUREMENT LOCATIONS**

2.1 Measurements of background sound levels were carried out at the 12 community locations where measurements were carried out in 2008 (sites 1 – 12), which were in turn at, or as near as possible to, the locations used for all the previous surveys. These measurement locations were selected as being generally representative of the different types of residential area located at different distances and in different directions around the airport and have also been used for assessments of ground noise to inform various planning applications made over the past few years.





- 2.2 The 4 new locations (sites 13 -16) have been selected to be representative of residential locations further to the south of the airport which could become more affected by airport ground noise if proposals for a second runway go ahead.
- 2.3 The sound level measurement locations are shown at Figure 1. Each location is described in Paragraphs 2.4 to 2.19 below. General environmental sounds such as wind in the trees, early morning birdsong, etc. can make varying contributions at any and all of these locations at different times of the year and are not separately noted in this report. Distances are given between monitoring locations, nearby noise sources and the closest operational parts of the airport. It should be noted that, depending on the relative distances to aircraft stands and taxiways, aircraft taxiing is generally the most significant source of airport ground noise.

#### **Site 1 – Blue Cedars (OSGB36 Grid Ref. 524569 141233)**

- 2.4 Blue Cedars is located on the northern edge of the village of Charlwood, directly opposite Charlwood Primary School that was used for the original 1998/1999 survey. The current measurements were carried out at a slightly different location compared with the location used in the 2002, 2005 and 2008 surveys but the location is slightly closer to the original 1998/1999 location. Equipment was set up in the front garden area adjacent to the boundary fence as shown in Figure 2. At installation and collection, noise sources at this location mainly consisted of aircraft overflights, distant road traffic, wind in foliage and bird noise but power tools were also noted during the installation as the resident was carrying out some DIY at the front of the house. The distance from the monitoring location to Charlwood Road is approximately 240 metres. This location is approximately 1.2 km north of the closest part of the airport at the western end of the runway.

#### **Site 2 – 3 Charlwood Road (OSGB36 Grid Ref. 524621 140931)**

- 2.5 No. 3 Charlwood Road is a semi-detached house on the south side of Charlwood Road to the west of the junction with Lowfield Heath Road. The measurements were carried out at a slightly different location, several doors down, to that used for the previous survey and equipment was setup in the rear garden as shown in Figure 3. At installation and collection, noise sources at this location mainly consisted of aircraft overflights, airport ground noise (clearly audible), road traffic on Charlwood Road, wind chimes and loading noise from a coal yard further up the road. The distance from the monitoring location to Charlwood Road is approximately 40 metres. This location is approximately 900m north of the closest part of the airport at the western end of the



runway.

### **Site 3 - Brook Farm (OSGB36 Grid Ref. 525313 141029)**

- 2.6 Brook Farm consists of a dwelling house, a mobile home and a number of farm buildings to the south side of the Charlwood/Horley Road, east of the junction with Lowfield Heath Road. The measurements were carried out in the field just behind the mobile home within 5m of the location used for the previous surveys as shown at Figure 4. At installation and collection, noise sources at this location mainly consisted of aircraft overflights, airport ground noise (clearly audible), distant road traffic and power tools from a nearby workshop. The distance from the monitoring location to Charlwood/Horley Road is approximately 75 metres. This location is approximately 700m north of a taxiway just north of the runway and approximately 900m west of stands in the northwest zone.

### **Site 4 - The Bear and Bunny Nursery (OSGB36 Grid Ref. 526051 141564)**

- 2.7 The Bear and Bunny Nursery is a children's nursery on the south side of Charlwood/Horley Road about half way between Horley and Charlwood. The measurements were carried out in a corner of the car park within 5m of the previous survey location as shown at Figure 5. At installation and collection, noise sources at this location mainly consisted of aircraft overflights, airport ground noise (clearly audible), children playing and road traffic on Charlwood Horley Road. The distance from the monitoring location to Charlwood/Horley Road is approximately 50 metres. This location is approximately 460m north of stands in the northwest zone

### **Site 5 – April Cottage, NHS Farmfield (OSGB36 Grid Ref. 525764 142366)**

- 2.8 The NHS Farmfield complex is a set of self-contained residential care units on the site of the old Farmfield Hospital. It is accessed up a track leading northwards off Charlwood/Horley Road. The measurements were taken in the grounds beside April Cottage to the north side of the lake in a similar place to the previous survey as shown at Figure 6. At installation and collection, noise sources at this location mainly consisted of aircraft overflights, distant road traffic, wind in trees, movements in the car park and voices from the rear garden of April Cottage. The distance from the monitoring location to Charlwood/Horley Road is approximately 660 metres. This location is approximately 1.3 km north of stands in the northwest zone.



**Site 6 - Oakfield Cottage, Povey Cross Road (OSGB36 Grid Ref. 526887 141974)**

2.9 Oakfield Cottage is the second property from the western end of the Povey Cross Road cul-de-sac. The measurements were taken in the front garden as for the previous survey as shown at Figure 7. At installation and collection, the background noise was dominated by road traffic on the airport perimeter road, airport ground noise, birdsong and vehicles manoeuvring next door. The distance from the monitoring location to Charlwood/Horley Road is approximately 125 metres. This location is approximately 200m west of stands in the north terminal.

**Site 7 - 103 Cheyne Walk, Horley (OSGB36 Grid Ref. 527873 142246)**

2.10 No. 103 Cheyne Walk is located on the south-east side of Cheyne Walk, Horley, opposite the junction with Longbridge Road. The measurements were taken in the centre of the rear garden as for the previous survey as shown at Figure 8. At installation and collection, road traffic on the A23 was the dominant background noise source, with birdsong also significant. The distance from the monitoring location to the A23 is approximately 70 metres. This location is approximately 550m north of the closest stands in the north terminal.

**Site 8 - 82 The Crescent, Horley (OSGB36 Grid Ref. 528517 141795)**

2.11 The 2016 measurements were carried out at No. 82 The Crescent next door to the location (no. 84) used for the 2008 measurements. This address is approximately 50 metres north west of No. 96 where the previous measurements had been carried out in 1998/99 and 2002. The precise location of the measurement microphone in the rear garden of No. 82 is shown at Figure 9. At installation and collection, noise sources at this location mainly consisted of road traffic on the A23, aircraft overflights, birdsong and construction from a building site further down the road. The distance from the monitoring location to the A23 is approximately 95 metres. This location is approximately 300m east of the closest stands within the 'satellite' in the south terminal.

**Site 9 - Hyder's Farmhouse, Bonnetts Lane (OSGB36 Grid Ref. 525296 139381)**

2.12 Hyder's Farmhouse consists of a dwelling house, a mobile home and various farm buildings set back approximately 25 metres west of Bonnetts Lane (which leads south from Lowfield Heath Road). The measurements were taken in a garden area to the north of the property as used for the previous survey and as shown at Figure 10. At installation and collection, noise sources at this location mainly consisted of aircraft overflights, airport ground noise, road traffic on



Bonnetts Lane and agricultural machinery in nearby fields. The distance from the monitoring location to Lowfield Heath Road is approximately 280 metres. This location is approximately 550m south of the western end of the runway.

**Site 10 - Myrtle Cottage, Poles Lane (OSGB36 Grid Ref. 526401 139753)**

2.13 Myrtle Cottage is situated at about 100 metres down Poles Lane that leads off Lowfield Heath Road by Charlwood House. The measurements were taken at the south end of the garden, away from the road as for the previous survey as shown at Figure 11. At installation and collection, noise sources at this location mainly consisted of aircraft overflights, airport ground noise, distant road traffic on Lowfield Heath Road and children playing next door. The distance from the monitoring location to Lowfield Heath Road is approximately 160 metres. This location is approximately 450m south of the runway.

**Site 11 - Rowley Farmhouse (OSGB36 Grid Ref. 527964 139632)**

2.14 Rowley Farmhouse is an old farmhouse, currently divided into separate residential units. Access is up a track leading past Rowley Cottages from the A23. The equipment was set up in a sheltered location within the resident's car park, within 10m of the location used in the previous survey, as shown in Figure 12. At installation and collection, noise sources at this location mainly consisted of aircraft departures, distant road traffic on the A23, wind in trees, agricultural machinery and noise from trucks at the royal mail sorting office to the south. The distance from the monitoring location to the A23 is approximately 410 metres. This location is approximately 950m south of the runway.

**Site 12 - Trent House, Balcombe Road (OSGB36 Grid Ref. 529815 140633)**

2.15 Trent House is a residential care home located approximately 80 metres north of the junction of Balcombe Road and the B2037 on the west side of Balcombe Road. The location is next door to Vementry House which was used for the previous survey. The measurements were taken in the front garden as shown at Figure 13. At installation and collection, noise sources at this location mainly consisted of road traffic on Balcombe Road, aircraft overflights, gardening and birdsong. The distance from the monitoring location to Balcombe Road is approximately 35 metres. This location is approximately 1.3km east of the closest stands in the south terminal.



**Site 13 - 24 Burlands (OSGB36 Grid Ref. 525566 138393)**

2.16 No. 24 Burlands is located towards the end of a residential cul-de-sac approximately 200 metres northeast of Ifield Avenue and 445 metres southeast of Bonnets Lane. The measurements were taken in the rear garden of this new location as shown at Figure 14. At installation and collection, noise sources at this location mainly consisted of aircraft overflights, distant airport ground noise, wind in trees, birdsong and a radio located in the workshop in the rear garden. This location is approximately 1.6km south of the western end of the runway.

**Site 14 - 12 Cherry Lane (OSGB36 Grid Ref. 526450 138386)**

2.17 No. 12 Cherry Lane is located behind the Cherry Lane Playing Fields, approximately 560 metres west of London Road. The measurements were taken in the rear garden of this new location as shown at Figure 15. At installation and collection, noise sources at this location mainly consisted of aircraft overflights, distant airport ground noise, music and voices from next door, birdsong and children playing. This location is approximately 1.8km south of the runway.

**Site 15 - Hoots Cottage, Tinsley Green (OSGB36 Grid Ref. 529554 139832)**

2.18 Hoots Cottage is located approximately 300 metres west down Radford road from the junction with Balcombe Road. The property is on the south side of Radford Road and the measurements were taken in the rear garden of this new location as shown at Figure 16. At installation and collection, noise sources at this location mainly consisted of road traffic on Radford Road, and aircraft overflights, birdsong and neighbours talking in garden. The distance from the monitoring location to Radford Road is approximately 40 metres. This location is approximately 1.5km south of the eastern end of the runway.

**Site 16 - 146 Tinsley Lane (OSGB36 Grid Ref. 528428 138742)**

2.19 No. 146 Tinsley Lane is located approximately 100 metres southeast of the junction between Tinsley Lane and Gatwick Road on the east side of Tinsley Lane. The measurements were taken in the rear garden of this new location as shown at Figure 17. At installation and collection, noise sources at this location mainly consisted of road traffic on Gatwick Road. This location is approximately 1.9km south of the runway.

**3. INSTRUMENTATION**

3.1 The instrumentation used for these measurements consisted of 14 Larson Davis Model 820 Type



- 1 Integrating Sound Level Meters and 2 Rion NL52 Class 1 Integrating Sound Level Meters all deployed simultaneously at each of the measurement locations from 8<sup>th</sup> to 23<sup>rd</sup> of August 2016.
- 3.2 Each sound level monitoring system was housed in a rugged steel box complete with its own self-contained battery power supply. In all cases, the microphones were placed in open positions where local extraneous noise sources could be avoided as far possible. At the majority of locations the microphone was positioned on the airport facing side of any houses or other buildings except for at Site 10, Myrtle Cottage, Site 12, Trent House and Site 15, Hoots Cottage, where the microphone was positioned on the other side of the building facing away from the airport, but away from the building to minimise any acoustic screening effect that the building might otherwise have had.
- 3.3 In accordance with the EC Directive on the assessment and management of environmental noise (2000/0194 (COD) Brussels 18th July 2002), and for consistency with the previous background sound level measurement surveys the microphones were mounted away from reflecting facades at a height of 4m above the ground so as to determine incident sound levels. Each microphone was mounted within a wind and rain shield on a steel pole fixed to the side of the steel box. The whole system was weighted down with a concrete block to give stability during high winds.
- 3.4 The sound level monitors were set to record a number of parameters including the background noise level ( $L_{A90}$ ) and overall ambient sound level ( $L_{Aeq}$ ) for consecutive hourly intervals throughout the two-week monitoring period at each location. In addition, the 14 Larson Davis meters were set to record a sequence of  $L_{Aeq,1min}$  levels throughout the monitoring period and the 2 Rion meters were set to record continuous audio. The sequence and audio data were recorded to allow for possible further investigation of unexpected results where necessary.
- 3.5 The sound level monitors were calibrated prior to the measurement period and checked at the end using a Brüel & Kjær model 4231 Acoustical Calibrator (s/n 2218188). There were no differences in calibration exceeding 0.2 dB, except at Sites 3 and 4 where calibration drifts of +2.1 dB and +0.8 dB occurred respectively. It should be noted that the data reported herein is exactly as recorded by the sound level monitors with no adjustment for observed calibration drift. Observed differences between start and end calibrations indicate additional data uncertainty over and above the normal statistical uncertainty associated with all outdoor noise monitoring, which can easily be of the order of plus or minus 1 dB or more. In this case the observed positive differences between the start and end calibrations at site 3 suggest that the data reported herein could have over-estimated actual sound levels at site 3 by between 0 dB





and 2.1 dB, depending on at what time during the measurement period the calibration drift may have occurred. It should also be noted that all such measurement uncertainties are within the range of decibel differences in sound levels that are not (generally) discernible to average listeners.

#### 4. MEASUREMENT RESULTS

- 4.1 The measurement results are shown at Figure 18 through to Figure 65 with three charts for each of the 16 Sites in numerical order. The figures show the  $L_{A90}$  and  $L_{Aeq}$  values for each hour over the three-week period. The three charts for each location show the results for the first, second and third (partial) week respectively.
- 4.2 Differences in wind direction and other meteorological factors can have significant effects on acoustical propagation from different noise sources to the measurement locations, in addition to differences in the geographic location and operation of aircraft noise sources between easterly and westerly runway modes. Data on runway usage was obtained from Gatwick Airport control tower logs such that the arrivals and departures direction could be identified for each hour of the background sound level monitoring period. The charts identify where all departures took place on either runway 26 (westerly) or runway 08 (easterly). Hourly periods when departures took place in both runway directions are marked as NS (non-specific) and periods with no departures at all are marked 'No Departures'.
- 4.3 The main contributor to the background noise levels ( $L_{A90}$ ) at many of the measurement locations is road traffic noise from main roads. Noise from more distant departing aircraft and airport ground noise may also contribute to a greater or lesser extent depending on the relative level compared to traffic noise which is in turn dependant on runway direction (wind direction) and location (principally proximity to taxiways and holding areas for ground noise).
- 4.4 The main contributors to the overall ambient sound levels ( $L_{Aeq}$ ) are noise from take-offs and road traffic noise but also ground noise as described above. Differences between  $L_{Aeq}$  and  $L_{A90}$  provide an indication of the type of sound level profile over time at any measurement location. Small differences between  $L_{Aeq}$  and  $L_{A90}$  indicate that the sound level profiles are reasonably steady, suggesting that the aircraft noise contribution to ambient sound levels is no greater than that of steadier noise sources such as continuous road traffic and, to a certain extent, ground noise.



- 4.5 This situation applies at locations 7 and 8, particularly for R/W 26 operations where the difference between  $L_{Aeq}$  and  $L_{A90}$  is generally 5 dB or less, and where direct observation indicates that road traffic noise from the nearby A23 makes significant contributions to overall ambient sound levels. For R/W 26 operations, locations 6, 15 and 16 have differences between  $L_{Aeq}$  and  $L_{A90}$  of the order of 5dB or less. For R/W 08 operations, locations 5, 6 and 16 also have differences between  $L_{Aeq}$  and  $L_{A90}$  of the order of 5dB or less.
- 4.6 At other measurement locations where there are much larger differences between  $L_{Aeq}$  and  $L_{A90}$  of up to 20 dB or more, intermittent noise sources such as aircraft noise, where present, make much more significant contributions to overall ambient sound levels. This situation applies at locations 9 and 10, which are relatively close to the airport perimeter and relatively distant from busy main roads. The differences between  $L_{Aeq}$  and  $L_{A90}$  at the remaining locations are mostly around 10 to 15 dB, suggesting that the aircraft noise contribution to overall ambient sound levels is likely to be dominant for much of the time but that road traffic noise could still be dominant during temporary lulls in airport traffic. At Site 16, the difference is around 5 dB for both R/W 26 and R/W 08 operations indicating that road traffic is more dominant but not as much as at Sites 7 and 8.
- 4.7 The results are also provided in tabular form at Tables 1 to 6. Tables 1 and 2 show the numbers of 1-hour samples of background sound level data for R/W 26 and R/W 08 operations respectively over the monitoring period at each location. Tables 3 and 4 show the average background noise levels ( $L_{A90}$ ) for each measurement location for each hour and Tables 5 and 6 show the corresponding average ambient sound levels ( $L_{Aeq}$ ).
- 4.8 As for the previous measurements, the results from all measurement locations follow a regular day-night cycle with the lowest hourly sound levels generally occurring between 0200 and 0400 hours in the morning. The maximum hourly sound levels generally occur at around 0600-0700 hours during the morning peak hour and then fall slightly to remain steady through the rest of the day until late evening. At some locations the maximum occurs later between 1000 and 1200 or 1300; both of these reflecting a greater spread than seen previously and possibly reflecting a change in road traffic commuter patterns over the years, perhaps to avoid travelling at the most congested times. The secondary peak between 1700 and 1900 hours as seen in previous data, similarly does not appear at all locations, also reflecting possible changes in road traffic commuter patterns since the start of the survey work.
- 4.9 The lowest background noise levels ( $L_{A90}$ ) vary depending on the location and runway direction



(also corresponding to wind direction). During the middle of the night, averaged hourly background noise levels are lower for R/W 26 operations at between 30 and 35 dB  $L_{A90}$  in quieter areas away from main roads (Sites 3, 4, 5, 9, 13 and 14) and less than 30 dB  $L_{A90}$  at Site 1. At the remainder of the locations closer to main roads the corresponding lowest hourly background noise levels for these conditions are between 35 and 45 dB  $L_{A90}$  except at Sites 7 and 8 where the lowest average hourly  $L_{A90}$  levels are 45.4 and 49.8 dB  $L_{A90}$  respectively. Typical day-time  $L_{A90}$  sound levels for R/W 26 range from 40 to 50 dB  $L_{A90}$  at most locations, but from 50 - 60 dB  $L_{A90}$  at locations 7, 8 and 12.

4.10 Comparing Tables 3 and 4, it can be seen that for night-time hours (broadly 2300-0700), average background noise levels tend to be a few decibels higher under R/W 08 operations, except at Sites 7 and 8 which are dominated by nearby high traffic flows, probably resulting from the effect of the wind direction on noise propagation from more distant road traffic noise sources, particularly the M23. During the day the opposite generally applies, except at Site 9 where background noise under R/W 08 departures is still higher, possibly due to ground noise from aircraft waiting to depart at the western end of the runway (550m from location 9). At Sites 1-6 and 11-16 there is actually little difference in background noise (generally less than 2 dB) between runway directions during work hours (9:00 to 17:00) and this is an indication that road traffic noise may be having a greater effect on background noise levels than airport ground noise at these locations during the day.

4.11 Comparing Tables 5 and 6, it can be seen that, as for the background noise levels, ambient sound levels at night are higher for R/W 08 conditions (wind from the east) except at Sites 7 and 8. At sites 3, 11, 12, 15 and 16 there is little difference between ambient sound levels in the early hours of the morning for R/W08 or R/W 26 operations. During the day ambient sound levels for Sites 1 – 5, 7,9 – 10, 13 and 16 are higher for R/W 26 departures, likely to be due to departing aircraft dominating the noise environment (except at Site 7 which is dominated by road traffic on the A23), and little different for Site 6, 8 and 14. For Sites 11, 12, and 15 they are higher for R/W 08 departures which is likely to be due to aircraft passing overhead as there is a large difference between  $L_{Aeq}$  and  $L_{A90}$  for R/W08 operations at these locations.

4.12 Considered overall, the data suggests that aircraft noise makes a greater contribution to overall ambient sound levels than road traffic noise in most but not all residential areas around Gatwick. The precise contributions made by aircraft noise and road traffic noise at specific sites could only be determined by attended sound level measurement surveys using more sophisticated source



identification techniques.

## 5. COMPARISON WITH 2008 SURVEY RESULTS

5.1 The changes in background noise level since 2008 for R/W 26 and R/W 08 operations respectively are shown in Tables 7 and 8 in this report. For clarity, increases of 3 dB or more are shown in dark red and decreases of 3 dB or more are shown in dark green, lighter red and green indicate smaller changes.

5.2 Average hourly background noise levels ( $L_{A90}$ ) are mostly within the same overall range in 2016 as in 2008, but there are a number of detailed differences. For R/W 26 operations, Table 7 shows that night-time background noise levels at Sites 5 and 8 (and to a lesser extent 3 and 7) are significantly lower (by 3 dB or more). Night time background noise levels for R/W 26 operations are significantly higher at Site 2 and, to a lesser extent, at sites 9 and 10. At Sites 5, 7, 8 and 11 background noise levels are also significantly lower during the day-time period. Site 12 is the only location to have significantly higher background noise levels for R/W 26 operations during the day. This can be explained by the change in measurement location which is closer to road traffic on Balcombe Road than the 2008 location.

5.3 For R/W 08 operations sound levels are significantly lower during the day at Sites 1 – 3 and 5 – 8 and during the night at Sites 5 – 8. Significantly higher background noise levels can be noted at Sites 9 and 12 (and at 10 and 11 to a lesser extent) during the day.

## 6. SUMMARY OF RESULTS

6.1 For the 2016 survey, as in all previous surveys, the day-night variation in ambient sound levels ( $L_{Aeq}$ ) and background noise levels ( $L_{A90}$ ) in residential areas around Gatwick Airport is consistent with the varying amounts of road traffic, aircraft operations and other noise sources at different times of the day and night, and is generally consistent with day-night variation in other areas.

6.2 For the 2016 survey, the observed differences between average hourly ambient sound levels ( $L_{Aeq}$ ) and background noise levels ( $L_{A90}$ ) in the different residential areas are consistent with the expected contributions to the overall noise environment made by road traffic noise and aircraft noise having regard to the relative distances from the measurement locations to the nearest main roads.

6.3 For the 2016 survey, average hourly background noise levels ( $L_{A90}$ ) tend to be higher under R/W



08 (easterly) operations at night except at properties in Horley Gardens to the north-east of the A23 (sites 7 and 8) where there the differences, such as exist, are the other way round. During the daytime, any differences, such as exist, also tend to be the other way round, except at sites 9 and 10 to the south and south-west of the airport, where background noise levels ( $L_{A90}$ ) are higher under R/W 08 (easterly) operations throughout the day and night. At Sites 1 – 6 and 11 – 16 there is little difference in background noise levels ( $L_{A90}$ ) between either runway direction during normal working hours (09:00 – 17:00).

- 6.4 Comparing 2016 against 2008, average hourly background noise levels ( $L_{A90}$ ) are mostly within the same overall range, but there are a number of detailed differences. For R/W 26 (westerly) operations, night-time background noise levels ( $L_{A90}$ ) at Sites 5, 7, 8 and 11 are generally lower by 3 dB or more but are higher by a similar amount at Site 2. At Site 5, 7, 8 and 11 these differences have continued into the day-time period. At Site 12 day time background noise levels are higher by 3 dB or more.
- 6.5 Further comparing 2016 against 2008, for R/W 08 (easterly) operation background noise levels ( $L_{A90}$ ) are lower by 3 dB or more during the day at Sites 1 – 8 and during the night at Sites 5 – 8. Significantly higher background noise levels were noted at Sites 9, 10 and 12 during the day.
- 6.6 Many of the larger observed differences in both background noise levels and ambient sound levels between the different surveys from 1998/99 to 2016 reflect national trends for generally quieter road vehicles and aircraft types, while also reflecting differences in the amount, geographic distribution, and peak-hour congestion of road traffic throughout the Gatwick area and the numbers of aircraft operations at different times of the day and night. Many of the smaller observed differences, however, do not exceed the generally expected levels of statistical uncertainty for outdoor sound level measurements and should only be interpreted in that light.

## **TABLES**







**Table 3 - Average Background (L<sub>A90</sub>) Noise Levels for R/W 26 Operations**

Start Time	Location															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
00:00	29.3	36.1	33.9	36.8	33.0	43.0	49.2	52.9	34.7	39.0	42.7	43.9	32.7	34.7	44.1	41.0
01:00	28.7	35.8	33.1	35.1	32.1	42.1	46.9	51.6	34.0	39.1	42.0	42.1	31.6	34.5	43.2	39.9
02:00	27.8	35.7	31.5	34.6	31.9	41.3	46.4	51.0	33.0	37.1	41.4	41.0	30.5	33.1	42.8	39.6
03:00	28.3	36.6	32.9	33.6	31.4	41.3	48.2	52.1	32.8	37.1	41.1	41.4	30.9	34.0	43.0	40.4
04:00	29.2	36.7	34.4	34.2	32.1	42.4	49.0	52.5	34.1	37.9	41.6	42.4	31.7	34.7	43.5	41.7
05:00	31.0	37.6	36.2	36.0	33.3	45.6	52.1	53.9	35.3	39.1	42.8	44.1	34.1	36.0	44.8	44.0
06:00	40.8	44.6	45.5	45.9	40.9	51.0	56.3	57.4	42.5	45.1	50.2	51.5	40.6	42.8	51.1	49.6
07:00	42.0	47.3	47.9	48.5	41.7	50.6	57.4	57.1	46.4	46.7	50.3	53.7	41.2	42.9	51.1	49.4
08:00	42.2	48.0	48.5	49.3	41.9	49.8	57.4	57.0	47.9	47.7	50.3	54.4	41.7	43.6	51.5	50.2
09:00	42.4	47.2	48.1	50.2	43.0	49.3	57.1	57.2	47.6	47.3	49.5	53.3	41.8	43.8	50.5	50.5
10:00	41.6	46.6	47.4	50.9	41.6	49.3	57.2	57.5	46.4	46.8	49.1	54.1	42.0	43.7	50.6	50.2
11:00	41.0	46.2	46.8	48.6	41.0	49.4	57.2	57.4	45.6	45.8	49.0	54.6	41.5	43.7	49.9	50.1
12:00	41.9	47.1	48.2	49.6	41.7	49.9	57.7	58.1	48.1	46.4	49.2	54.5	42.4	44.2	50.4	50.4
13:00	42.3	47.2	48.2	50.0	41.7	50.4	57.8	57.9	47.6	46.2	48.8	54.5	42.8	44.6	50.3	50.3
14:00	42.1	47.4	48.4	50.5	42.4	50.5	57.9	57.9	47.5	46.1	49.0	54.7	43.0	44.6	50.2	50.3
15:00	42.3	47.7	48.3	50.3	42.2	50.7	57.7	57.8	47.0	45.7	48.7	54.5	42.7	45.0	50.1	50.0
16:00	42.2	48.6	48.5	51.2	41.9	50.8	57.8	58.0	47.7	46.1	48.5	55.2	42.8	44.7	50.2	49.6
17:00	42.3	48.5	48.5	51.3	41.0	50.5	57.7	57.3	48.2	46.0	48.0	55.9	42.1	44.8	49.7	49.3
18:00	40.7	47.0	47.8	47.9	40.2	50.2	57.0	56.8	45.4	45.4	48.0	54.2	41.0	44.4	49.6	48.7
19:00	39.2	44.7	46.1	45.9	40.1	49.6	56.2	56.8	42.4	44.3	47.2	51.7	39.5	43.3	48.6	47.2
20:00	37.6	42.7	44.6	44.2	39.0	48.6	55.1	56.4	39.7	42.8	46.7	50.7	38.9	42.2	48.7	46.3
21:00	35.6	40.8	41.7	42.0	37.2	46.8	53.6	54.7	38.3	41.7	45.6	49.4	37.3	40.0	48.1	45.4
22:00	34.4	39.6	40.2	40.6	35.8	45.7	52.4	53.9	37.9	42.3	45.0	47.9	36.5	39.3	46.6	44.7
23:00	31.1	37.0	37.7	37.9	33.8	44.9	51.2	53.8	37.6	42.9	44.7	46.0	36.1	38.4	45.6	43.1

**Table 4 - Average Background (L<sub>A90</sub>) Noise Levels for R/W 08 Operations**

Start Time	Location															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
00:00	38.2	39.7	41.1	45.1	41.2	48.1	47.6	50.8	40.1	45.0	44.8	47.5	36.6	40.4	45.4	42.5
01:00	37.3	38.6	39.4	42.8	38.3	46.0	45.4	49.1	38.4	43.0	42.9	44.8	35.0	38.3	43.3	40.2
02:00	34.3	37.5	36.6	41.3	36.6	44.5	44.5	48.6	35.3	41.4	42.5	42.9	32.7	36.0	42.6	38.8
03:00	33.3	37.4	36.8	40.9	36.6	45.4	46.6	50.1	35.1	42.2	43.0	44.4	33.0	36.2	43.6	40.4
04:00	33.8	38.3	37.7	41.3	37.1	45.6	48.9	51.4	36.2	42.7	43.9	46.2	35.2	38.8	45.1	43.1
05:00	37.2	40.3	41.4	44.0	39.6	48.5	50.8	52.0	40.2	45.7	46.3	49.8	37.6	41.9	48.0	46.9
06:00	49.1	51.1	53.9	53.0	47.3	53.9	54.9	54.0	55.8	53.8	52.5	54.9	45.9	48.0	52.2	50.6
07:00	48.9	52.0	52.9	52.0	46.9	52.2	56.5	53.2	57.8	52.6	51.4	56.4	46.9	48.9	52.0	51.1
08:00	45.5	50.5	51.3	50.2	43.7	51.2	56.2	52.4	56.7	50.9	50.7	56.1	44.1	46.5	50.3	49.8
09:00	43.5	48.8	50.0	50.8	42.6	50.8	55.1	52.3	53.6	49.5	49.3	54.9	42.1	45.6	48.8	49.9
10:00	43.8	48.7	50.7	51.8	42.6	52.1	54.9	52.6	51.7	48.7	47.2	55.1	41.8	45.3	48.7	49.7
11:00	42.5	48.1	48.8	49.0	41.5	51.6	54.1	52.0	53.4	48.9	48.1	54.8	41.9	46.3	48.0	49.4
12:00	42.5	48.6	48.5	48.9	41.1	51.2	54.1	51.8	53.6	48.9	47.8	54.3	41.5	45.9	47.6	49.1
13:00	41.6	48.4	48.2	48.4	40.3	50.3	54.2	52.5	54.2	48.3	46.6	54.6	41.7	45.7	47.6	48.8
14:00	41.7	47.1	47.2	48.4	40.2	50.7	54.5	52.0	54.7	48.4	47.4	54.5	41.4	45.6	46.7	48.9
15:00	41.6	48.1	47.7	48.7	40.7	51.0	53.6	51.6	54.7	48.3	47.5	55.1	42.1	45.7	47.2	48.8
16:00	41.6	48.9	48.2	49.9	40.6	51.4	54.5	51.7	55.4	49.3	47.5	56.1	42.0	46.0	48.7	48.1
17:00	42.7	49.5	48.4	50.0	41.1	51.2	54.8	51.6	55.6	49.6	46.1	56.4	41.2	46.3	49.6	48.5
18:00	45.0	50.4	49.9	48.6	41.5	52.3	54.6	52.5	57.5	50.3	47.4	56.6	42.3	46.8	49.8	49.1
19:00	45.3	50.0	50.0	48.2	42.1	51.9	53.6	53.1	56.4	49.3	47.1	55.6	42.5	46.4	49.5	48.6
20:00	45.9	49.7	50.4	48.5	43.3	52.3	53.4	53.2	53.9	48.7	47.2	54.1	42.8	46.2	49.7	48.1
21:00	45.1	47.5	48.4	48.0	43.2	50.7	51.1	51.7	49.9	47.7	46.9	52.5	41.8	44.7	48.8	47.0
22:00	43.4	45.1	45.7	46.9	42.3	48.5	50.7	51.6	46.6	46.7	45.3	50.8	40.4	43.1	47.1	45.0
23:00	41.0	42.2	44.1	47.4	43.0	50.0	49.7	51.9	43.4	46.6	45.5	49.3	38.1	41.8	46.9	43.8

**Table 5 - Average Ambient ( $L_{Aeq}$ ) Sound Levels for R/W 26 Operations**

Start Time	Location															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
00:00	41.5	47.8	50.5	48.2	39.2	50.1	54.9	56.0	53.0	51.1	49.2	55.6	41.5	42.5	49.2	46.2
01:00	36.4	43.4	47.8	46.5	37.2	49.0	53.3	54.8	48.9	47.8	47.3	53.9	37.8	40.6	47.6	44.8
02:00	35.1	43.1	46.4	45.8	36.2	48.4	52.9	54.2	48.5	45.6	46.5	52.0	36.3	39.8	47.2	44.6
03:00	34.5	44.5	45.0	45.8	35.8	49.5	54.3	54.8	49.8	44.7	45.5	51.4	37.2	40.0	47.6	45.6
04:00	34.9	44.6	45.1	47.6	36.3	50.1	54.5	54.7	51.0	45.0	45.5	51.4	36.9	39.9	48.3	46.4
05:00	50.1	54.2	55.2	51.0	45.0	52.9	57.3	57.1	61.5	54.4	51.7	54.9	48.7	49.0	53.2	51.4
06:00	57.3	61.0	61.8	56.1	51.3	55.9	60.1	59.8	68.0	61.2	57.1	59.7	54.8	53.8	57.6	55.0
07:00	57.0	60.8	61.7	57.1	51.2	54.9	60.7	59.3	68.0	61.6	56.9	61.3	54.5	53.1	56.7	53.8
08:00	56.7	60.6	61.7	58.1	52.7	54.7	60.7	59.3	67.8	61.7	56.6	62.0	54.1	52.8	56.5	54.4
09:00	56.7	60.4	61.6	58.8	52.3	54.3	60.5	59.6	67.7	61.4	57.0	61.7	54.0	52.4	55.7	54.9
10:00	56.4	60.1	61.6	59.9	51.2	55.8	60.7	60.3	67.8	62.0	57.2	61.7	54.1	52.9	55.9	55.0
11:00	56.4	60.5	61.6	57.9	50.5	54.9	61.0	60.3	68.2	61.4	57.5	62.5	54.2	54.3	55.5	54.8
12:00	56.6	60.3	61.4	58.4	50.3	54.5	61.0	60.5	67.6	61.1	56.0	61.8	55.2	52.8	55.3	54.9
13:00	57.4	60.6	61.5	58.3	51.0	55.4	61.0	60.4	67.8	60.8	56.1	61.8	55.6	53.5	55.8	54.5
14:00	56.1	59.8	60.8	58.7	50.7	55.9	61.4	60.9	67.2	59.8	55.4	61.5	55.0	53.7	55.4	54.7
15:00	56.2	60.0	60.8	58.7	51.4	54.9	61.0	60.5	67.3	59.7	55.8	61.7	53.2	54.7	55.6	54.8
16:00	56.0	60.0	60.6	59.5	50.5	55.1	60.9	60.4	67.0	59.6	55.2	61.9	52.5	52.8	55.8	54.0
17:00	56.0	60.4	60.2	58.9	49.9	54.9	61.0	59.9	66.9	59.1	54.4	62.0	52.2	53.0	55.1	54.5
18:00	55.8	59.6	60.7	56.3	49.9	55.7	60.6	59.4	66.7	59.7	54.2	61.7	52.6	55.2	56.7	54.0
19:00	55.3	58.8	59.8	55.3	50.1	55.3	60.1	59.1	65.7	59.2	54.4	61.1	51.9	52.0	53.9	51.8
20:00	55.3	59.0	59.7	54.7	49.5	54.0	59.2	59.0	65.7	59.1	54.6	60.0	52.3	52.1	55.1	52.6
21:00	55.1	58.5	59.6	54.4	49.2	53.6	58.1	57.9	65.7	59.1	54.5	59.0	52.3	51.0	54.6	51.7
22:00	52.0	56.0	56.7	52.3	46.7	52.2	57.2	57.2	62.4	57.3	52.6	58.9	49.7	49.1	53.1	50.0
23:00	50.2	54.0	55.7	50.3	43.9	51.2	56.3	56.6	60.8	55.5	52.9	58.5	48.9	48.5	51.9	49.9

**Table 6 - Average Ambient ( $L_{Aeq}$ ) Sound Levels for R/W 08 Operations**

Start Time	Location															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
00:00	48.3	50.5	51.1	50.7	46.3	52.4	53.7	54.0	57.0	54.0	50.3	55.8	44.0	45.9	50.6	46.8
01:00	44.8	47.4	48.0	49.2	42.4	50.5	52.2	51.6	52.6	51.6	46.7	50.6	40.2	42.7	47.4	44.5
02:00	41.6	45.2	46.1	47.4	40.5	49.8	51.0	51.1	50.3	49.2	46.4	48.9	37.9	40.8	46.5	43.9
03:00	38.9	45.8	45.6	48.2	39.7	51.0	52.7	52.2	50.4	47.7	45.6	50.4	37.8	40.5	48.0	45.8
04:00	39.0	45.4	45.4	49.0	40.0	51.5	54.2	53.1	50.6	48.4	46.5	52.0	38.1	42.1	49.7	47.6
05:00	51.9	54.3	55.4	53.9	48.0	54.8	56.5	56.9	60.7	57.3	54.4	62.2	47.4	50.0	56.0	51.8
06:00	58.2	60.2	61.9	58.8	52.6	58.0	59.9	62.1	68.1	62.4	61.2	68.6	54.2	54.8	61.6	54.8
07:00	57.0	59.0	59.2	58.1	52.7	57.2	60.9	61.5	67.0	61.1	61.2	68.4	54.4	54.8	61.5	55.4
08:00	53.1	56.3	57.4	56.9	50.7	56.4	61.3	61.2	66.4	59.9	60.9	68.0	50.7	51.5	61.1	55.1
09:00	51.7	55.6	57.3	58.4	48.9	55.9	61.8	61.3	65.2	59.6	59.8	68.1	49.1	51.9	60.5	55.0
10:00	53.3	55.7	58.7	59.5	47.9	57.9	60.1	60.9	64.3	59.2	58.2	68.2	51.0	54.5	59.6	54.7
11:00	51.0	55.2	57.2	55.8	47.6	56.9	60.3	63.1	65.6	61.3	59.3	68.8	50.1	54.3	60.3	54.7
12:00	51.5	54.7	55.3	55.6	46.2	56.6	59.0	61.6	64.5	61.1	58.3	68.3	49.6	55.2	59.7	54.0
13:00	49.8	54.7	55.4	55.7	45.7	56.7	59.6	62.8	64.5	58.3	59.3	68.5	48.9	52.5	60.5	54.5
14:00	51.8	54.1	54.3	56.0	45.6	59.3	59.5	62.0	65.5	58.6	58.4	68.1	48.4	52.2	59.9	54.8
15:00	53.1	54.7	55.0	56.3	46.1	59.4	59.2	61.3	65.2	57.8	59.1	67.6	49.9	53.1	59.7	54.6
16:00	50.4	55.8	55.5	57.1	46.5	55.6	58.9	61.5	65.6	58.8	59.0	67.6	49.6	51.6	60.9	53.8
17:00	52.0	55.8	55.7	56.9	46.6	56.6	59.2	61.1	66.1	59.7	58.7	67.5	50.6	53.2	59.6	54.6
18:00	52.5	56.4	57.4	54.7	46.4	56.9	59.1	61.0	65.9	58.9	58.5	67.4	49.6	54.7	59.4	54.4
19:00	53.6	57.2	58.1	54.7	47.8	56.6	58.5	60.8	66.6	61.6	58.3	67.0	51.4	55.0	59.2	54.5
20:00	55.0	57.9	58.9	54.9	48.7	56.6	58.6	61.4	66.6	60.6	58.8	67.1	52.1	53.4	59.7	53.1
21:00	54.9	57.6	58.0	54.4	48.7	55.5	57.5	60.0	64.6	58.0	57.5	65.9	51.1	51.3	58.4	51.7
22:00	53.4	55.6	56.8	53.5	47.5	53.7	56.5	58.2	63.9	58.1	55.1	63.9	48.5	49.2	56.3	50.8
23:00	52.9	55.2	55.6	53.3	47.9	53.7	55.3	56.5	60.9	56.7	52.6	61.0	46.2	47.4	54.0	48.2



**Table 7 - Difference Between 2016 and 2008 Background Noise Levels (L<sub>A90</sub>) for R/W 26 Operations (darker green highlight indicates values > 3 dB lower than 2008 and darker red highlight indicates values > 3 dB higher than 2008)**

Start Time	Location															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
00:00	-1.2	3.9	-1.9	1.0	-3.6	-0.8	-2.1	-3.6	1.6	2.4	-0.5	0.0	-	-	-	-
01:00	-0.8	4.5	-1.8	-0.9	-3.8	-0.5	-2.6	-3.3	1.9	3.1	-0.3	-0.9	-	-	-	-
02:00	-1.8	3.6	-3.5	-0.3	-4.3	-0.7	-2.7	-3.2	2.5	1.7	0.4	-1.3	-	-	-	-
03:00	-0.6	5.7	-2.0	-1.6	-5.0	-1.6	-3.6	-3.4	1.5	0.7	-1.3	-2.0	-	-	-	-
04:00	0.6	6.6	0.0	0.0	-1.6	0.0	-4.0	-4.1	0.4	2.1	-1.5	-0.6	-	-	-	-
05:00	-1.2	3.2	-1.8	-2.4	-4.7	-1.3	-3.7	-5.0	-0.6	-0.9	-4.1	-2.1	-	-	-	-
06:00	0.6	1.2	-1.3	-1.8	-4.3	-1.7	-2.7	-4.3	0.6	-1.2	-2.3	-0.2	-	-	-	-
07:00	0.2	1.3	-0.8	-1.1	-4.6	-3.0	-2.9	-4.6	1.9	-0.8	-3.6	1.0	-	-	-	-
08:00	0.2	0.9	-0.9	-0.7	-4.7	-3.0	-3.2	-4.3	1.8	-0.1	-3.5	2.3	-	-	-	-
09:00	0.9	1.3	-0.2	1.4	-3.4	-2.0	-2.4	-4.1	2.5	0.2	-3.8	2.0	-	-	-	-
10:00	0.4	0.9	-1.2	1.9	-4.5	-2.0	-2.2	-3.5	2.1	0.3	-3.1	2.7	-	-	-	-
11:00	-1.1	-0.1	-2.5	-1.0	-5.3	-2.2	-2.7	-4.1	0.3	-1.0	-3.5	3.1	-	-	-	-
12:00	-0.2	1.0	-1.6	0.4	-4.2	-1.9	-2.8	-0.8	2.1	-0.4	-3.3	2.9	-	-	-	-
13:00	0.4	1.0	-1.4	0.4	-4.6	-1.4	-2.7	-0.9	1.3	-0.9	-3.6	3.6	-	-	-	-
14:00	0.0	0.9	-1.0	0.8	-4.0	-1.6	-2.5	-4.4	1.7	-0.4	-2.9	3.7	-	-	-	-
15:00	-0.6	0.9	-1.4	0.4	-4.6	-1.4	-2.8	-4.7	1.0	-0.3	-2.6	3.4	-	-	-	-
16:00	-0.2	2.1	-1.1	1.7	-4.4	-0.7	-2.7	-4.7	0.9	-0.1	-2.7	3.9	-	-	-	-
17:00	-0.3	1.3	-1.3	0.5	-5.0	-1.1	-3.1	-5.6	-0.1	-0.4	-3.8	4.3	-	-	-	-
18:00	-0.7	1.4	-0.8	-1.1	-4.9	-1.2	-3.2	-5.5	0.5	0.1	-3.1	2.8	-	-	-	-
19:00	-1.7	0.5	-1.3	-2.3	-4.9	-1.1	-3.0	-4.8	0.0	-0.5	-3.4	0.3	-	-	-	-
20:00	-1.5	0.0	-1.9	-2.9	-5.3	-1.6	-3.1	-4.9	-0.8	-1.1	-3.3	0.0	-	-	-	-
21:00	-1.0	0.8	-1.6	-1.9	-4.3	-1.5	-3.2	-4.9	0.1	0.1	-2.6	0.2	-	-	-	-
22:00	0.1	2.3	-0.6	-1.3	-4.1	-0.6	-2.5	-4.0	1.7	1.8	-2.4	-0.1	-	-	-	-
23:00	-2.2	1.7	-1.9	-2.4	-5.0	-0.9	-2.7	-3.7	3.9	3.7	-0.7	-0.4	-	-	-	-

**Table 8 - Difference Between 2016 and 2008 Background Noise Levels (L<sub>A90</sub>) for R/W 08 Operations (green highlight indicates values > 3 dB lower than 2008 and red highlight indicates values > 3 dB higher than 2008)**

Start Time	Location															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
00:00	0.4	0.3	1.1	2.6	-0.8	0.3	-4.1	-3.1	3.8	2.7	0.8	0.6	-	-	-	-
01:00	2.2	2.3	2.2	2.3	-2.4	-0.3	-4.6	-3.4	5	3.3	1.7	1.3	-	-	-	-
02:00	1.7	3.9	-2.1	-1.8	-4.6	-3.8	-3	-4.6	-	-1.3	-3.5	-3.6	-	-	-	-
03:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05:00	-0.5	0.8	1	0.7	-4.1	-2.5	-3.9	-4.2	-	1.6	0.8	3.6	-	-	-	-
06:00	-0.7	-0.9	-1.6	-0.4	-4.9	-4	-3.9	-4.5	7.7	3.8	3.8	4.5	-	-	-	-
07:00	1.1	0.8	-1.5	-0.6	-4	-5.5	-1.6	-6	11	2.9	2.8	5.5	-	-	-	-
08:00	-1.8	-1	-4.3	-2.4	-6.4	-5	-2.7	-7.3	8.7	2.2	3.1	4.8	-	-	-	-
09:00	-3.2	-2.2	-4	-0.4	-6.5	-4.4	-3.9	-7.4	6.7	1.9	2.4	3.3	-	-	-	-
10:00	-3.3	-2.3	-3.2	0.2	-6.5	-3.4	-4.8	-7.3	5.1	1.4	-0.1	3.2	-	-	-	-
11:00	-4.2	-3.5	-7	-2.6	-7.7	-3.7	-5.8	-7.6	6.1	1.6	0.9	2.5	-	-	-	-
12:00	-4.2	-3.2	-7.1	-2.3	-7.7	-3.6	-5.5	-7.5	6.2	1.9	0.8	3.5	-	-	-	-
13:00	-1.3	-0.8	-3.3	-1	-6.6	-3.8	-4.8	-5.7	-	2	0.5	4	-	-	-	-
14:00	-1.9	-2.4	-5.1	-1.5	-6.3	-3.6	-4.6	-6.6	-	2.4	1.3	4.2	-	-	-	-
15:00	-1.2	-1.5	-3.5	-1.6	-5.7	-2.2	-5.3	-7.2	-	3.5	2	5	-	-	-	-
16:00	-0.8	0.4	-3.4	1.2	-4.7	-0.7	-4.4	-6.6	-	4.6	2	5.8	-	-	-	-
17:00	-0.4	-0.7	-4.1	0.2	-4.7	-0.4	-4.3	-6.1	-	4.4	0.4	5.8	-	-	-	-
18:00	2.3	1.8	-0.8	0.1	-3.7	0.3	-4.1	-5.3	-	6	2.8	7.2	-	-	-	-
19:00	0.7	0.1	-4.4	-1.8	-4.2	0.1	-4.3	-4.7	-	3.6	0.9	5.9	-	-	-	-
20:00	1.5	1.1	-1.9	-1.2	-3	-0.3	-3.7	-4.1	10	4.2	1.9	4	-	-	-	-
21:00	2.1	1.9	-0.7	-1	-3.3	-2.4	-5.1	-4.6	8.2	1.6	0.9	1.9	-	-	-	-
22:00	-1.4	-2	-4.6	-2.3	-4.6	-3.6	-3.9	-3.2	4.2	0	-0.7	0.9	-	-	-	-
23:00	1.5	0.5	0.3	2.3	-1.1	0.5	-3.9	-2.6	5.7	3.4	0.9	0.8	-	-	-	-

## Figures



Figure 1 – Measurement Locations





**Figure 2 – Site 1 – Blue Cedars**



**Figure 3 – Site 2 – 3 Charlwood Road**



**Figure 4 – Site 3 - Brook Farm**



**Figure 5 – Site 4 - The Bear and Bunny Nursery**





Figure 6 – Site 5 – April Cottage, NHS Farmfield



**Figure 7 – Site 6 - Oakfield Cottage, Povey Cross Road**



**Figure 8 – Site 7 - 103 Cheyne Walk, Horley**





Figure 9 – Site 8 - 82 The Crescent, Horley



**Figure 10 – Site 9 - Hyder's Farmhouse, Bonnetts Lane**



**Figure 11 – Site 10 - Myrtle Cottage, Poles Lane**





Figure 12 – Site 11 - Rowley Farmhouse



**Figure 13 – Site 12 - Trent House, Balcombe Road**



**Figure 14 – Site 13 - 24 Burlands**





Figure 15 – Site 14 - 12 Cherry Lane



**Figure 16 – Site 15 - Hoots Cottage, Tinsley Green**



**Figure 17 – Site 16 - 146 Tinsley Lane**





Figure 18 – Site 1 (week 1)

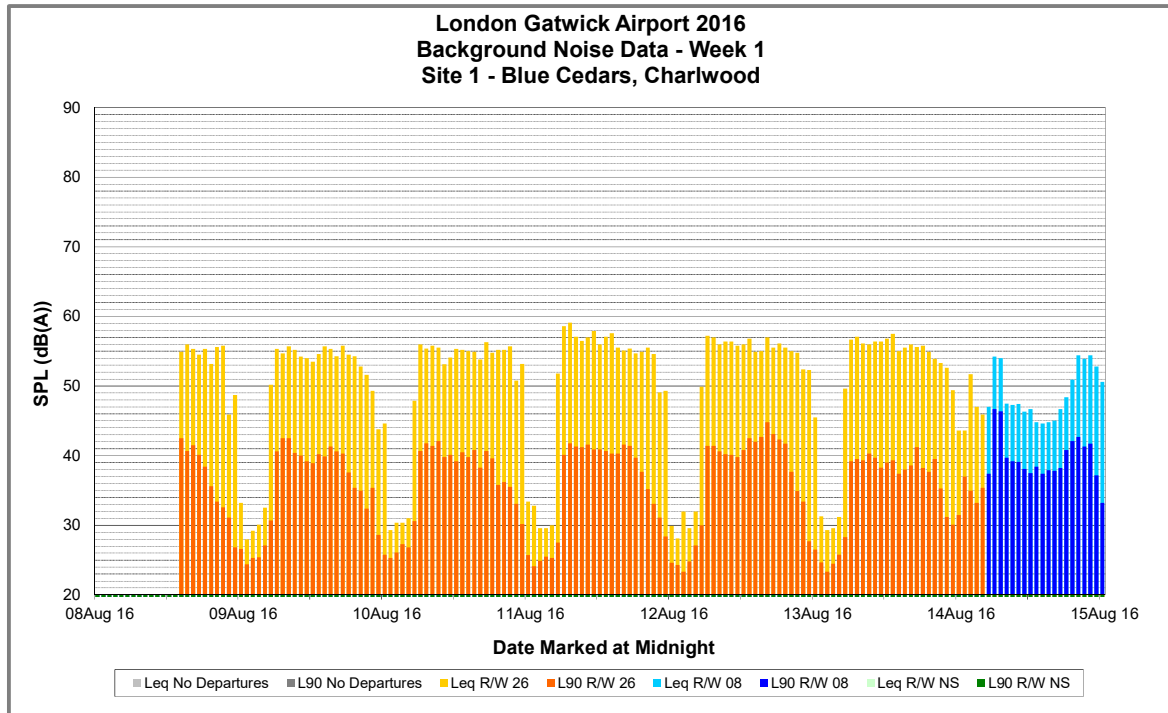


Figure 19 – Site 1 (week 2)

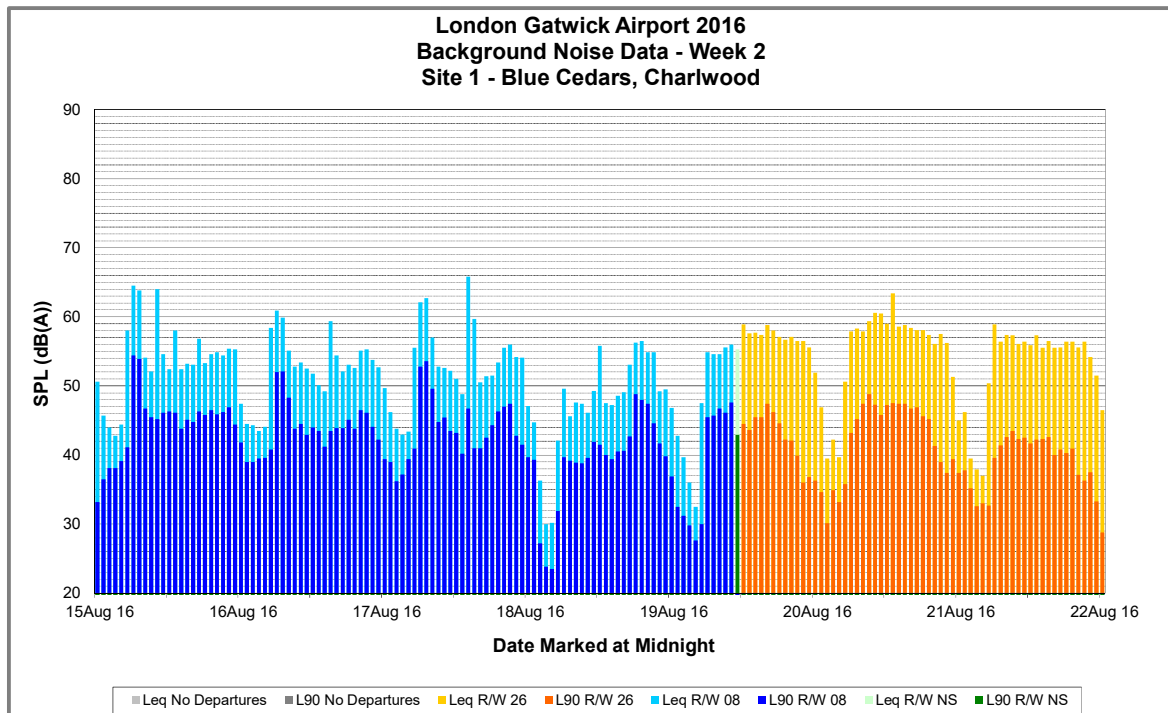


Figure 20 – Site 1 (week 3)

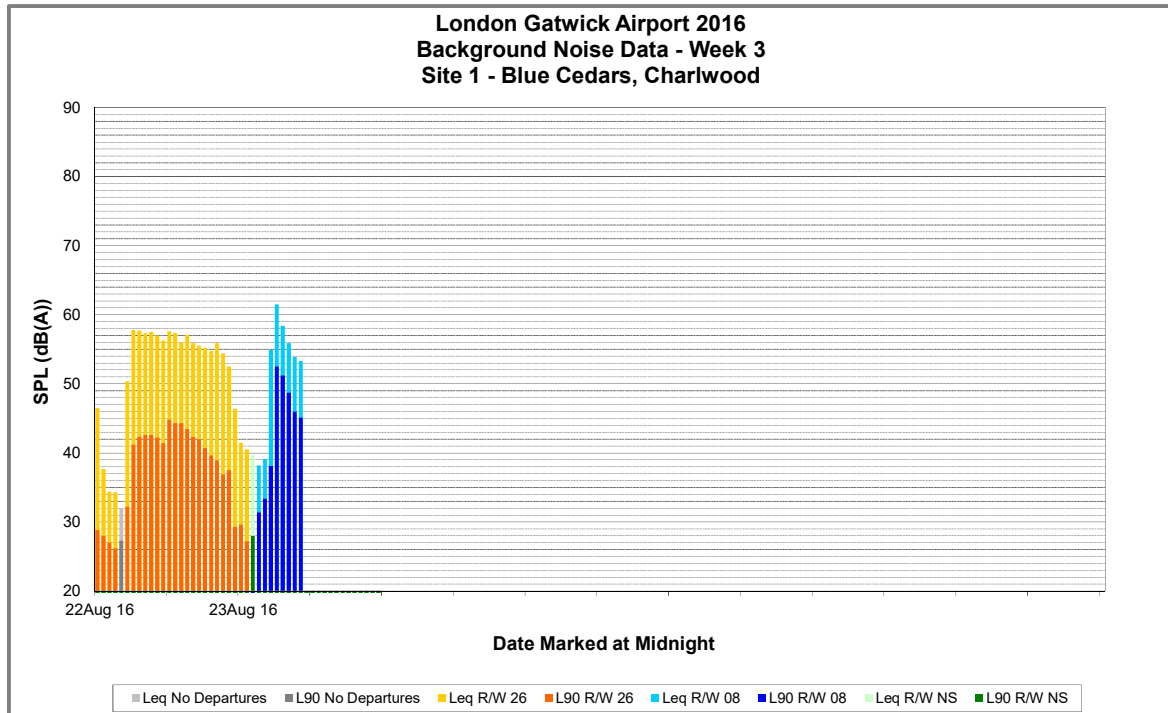


Figure 21 – Site 2 (week 1)

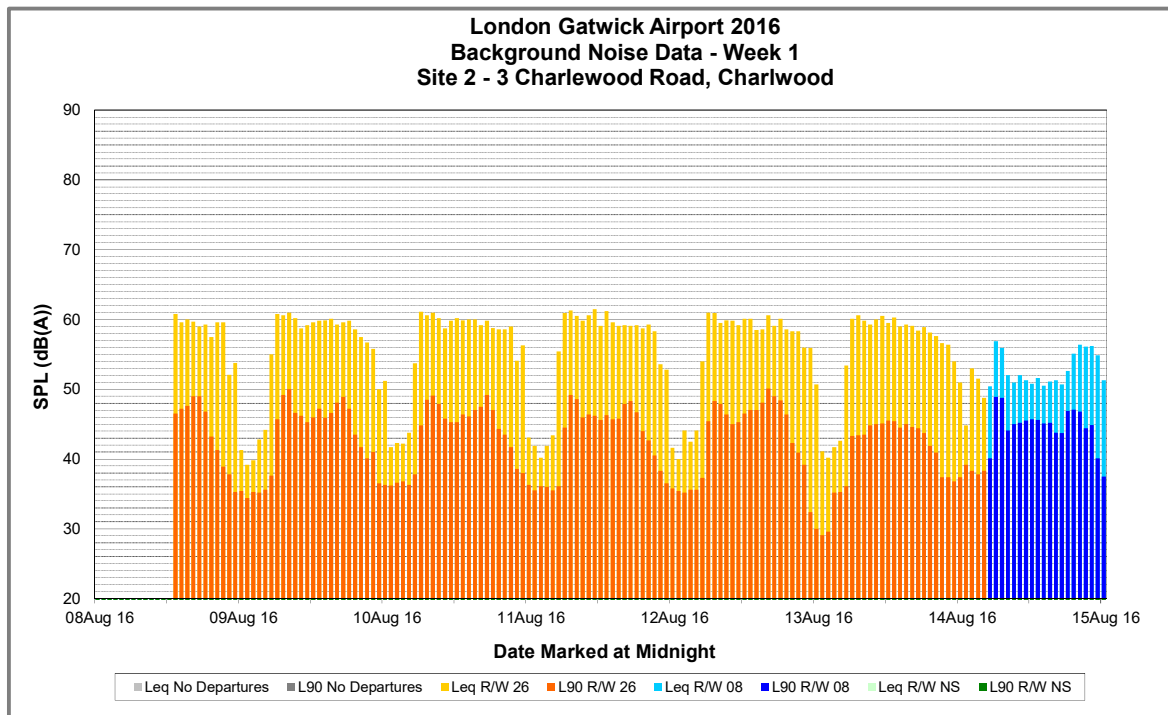


Figure 22 – Site 2 (week 2)

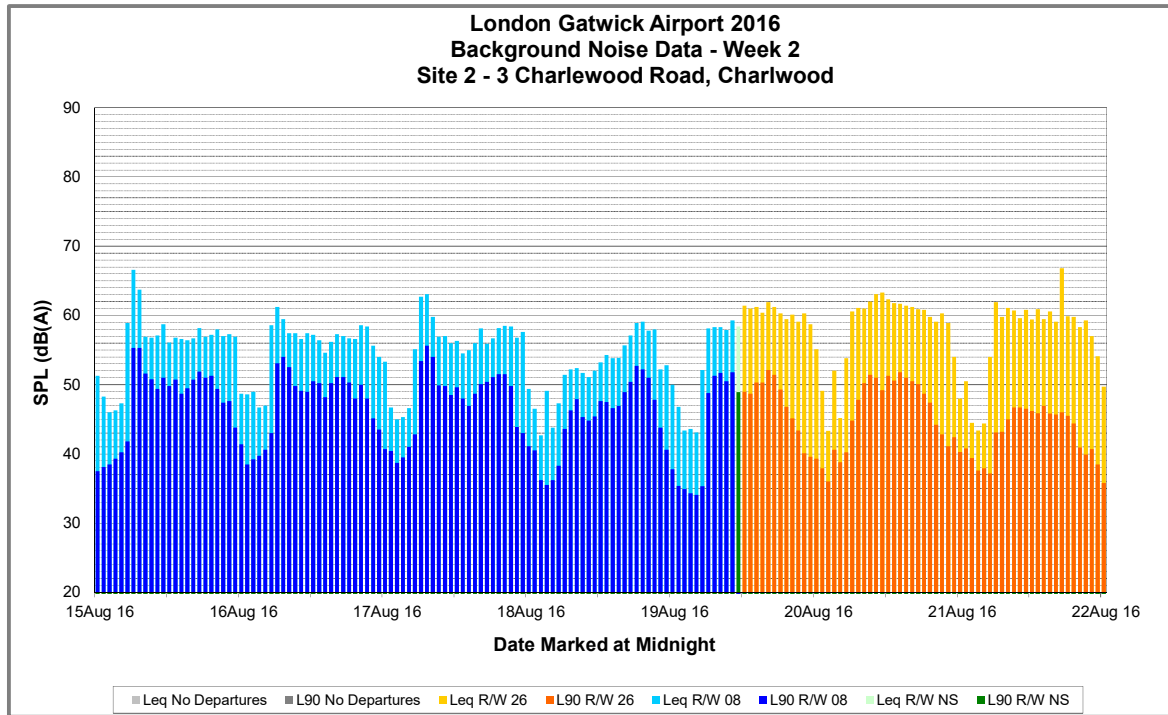


Figure 23 – Site 2 (week 3)

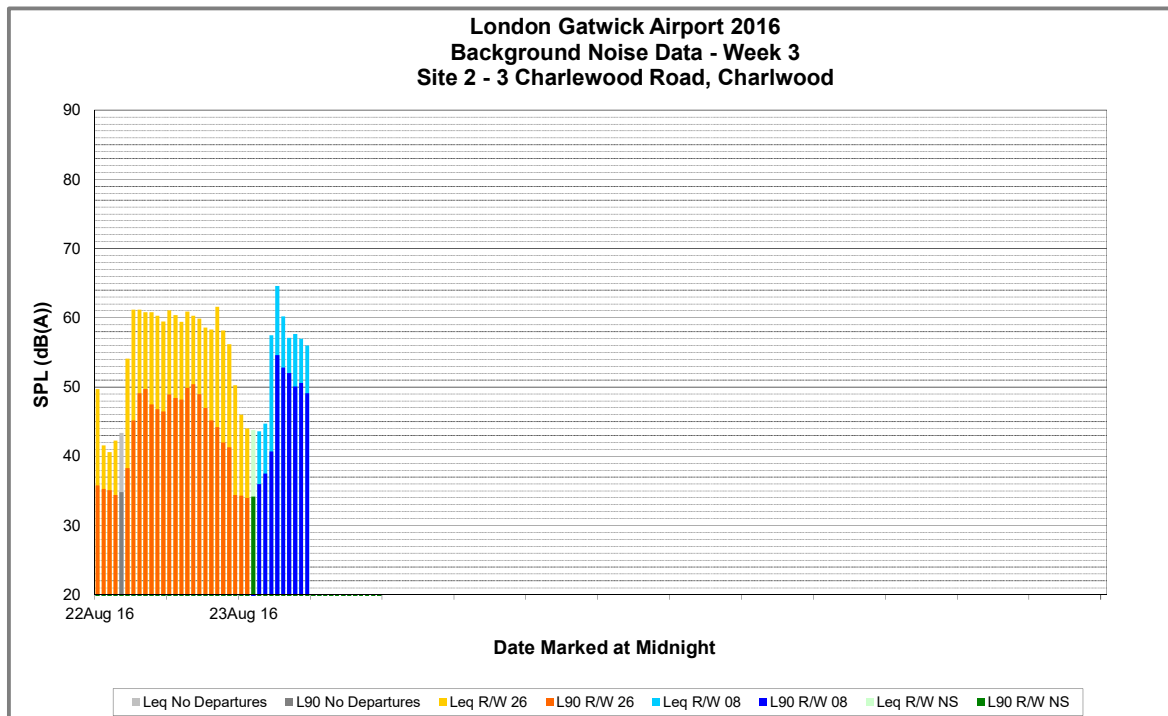


Figure 24 – Site 3 (week 1)

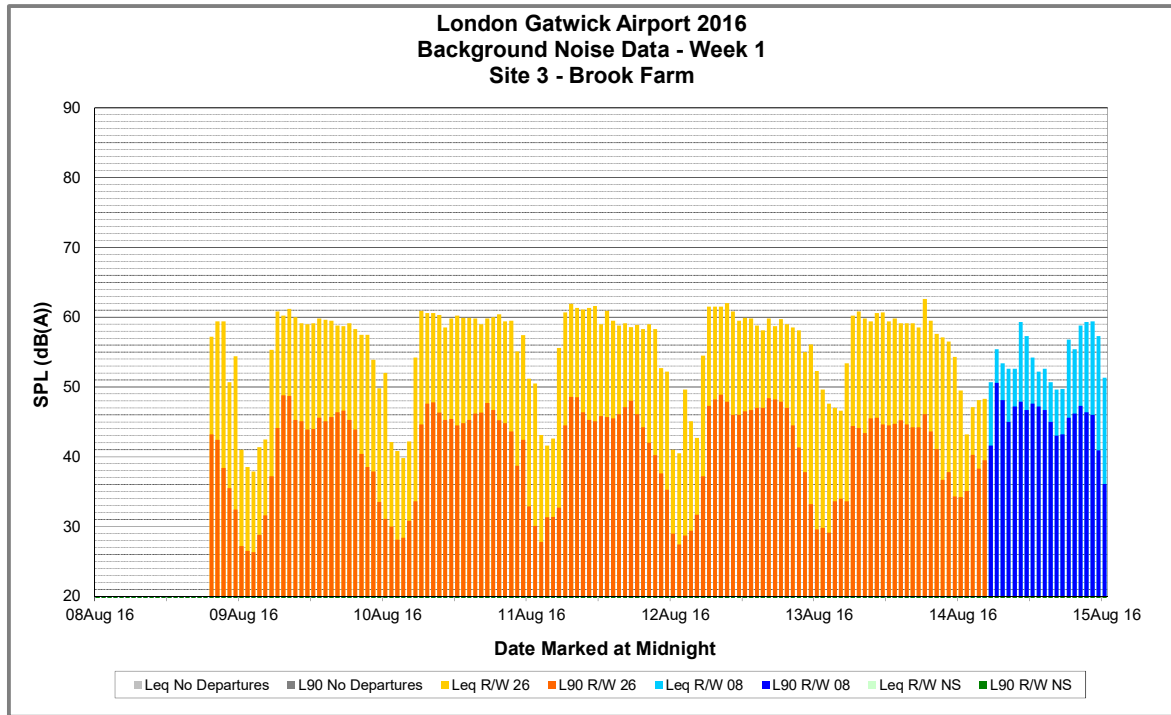


Figure 25 – Site 3 (week 2)

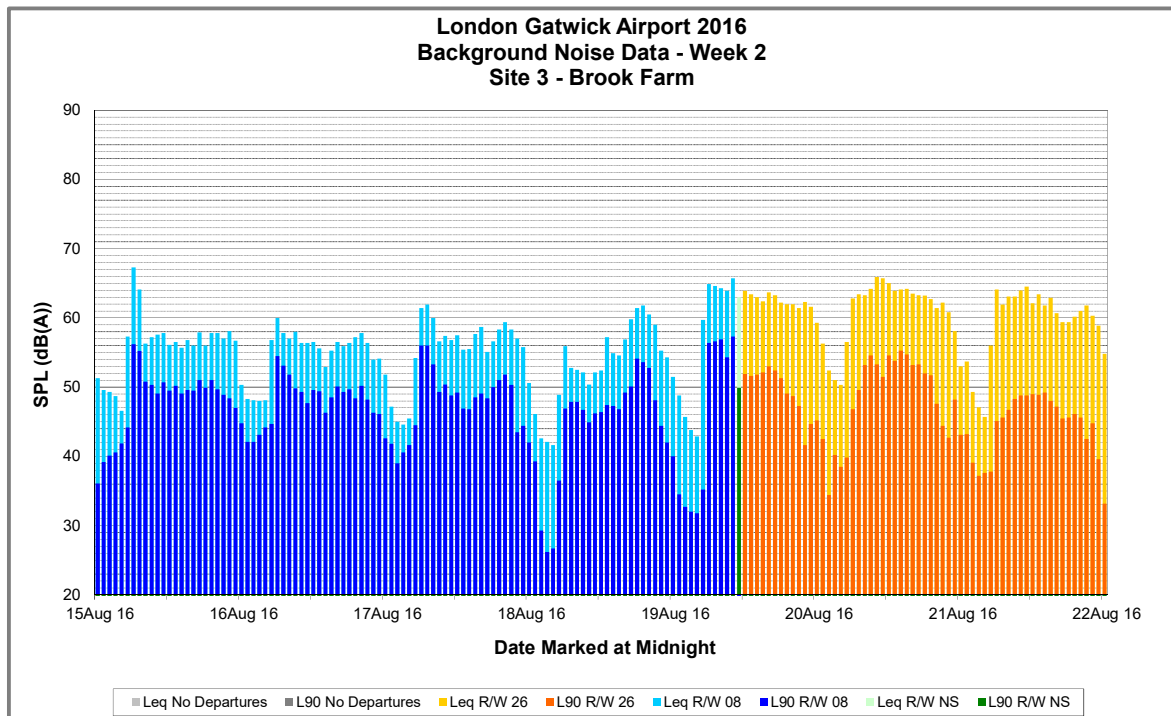


Figure 26 – Site 3 (week 3)

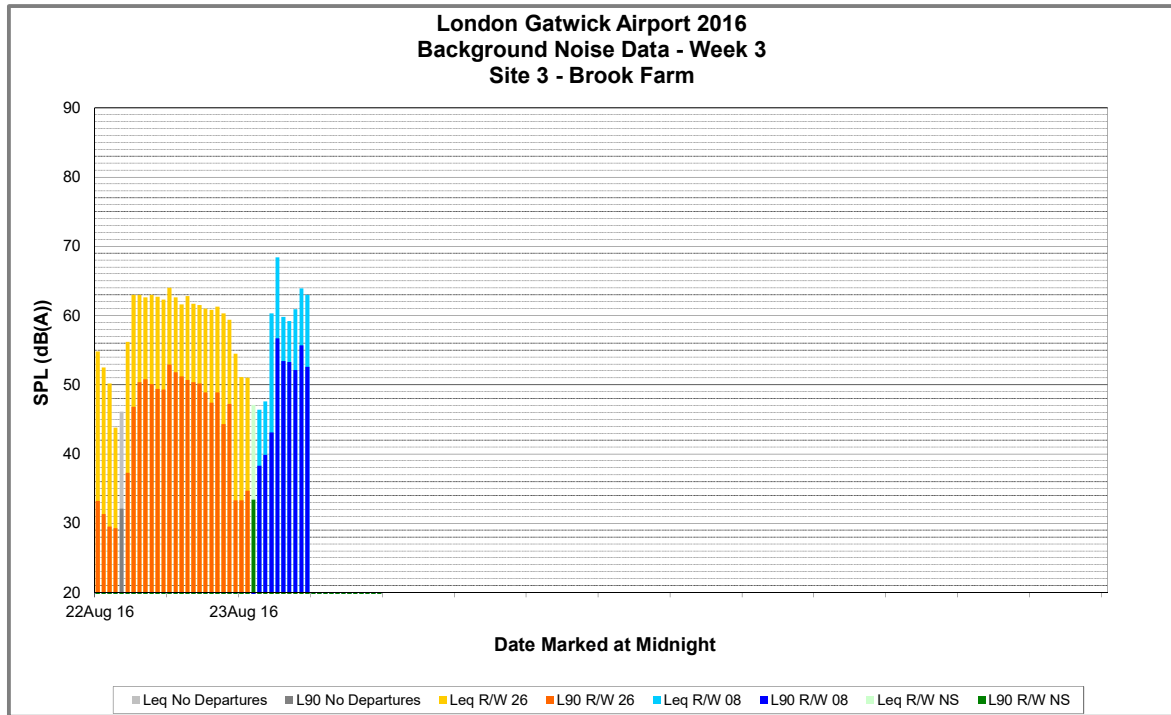


Figure 27 – Site 4 (week 1)

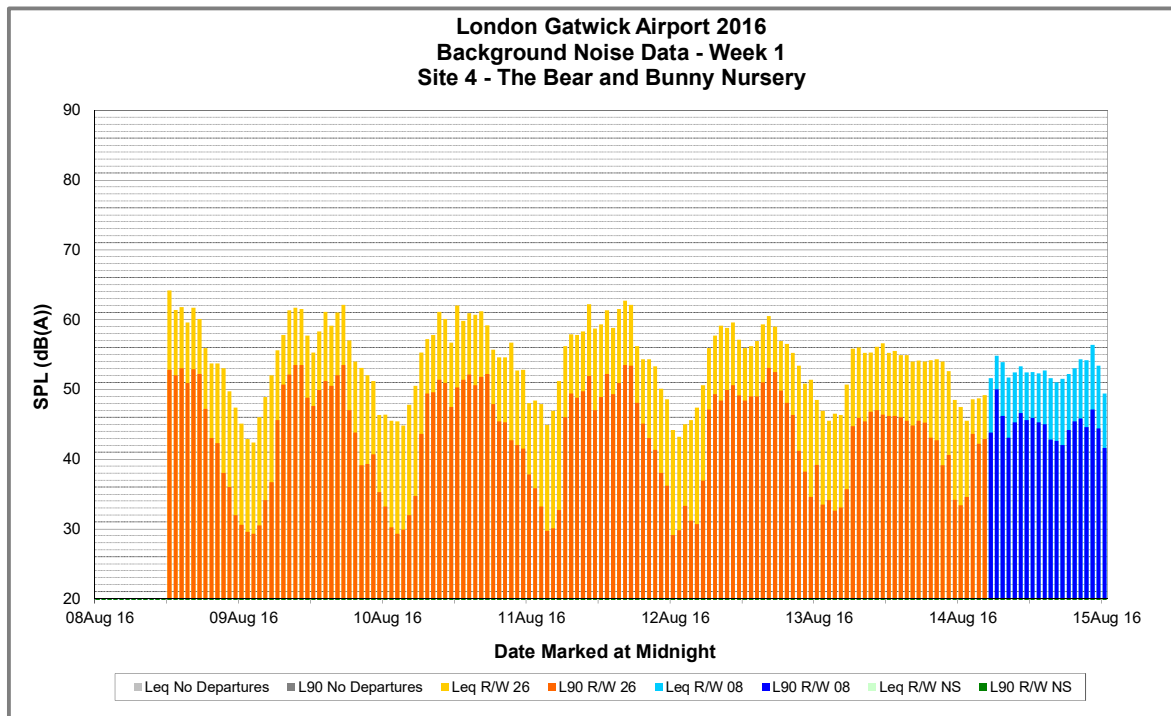




Figure 28 – Site 4 (week 2)

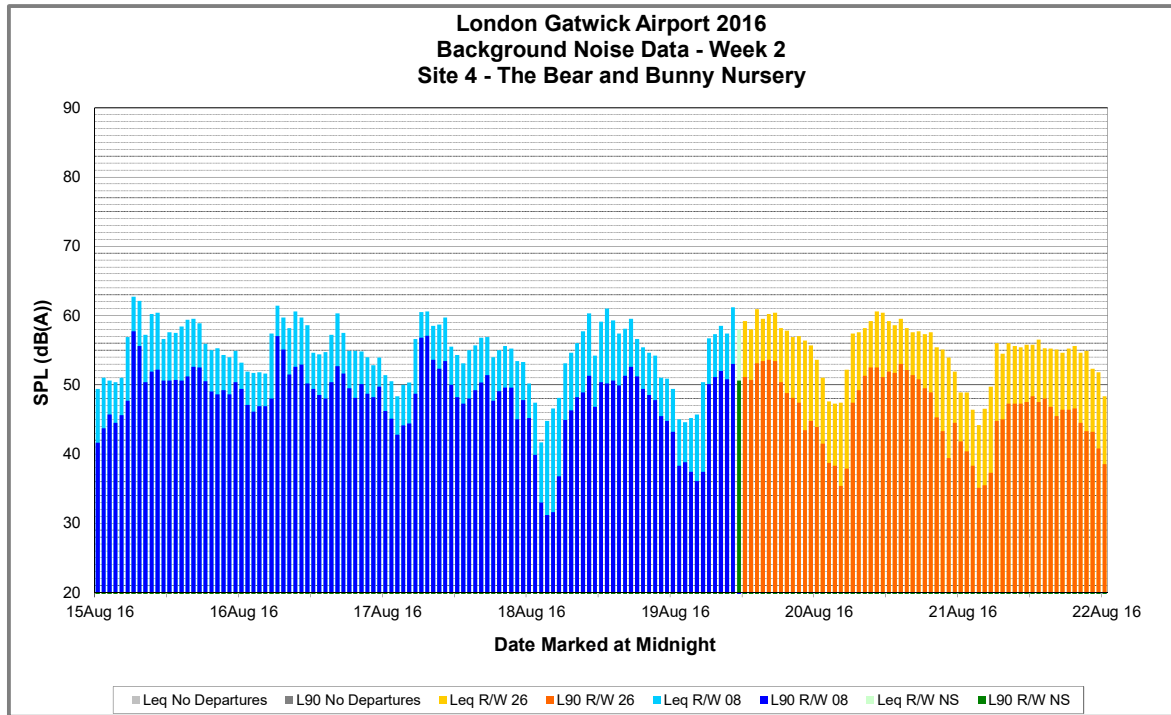


Figure 29 – Site 4 (week 3)

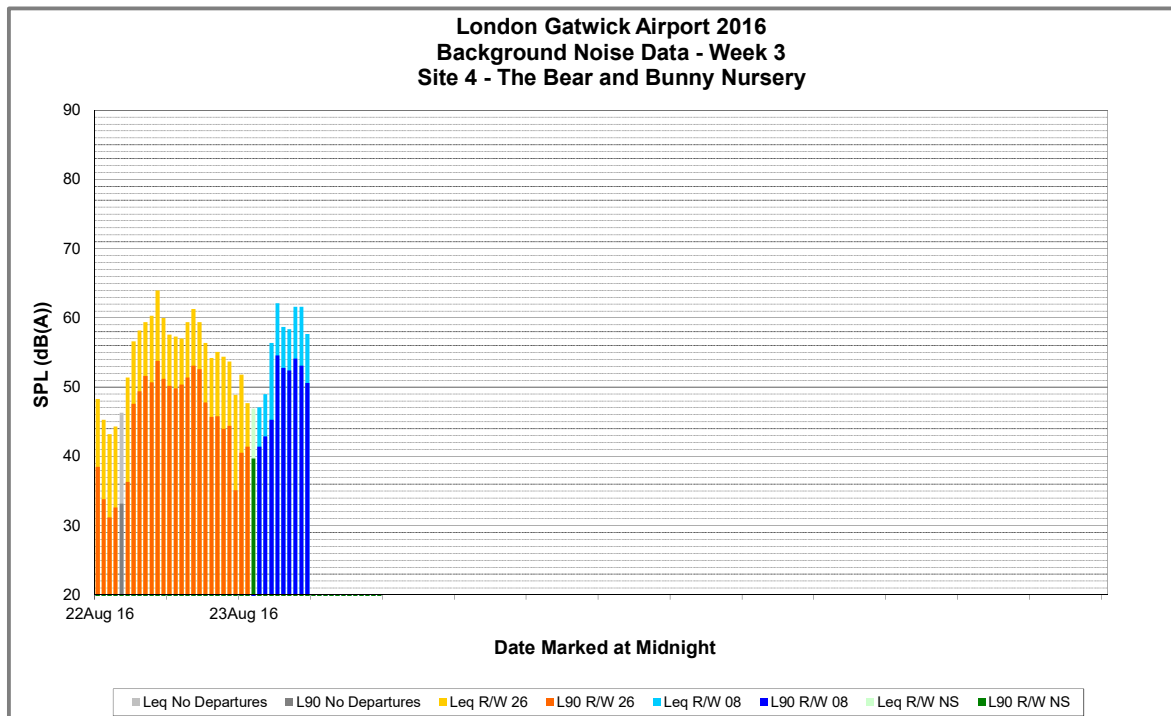


Figure 30 – Site 5 (week 1)

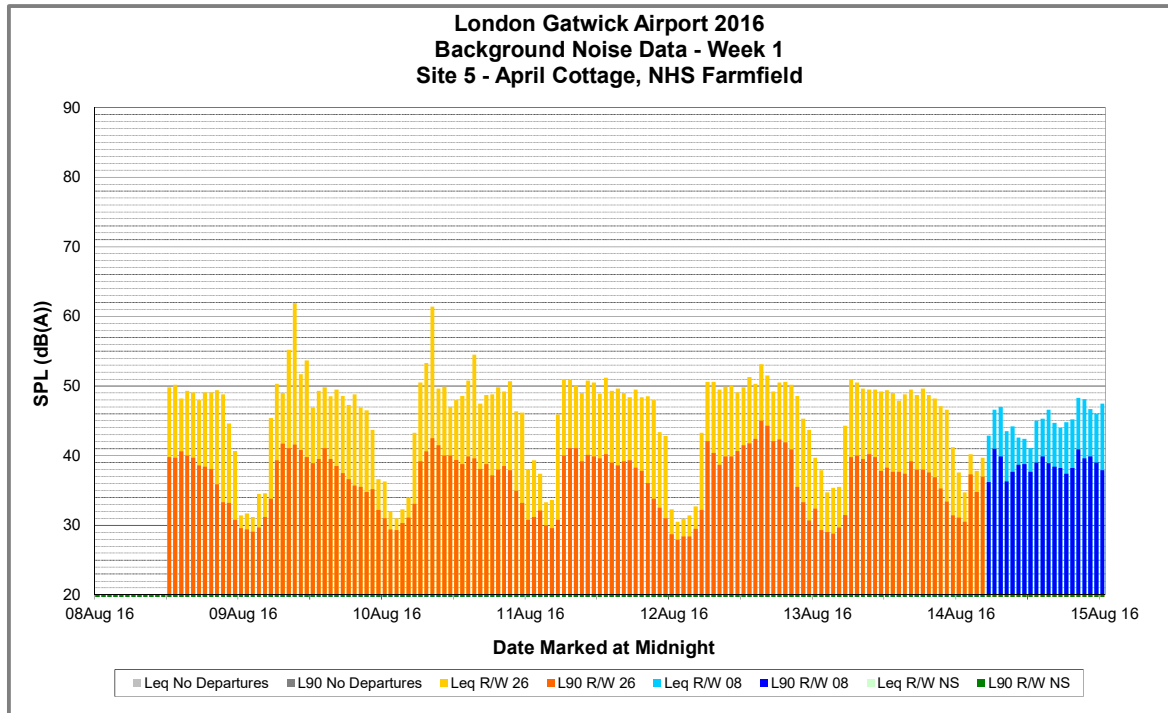


Figure 31 – Site 5 (week 2)

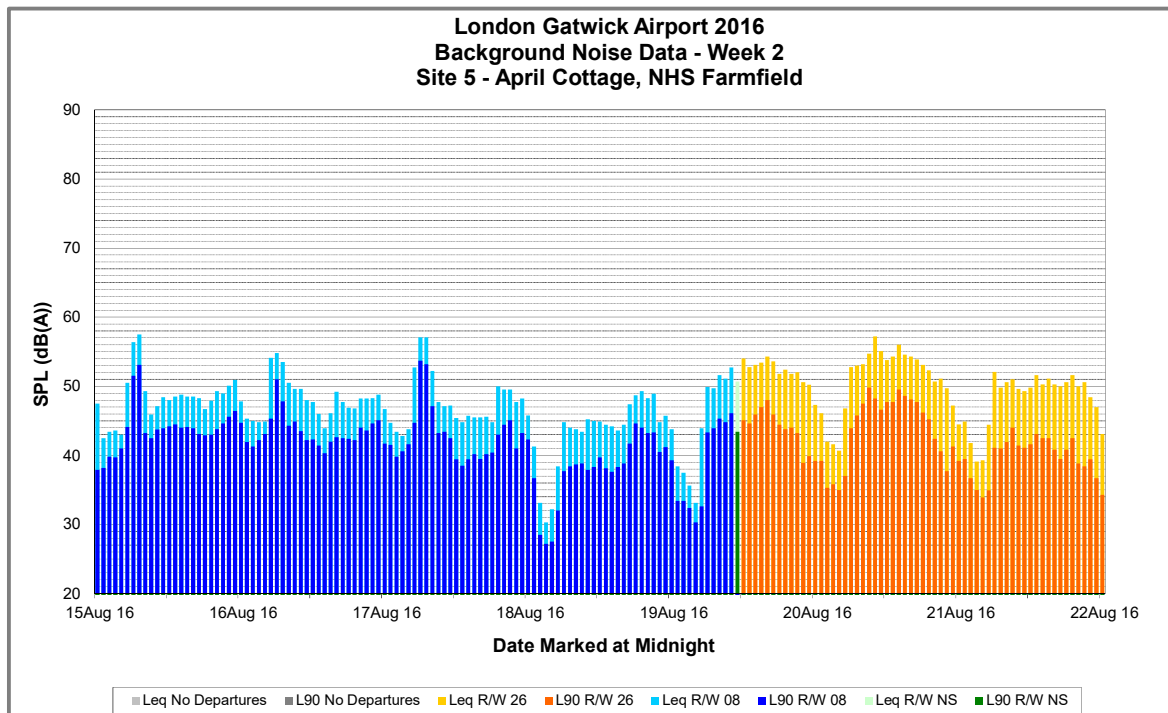


Figure 32 – Site 5 (week 3)

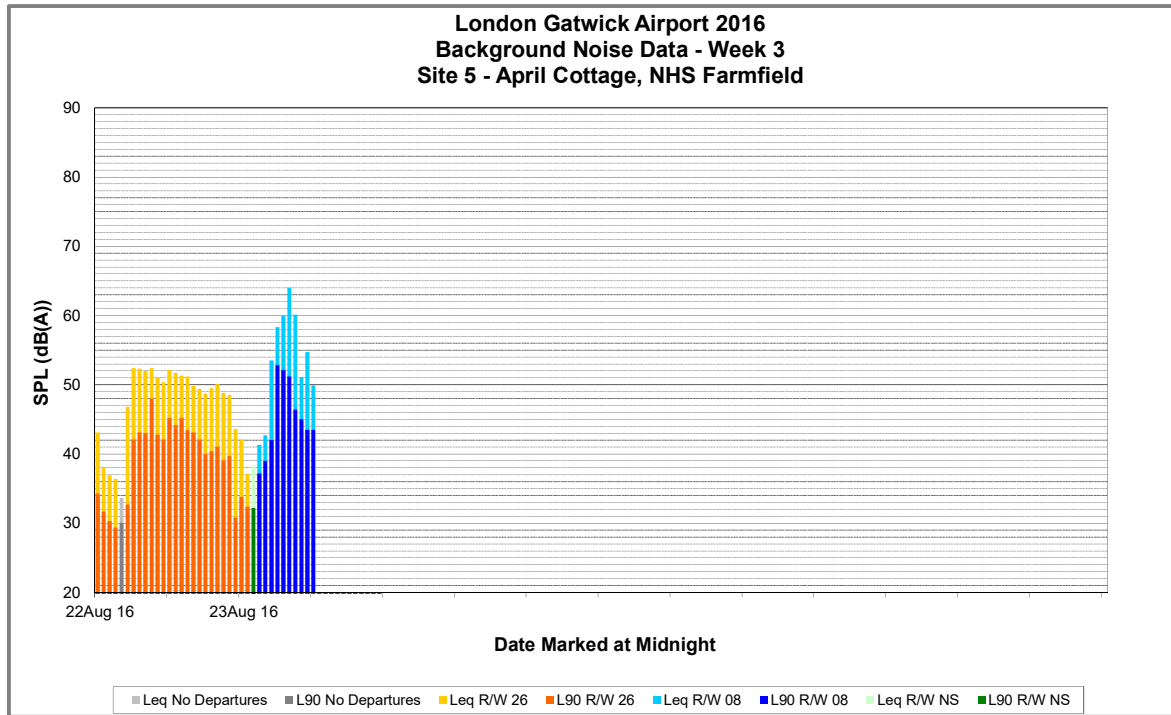


Figure 33 – Site 6 (week 1)

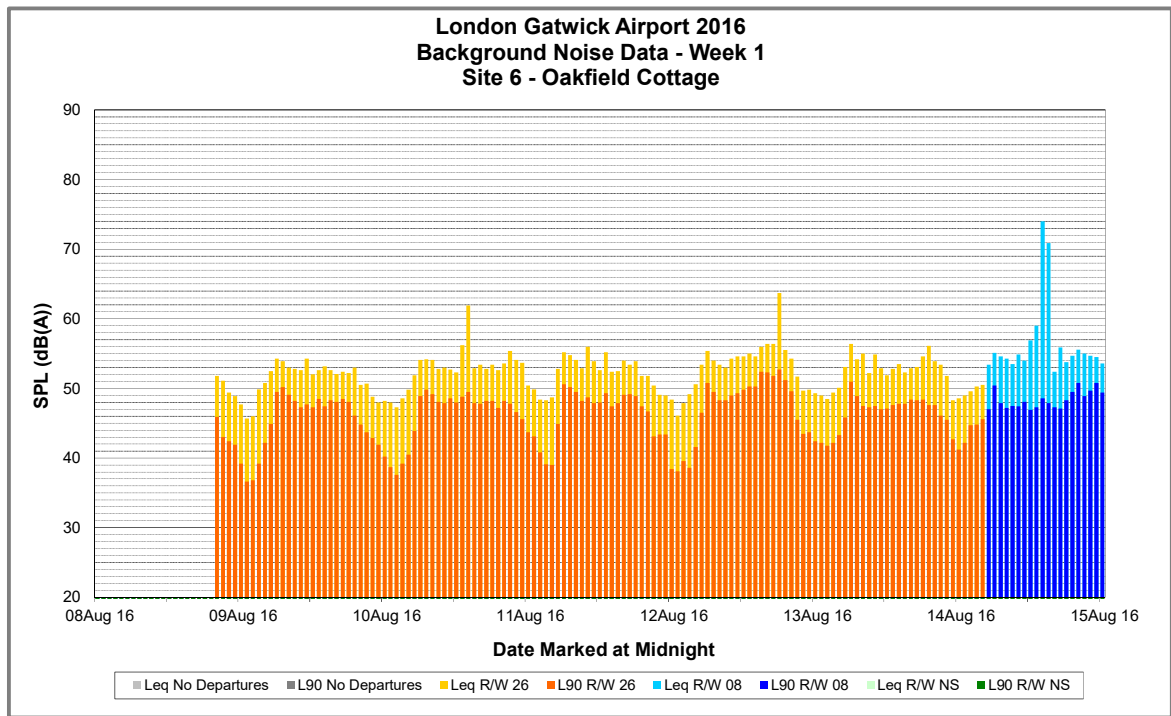


Figure 34 – Site 6 (week 2)

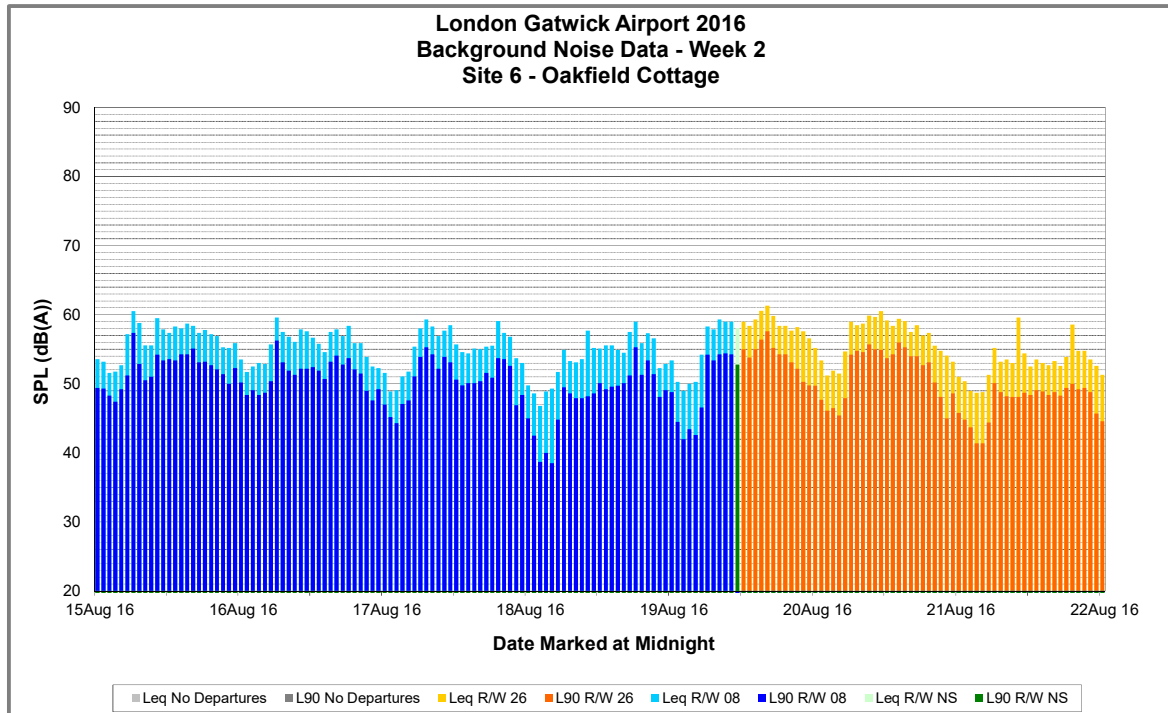


Figure 35 – Site 6 (week 3)

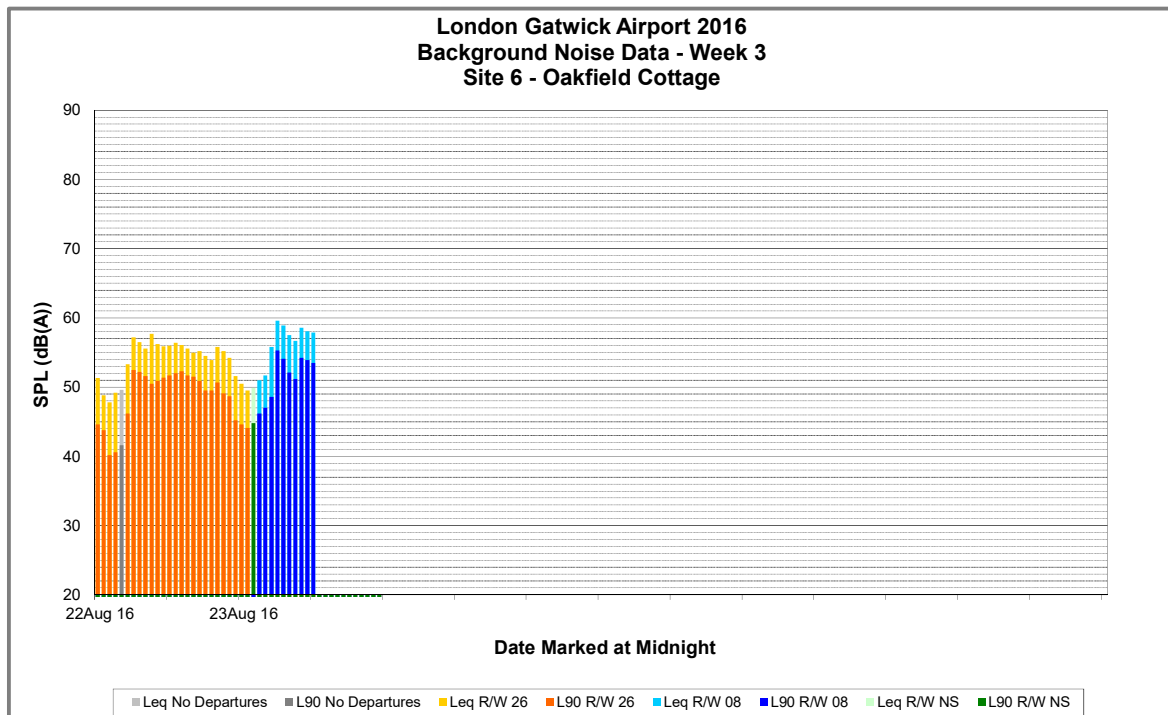


Figure 36 – Site 7 (week 1)

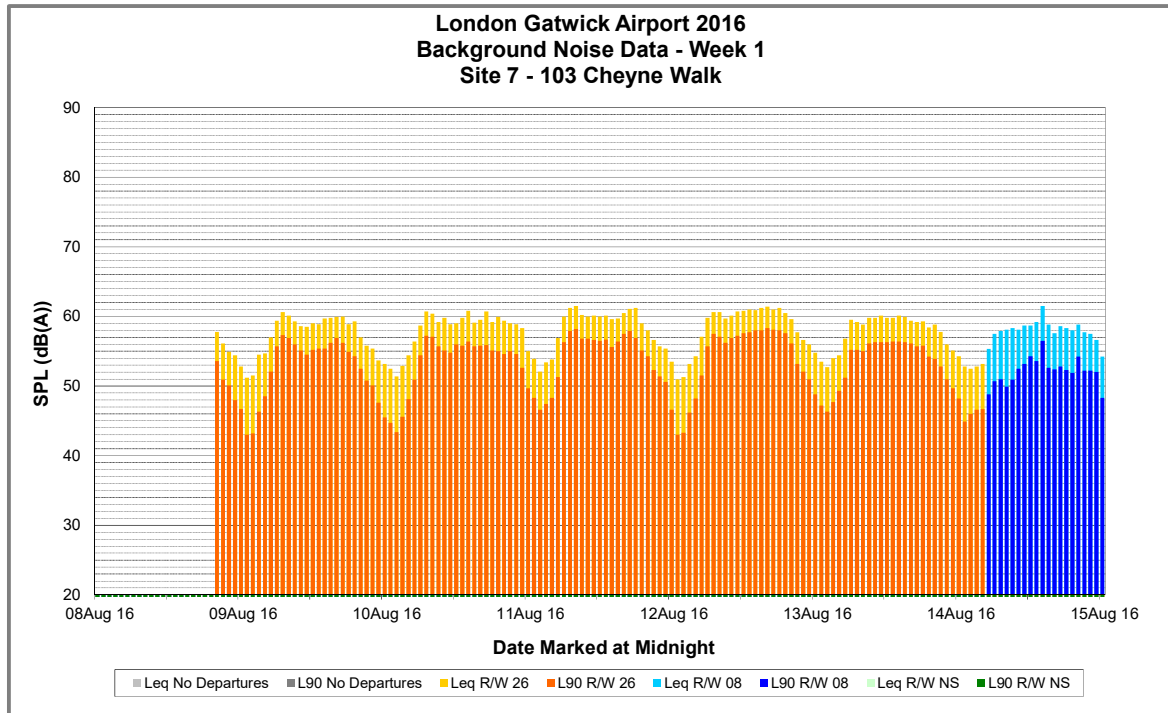


Figure 37 – Site 7 (week 2)

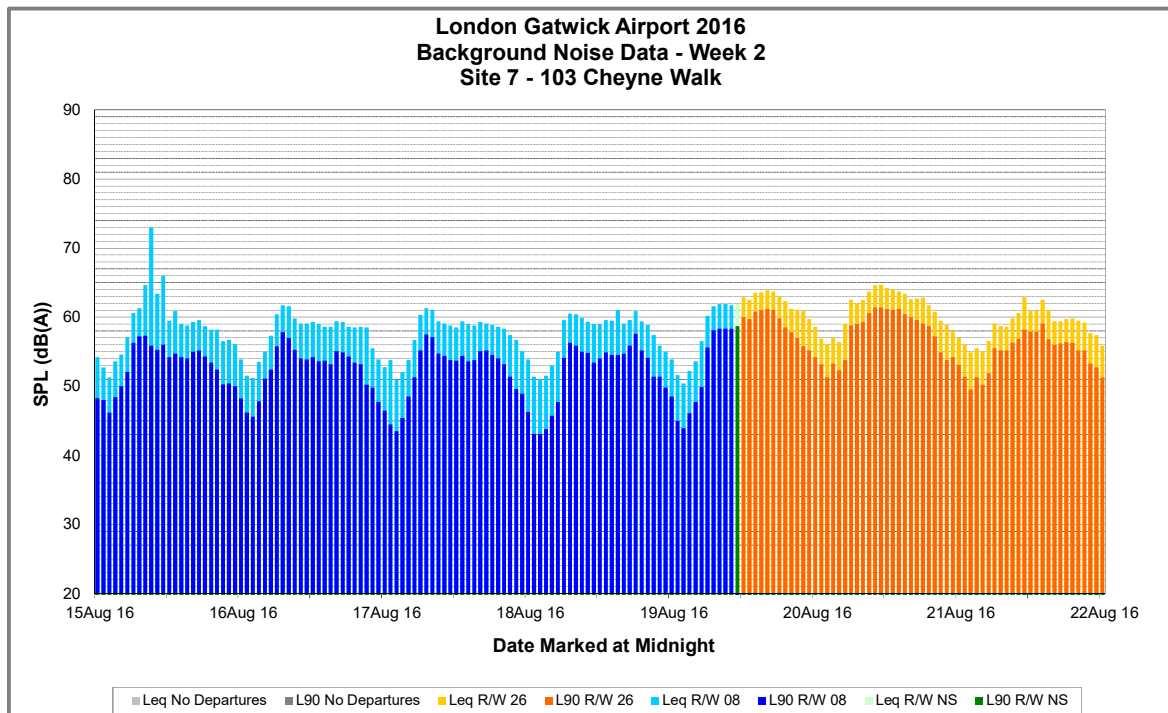


Figure 38 – Site 7 (week 3)

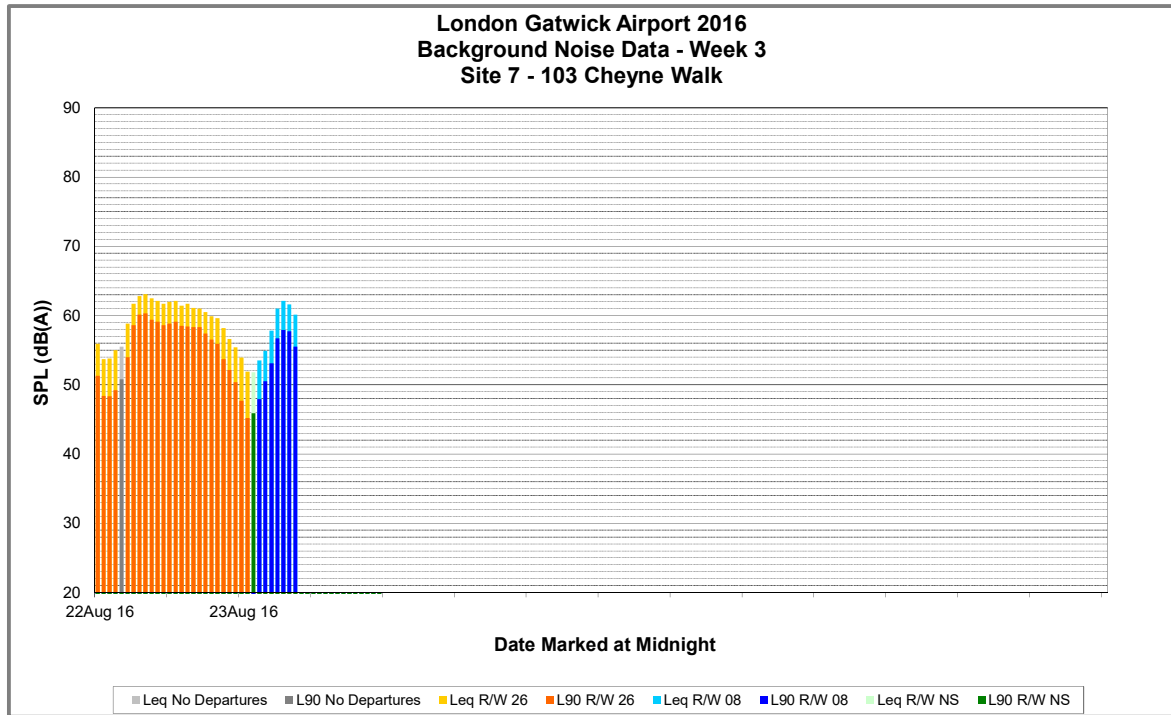


Figure 39 – Site 8 (week 1)

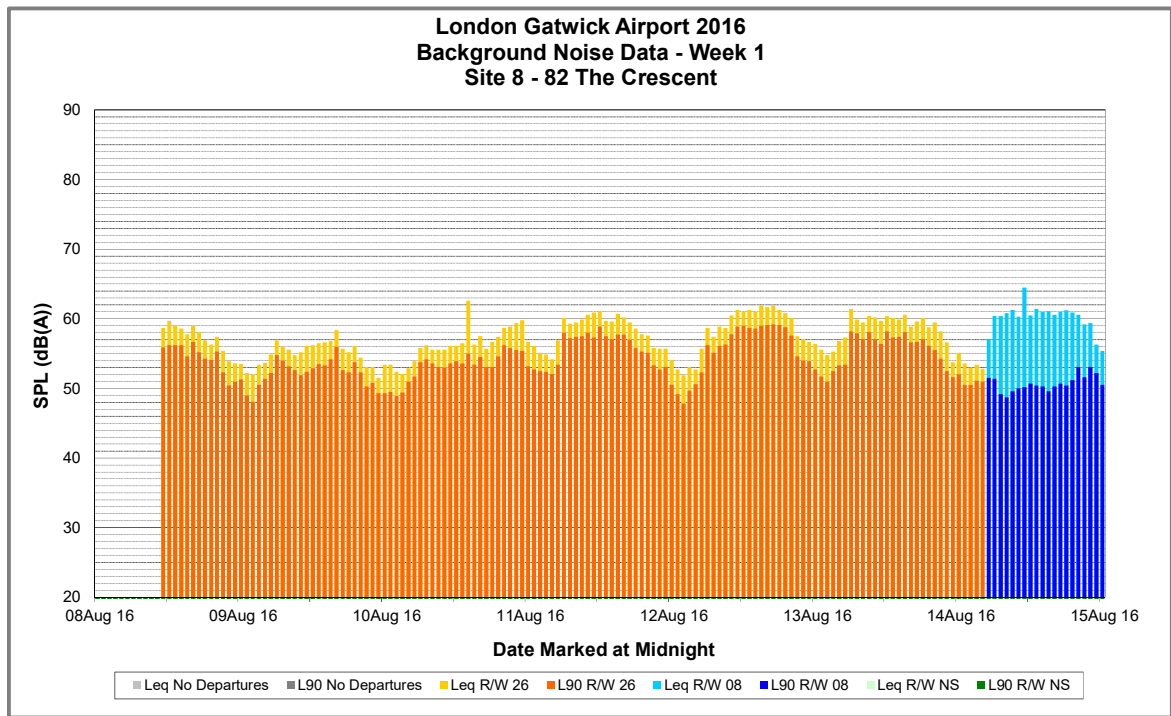


Figure 40 – Site 8 (week 2)

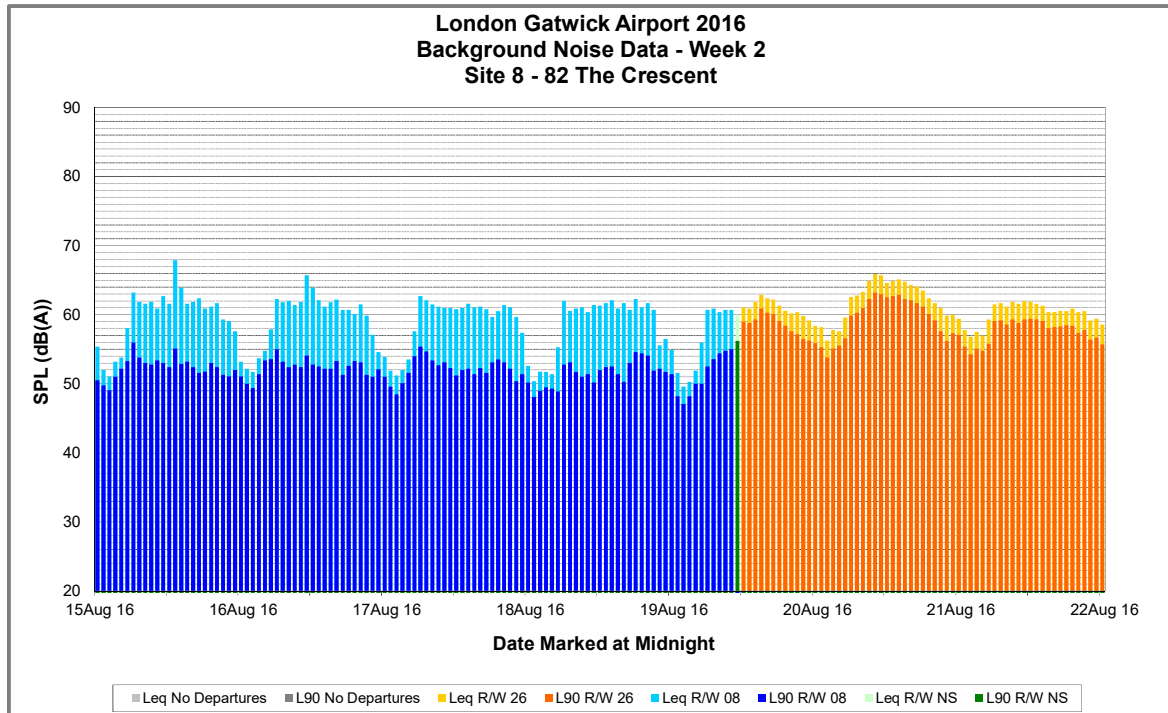


Figure 41 – Site 8 (week 3)

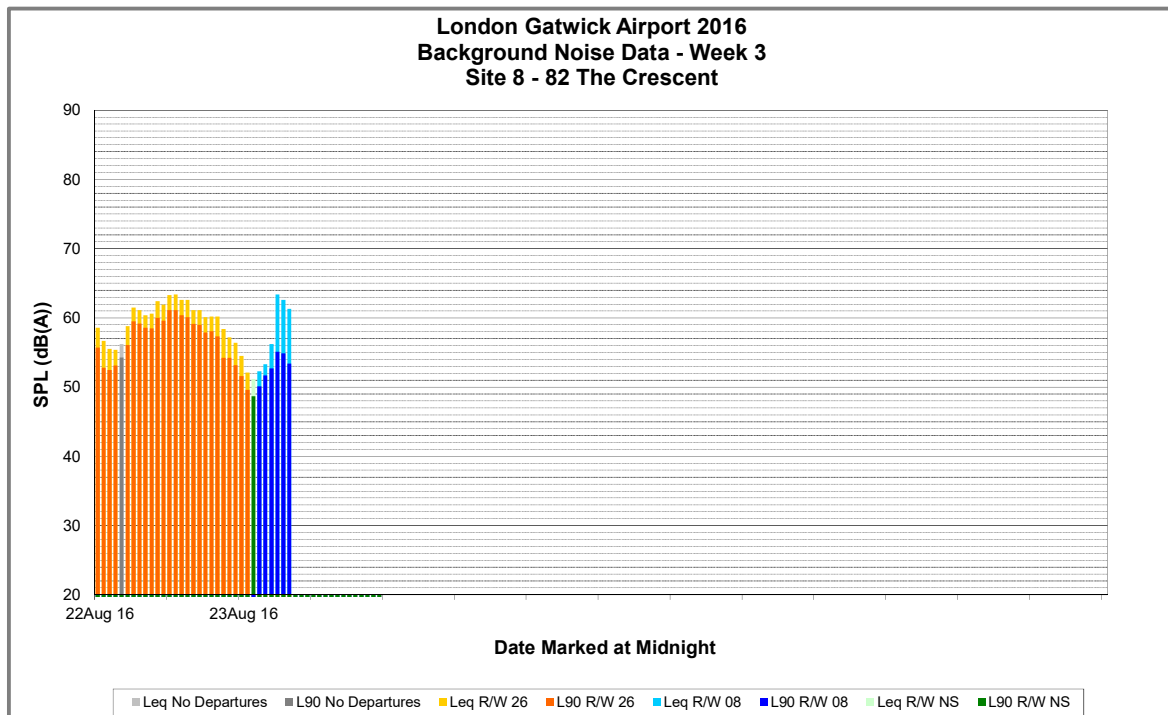


Figure 42 – Site 9 (week 1)

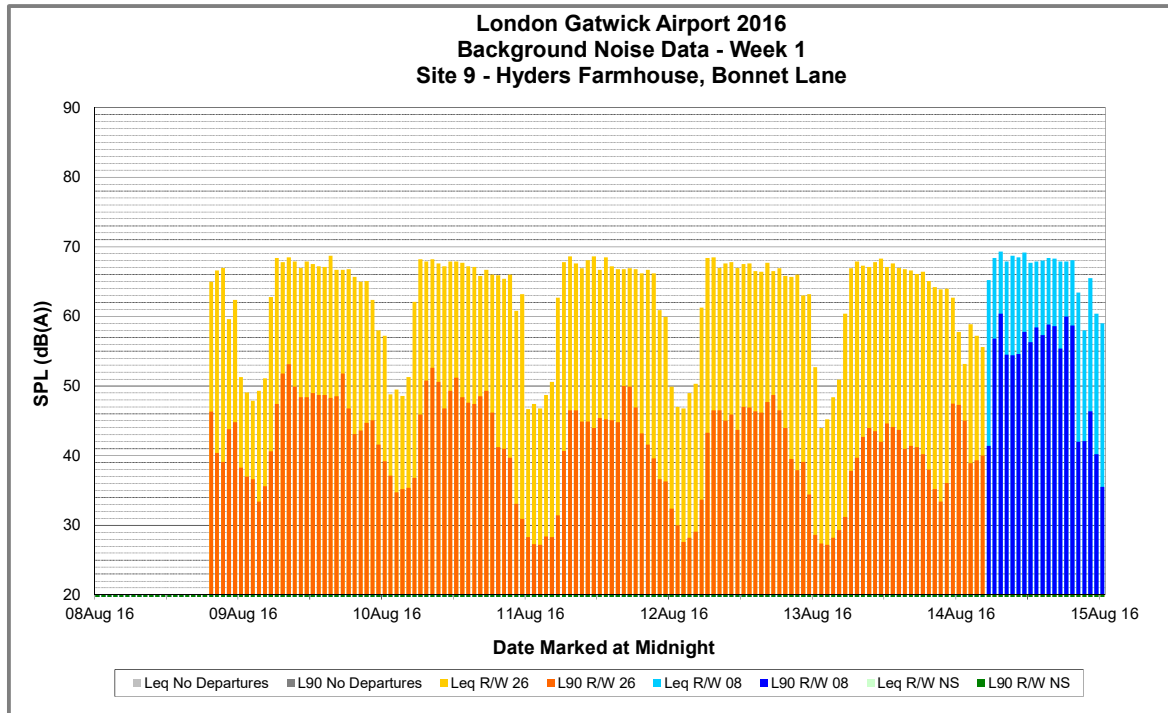


Figure 43 – Site 9 (week 2)

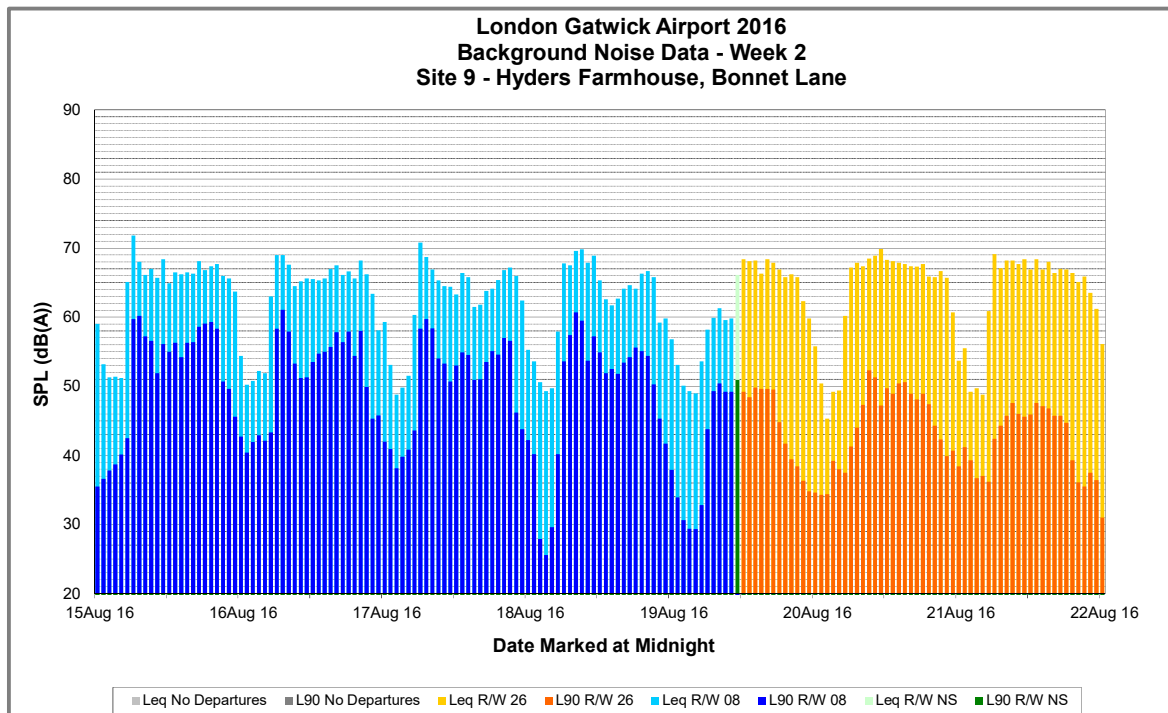




Figure 44 – Site 9 (week 3)

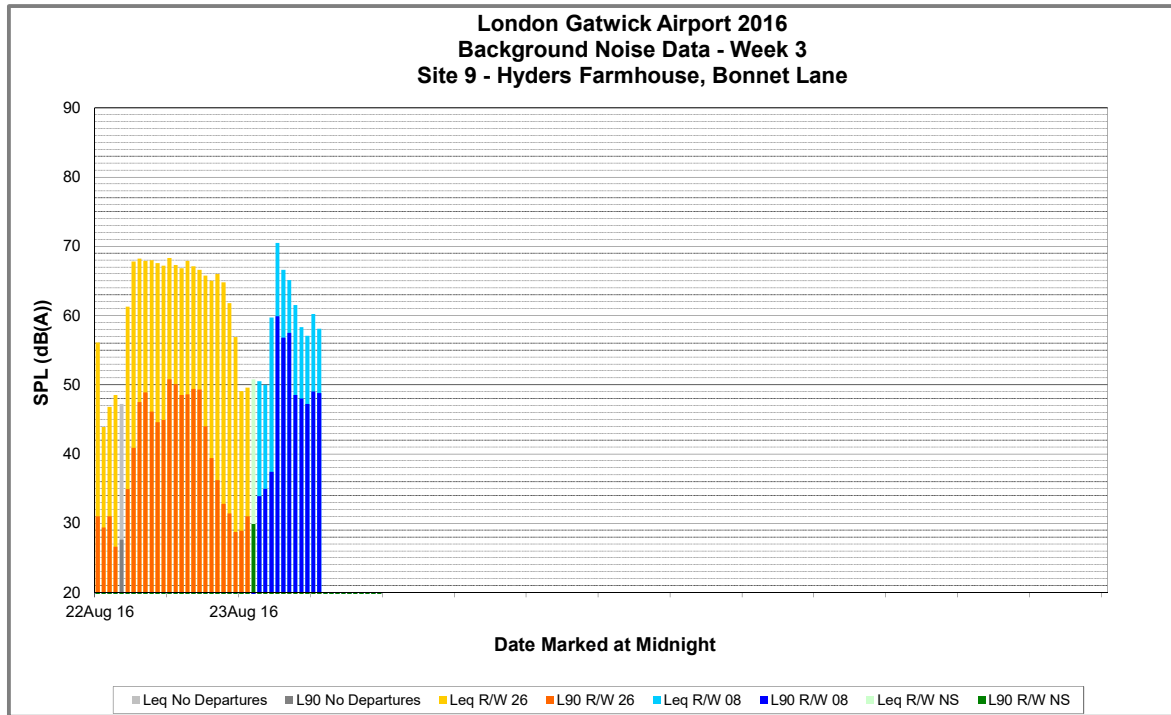


Figure 45 – Site 10 (week 1)

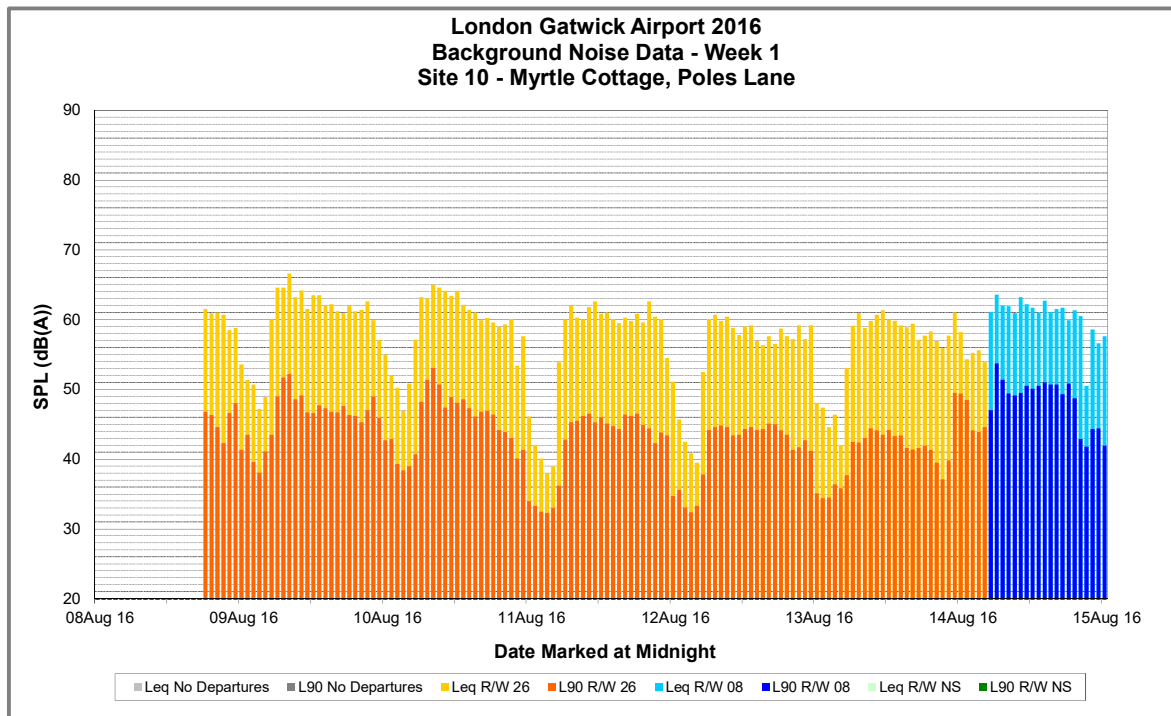


Figure 46 – Site 10 (week 2)

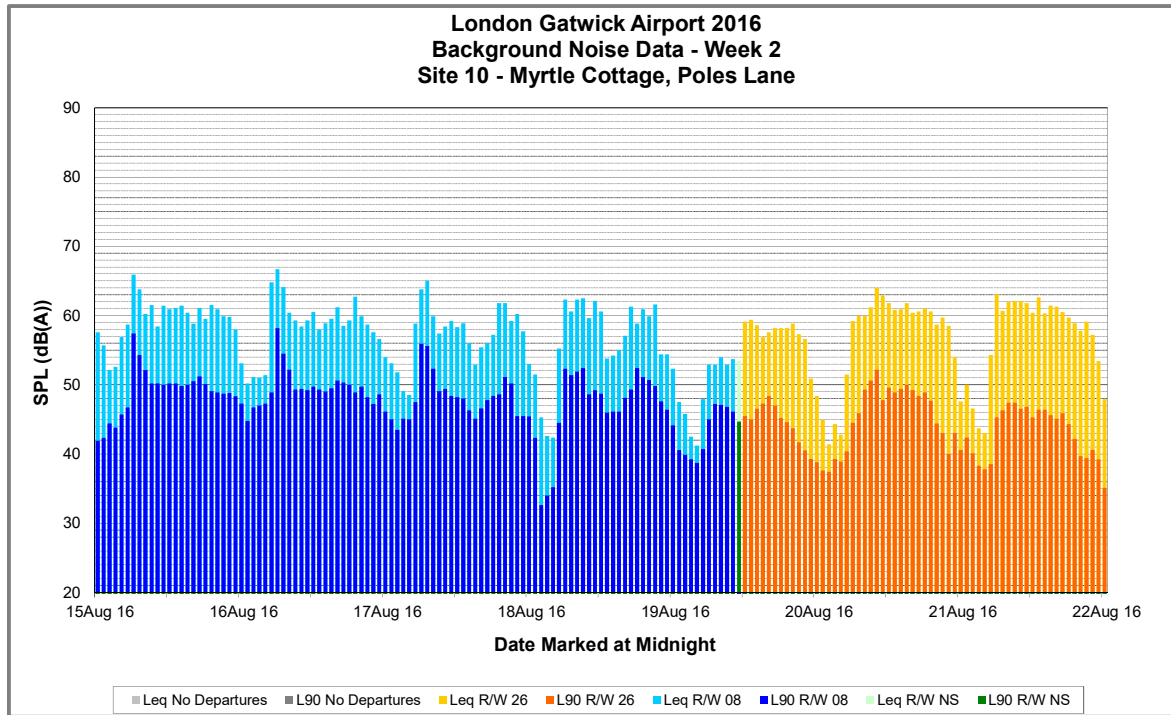


Figure 47 – Site 10 (week 3)

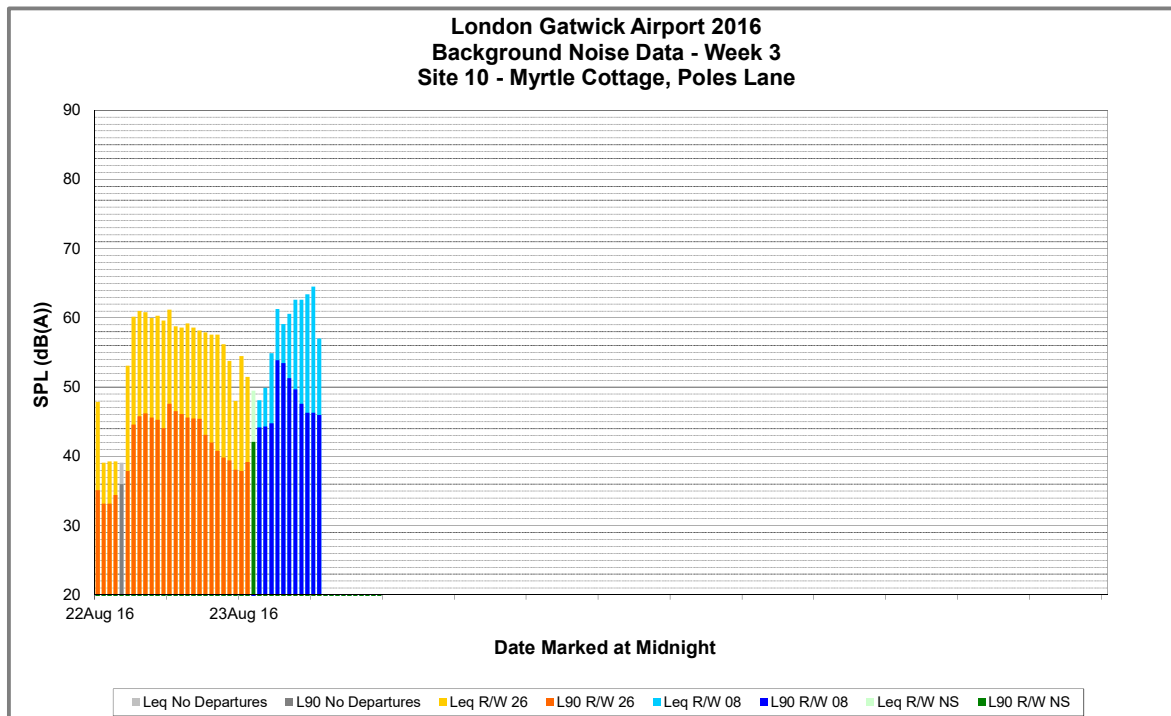


Figure 48 – Site 11 (week 1)

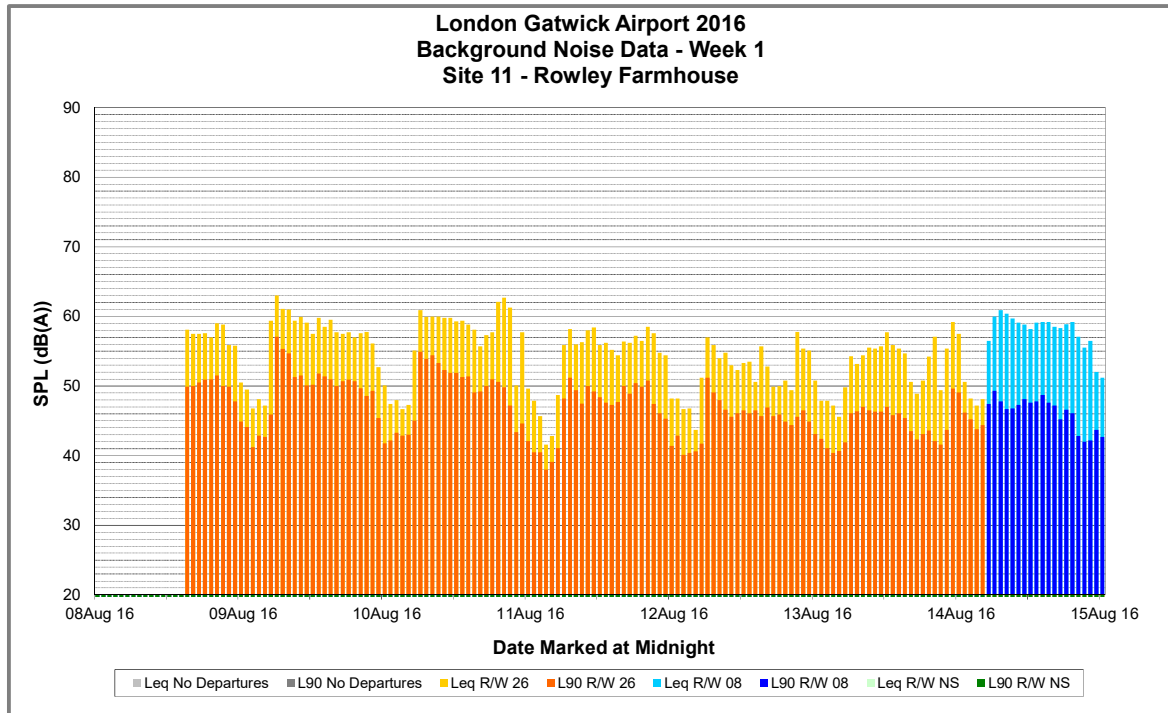


Figure 49 – Site 11 (week 2)

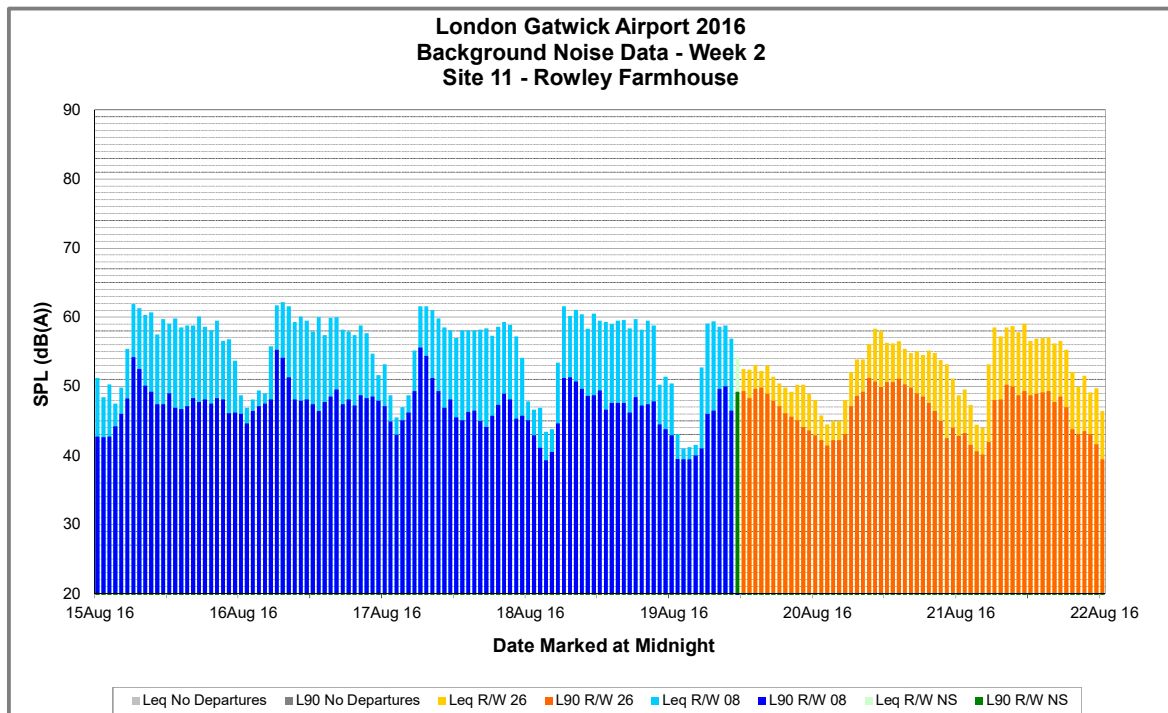


Figure 50 – Site 11 (week 3)

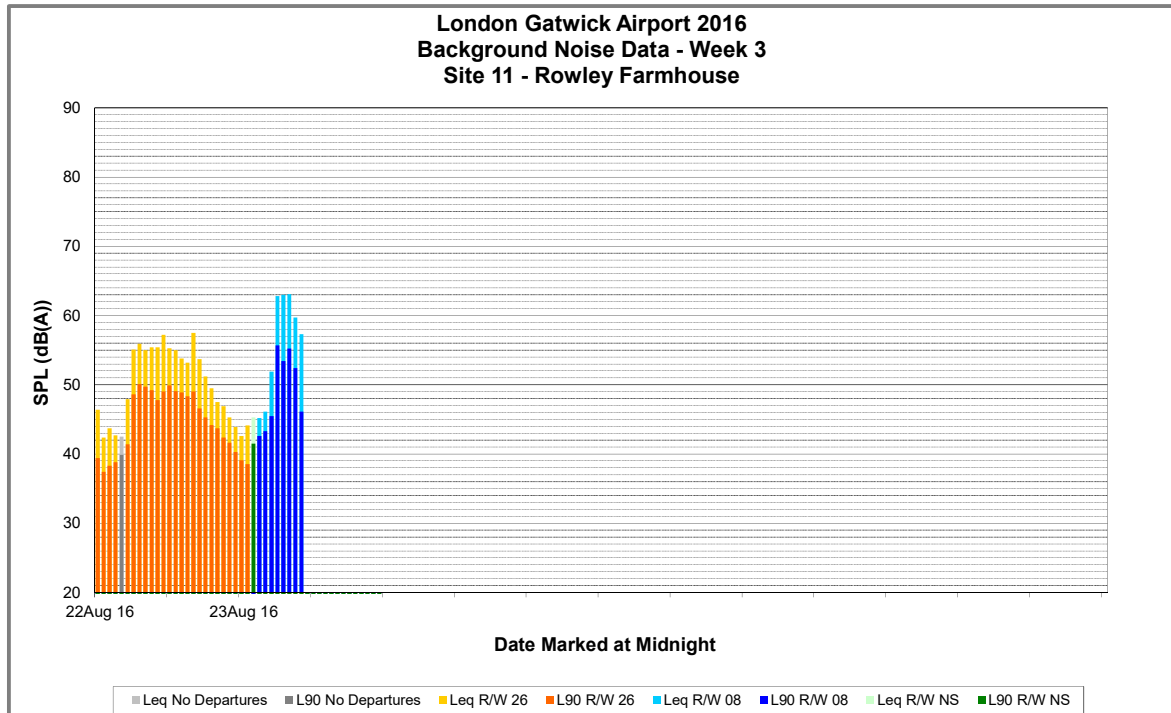


Figure 51 – Site 12 (week 1)

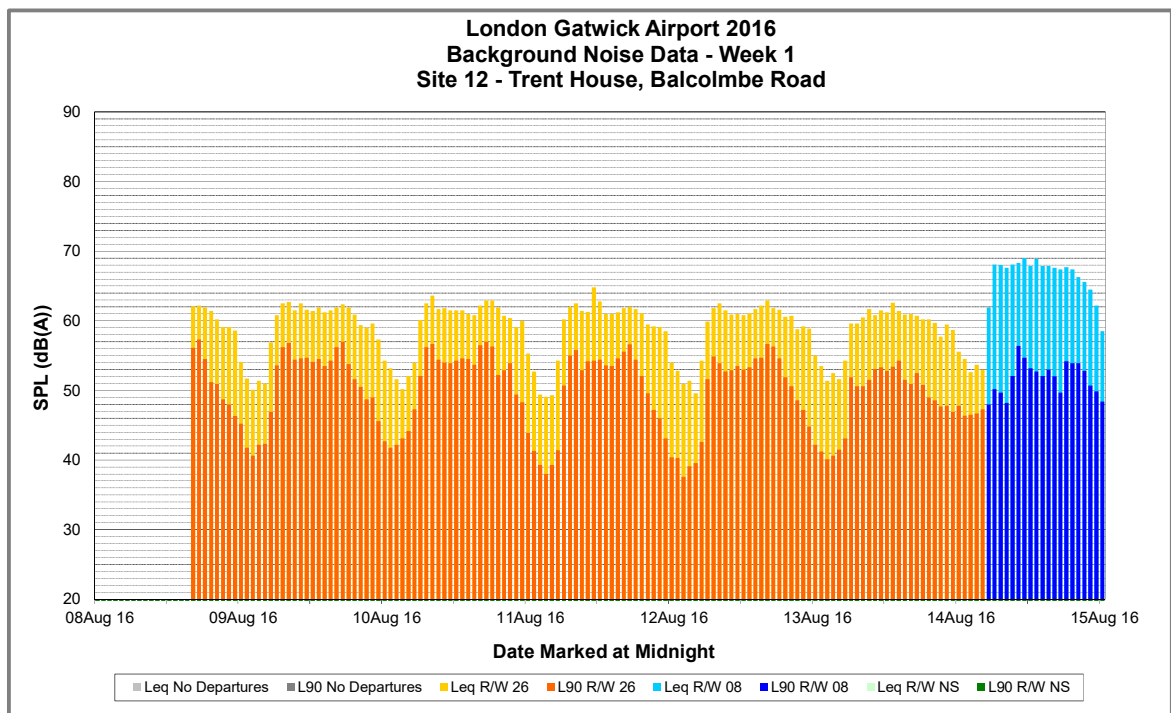




Figure 52 – Site 12 (week 2)

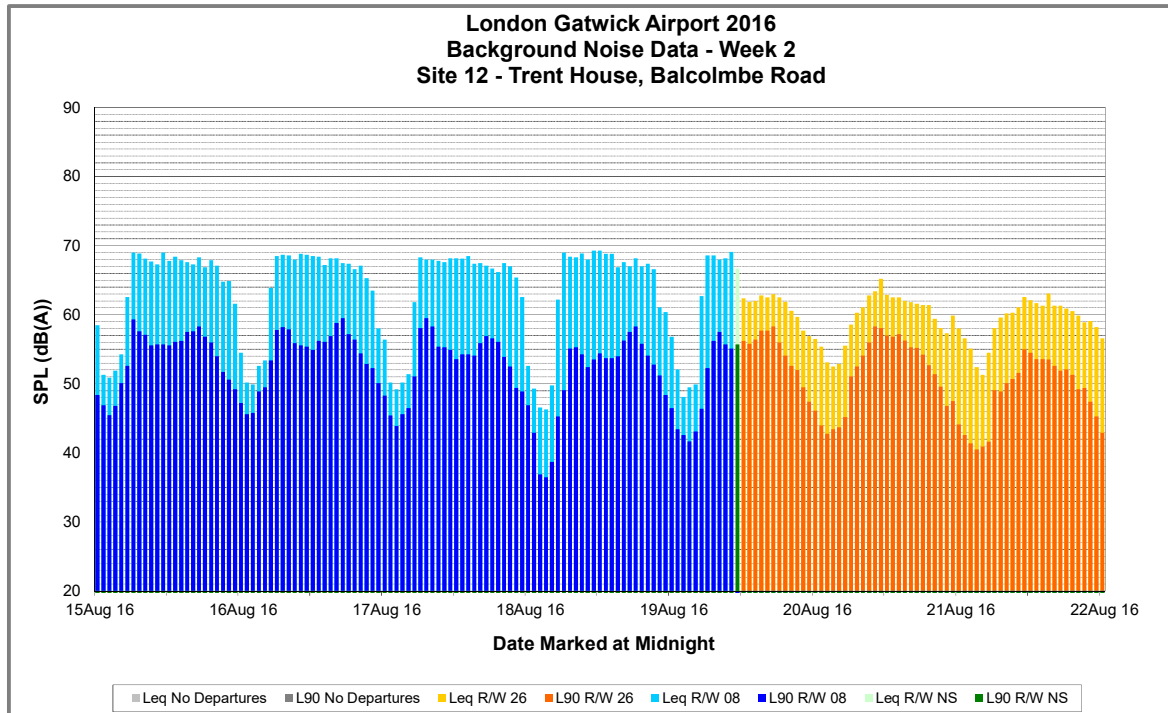


Figure 53 – Site 12 (week 3)

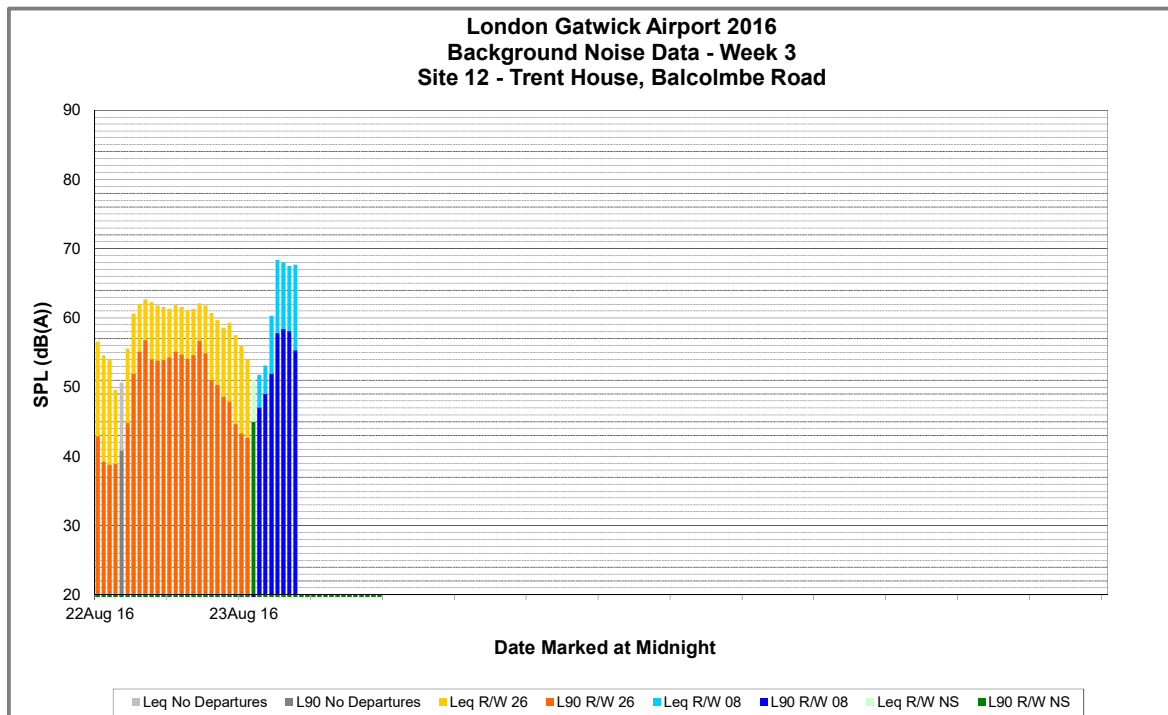


Figure 54 – Site 13 (week 1)

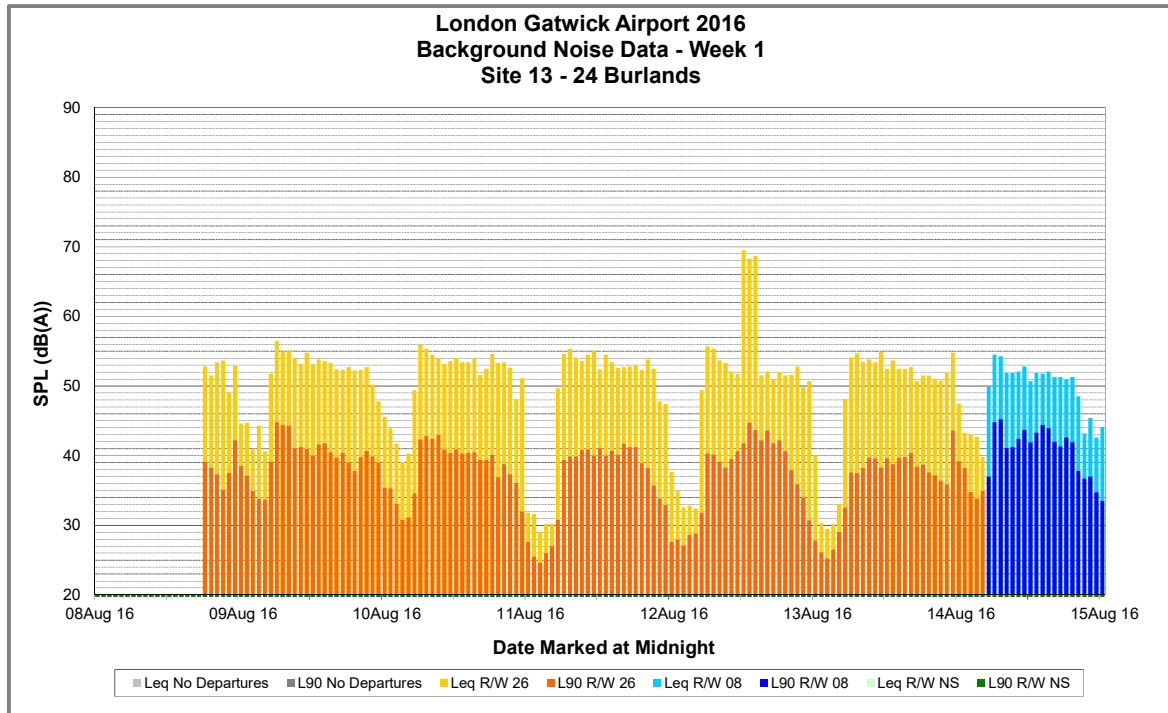


Figure 55 – Site 13 (week 2)

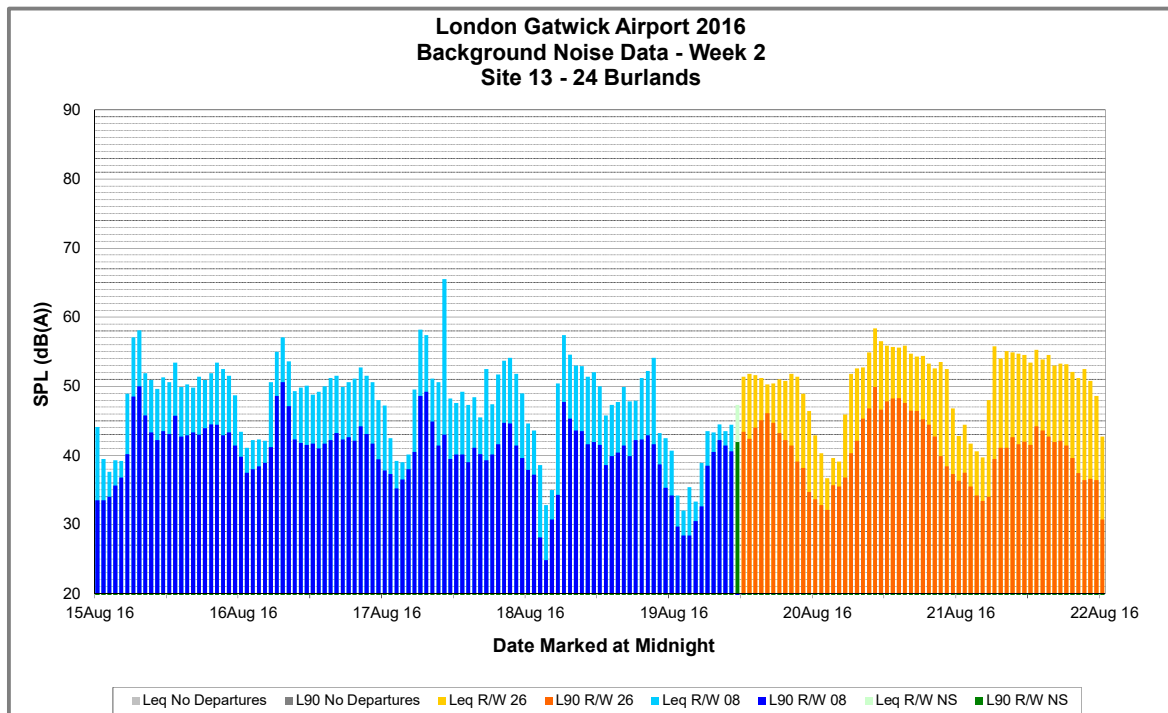


Figure 56 – Site 13 (week 3)

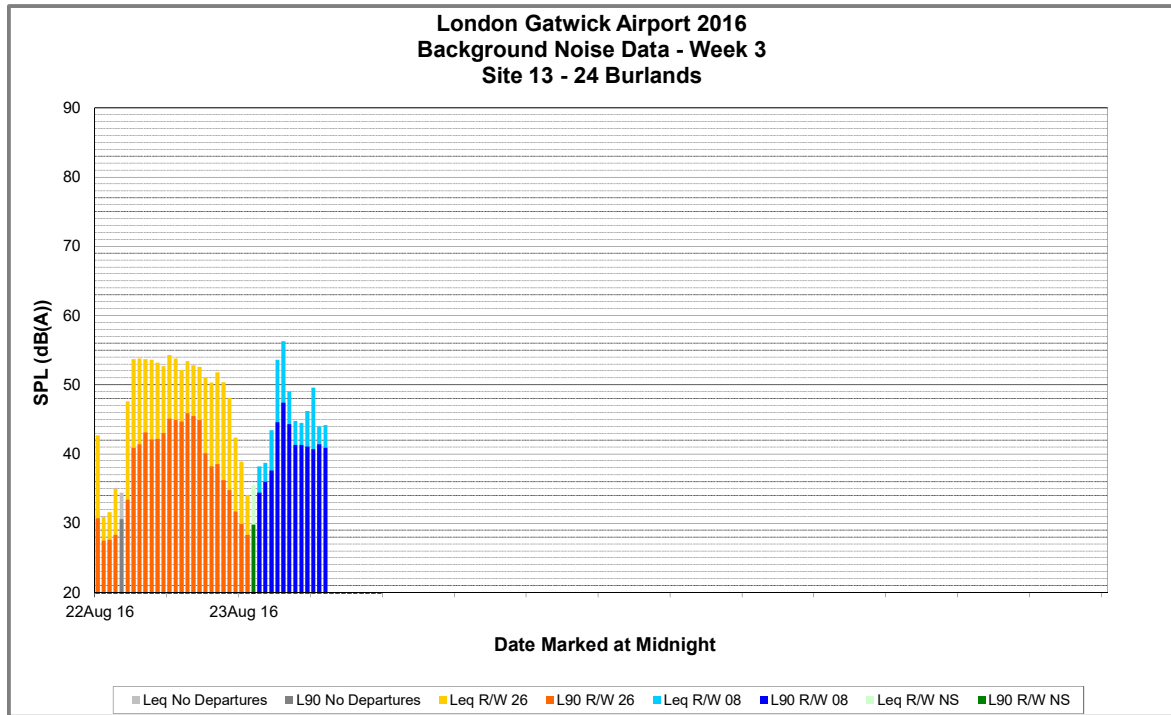


Figure 57 – Site 14 (week 1)

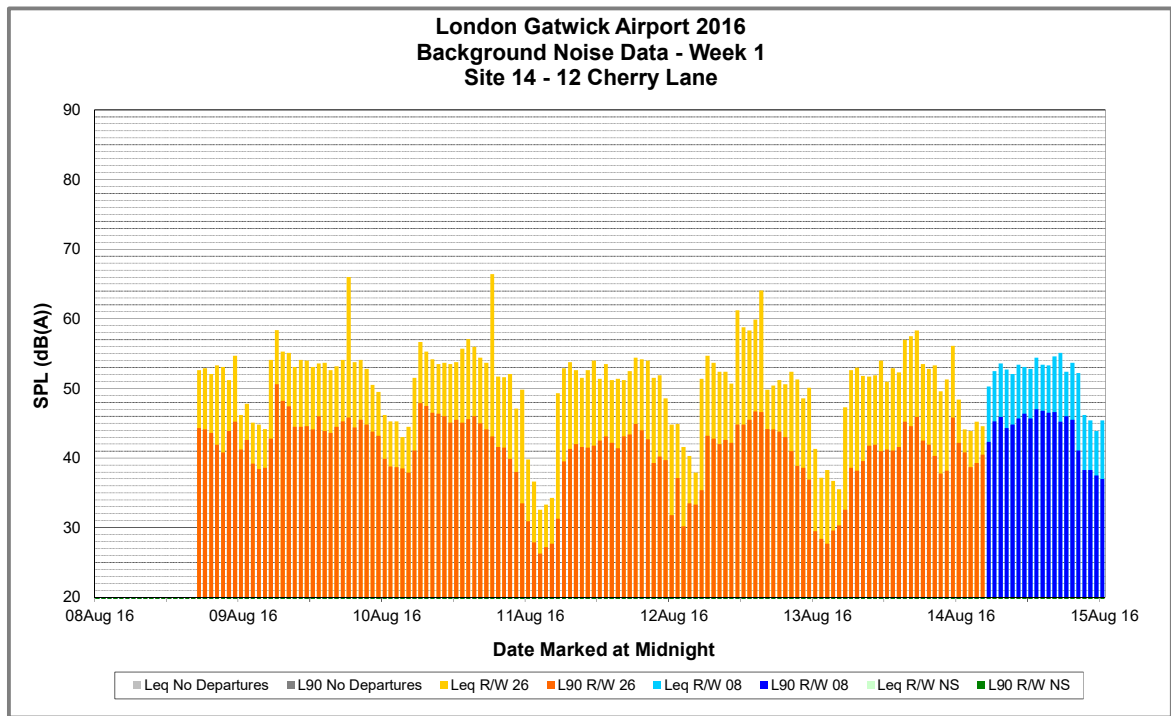


Figure 58 – Site 14 (week 2)

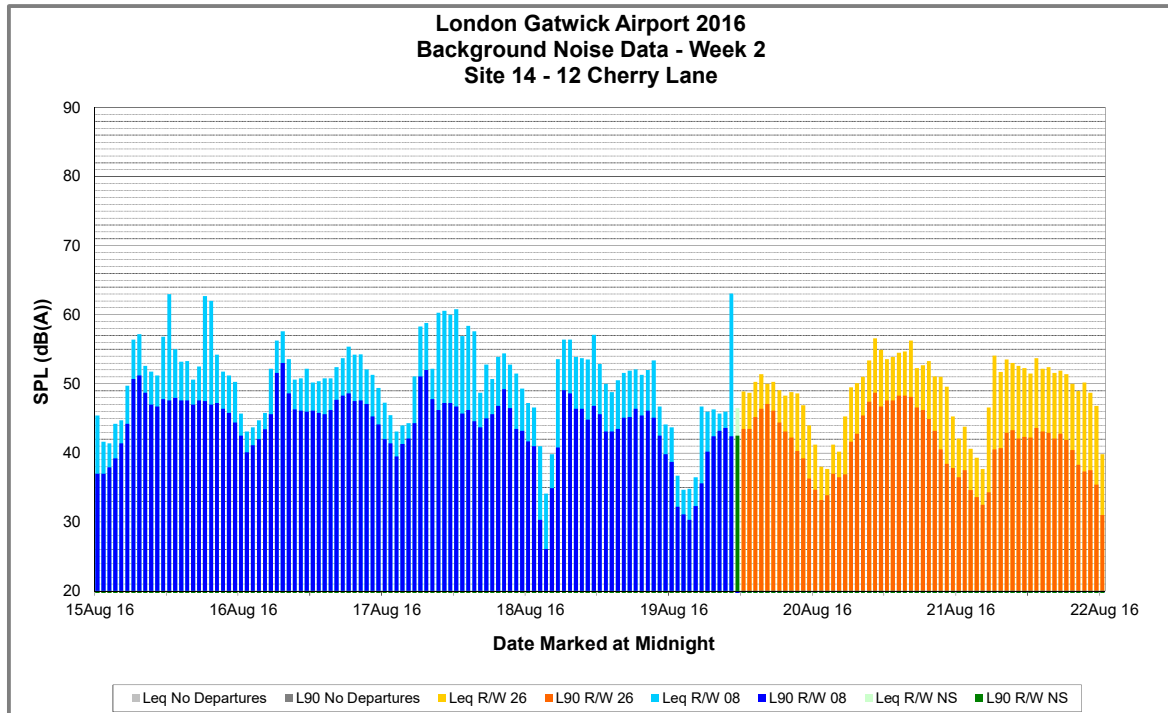


Figure 59 – Site 14 (week 3)

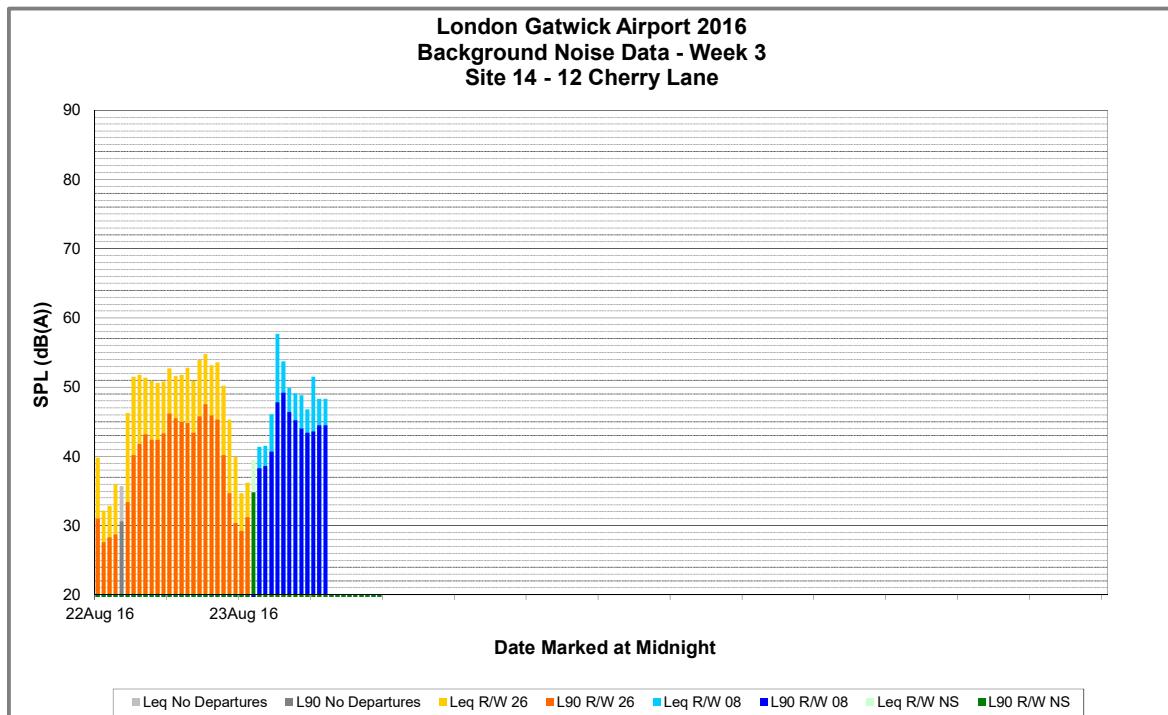


Figure 60 – Site 15 (week 1)

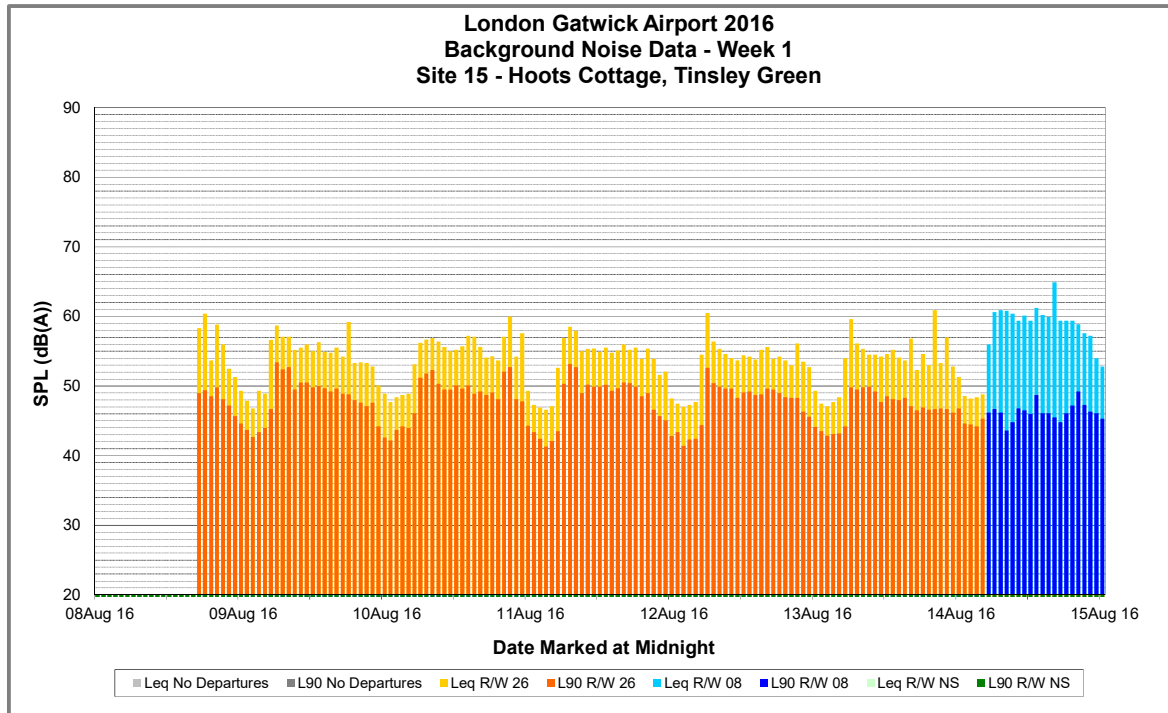


Figure 61 – Site 15 (week 2)

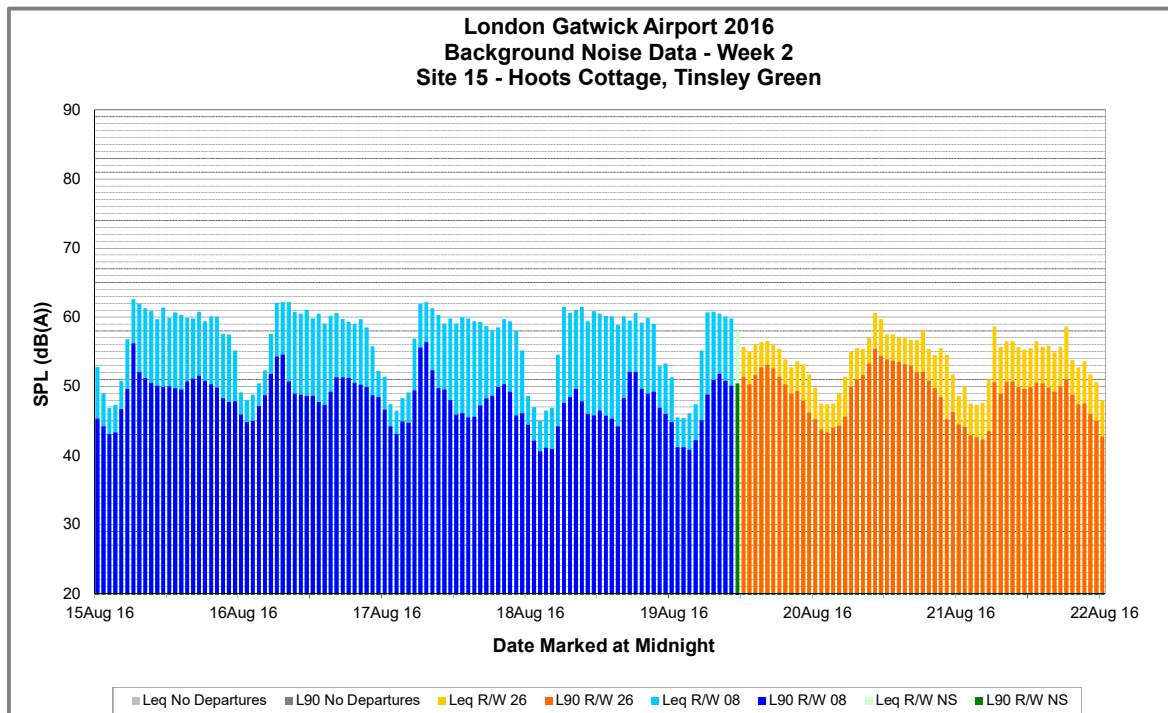




Figure 62 – Site 15 (week 3)

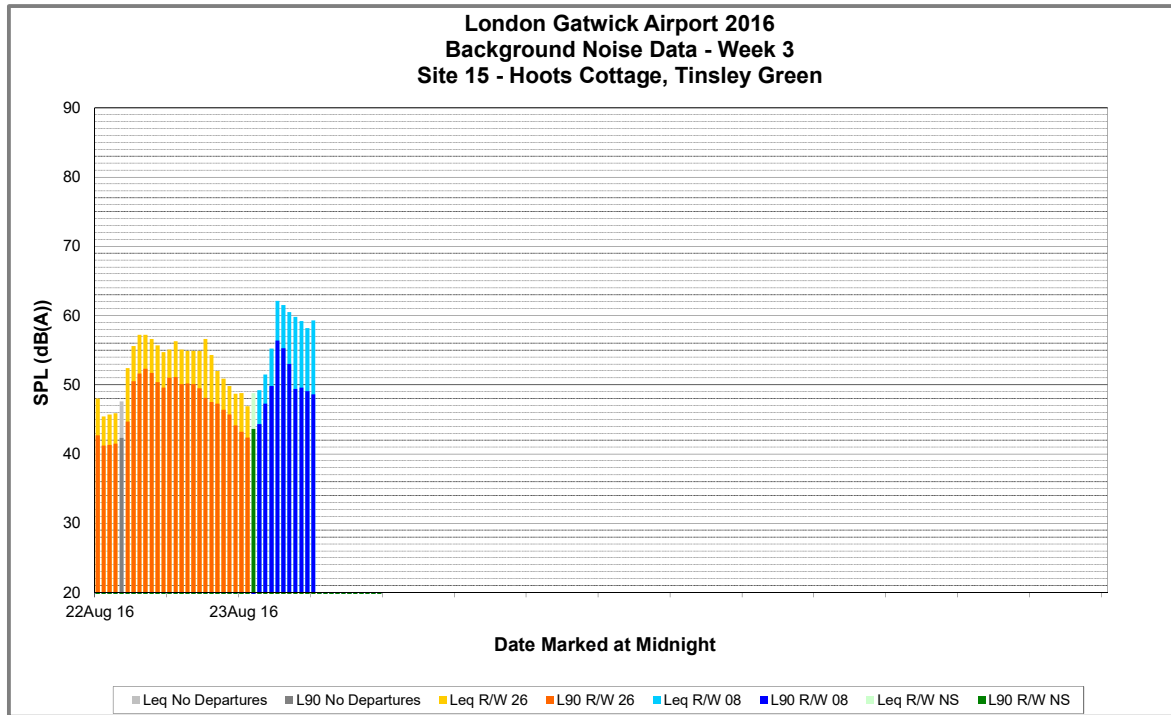


Figure 63 – Site 16 (week 1)

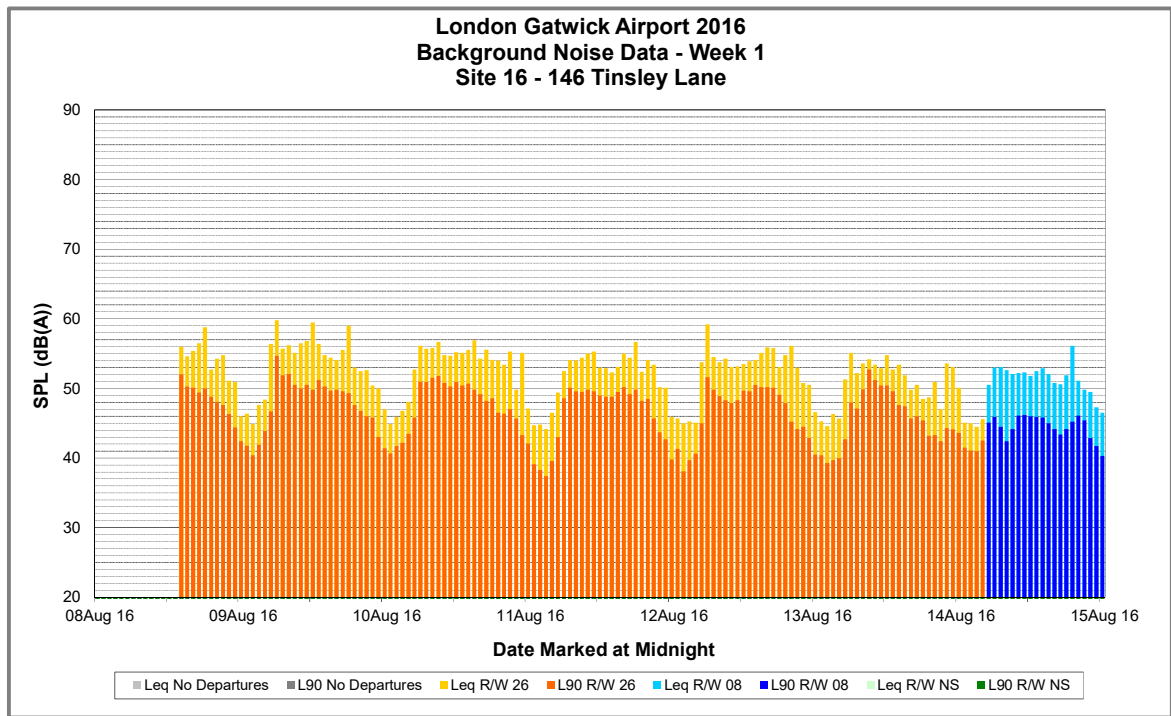


Figure 64 – Site 16 (week 2)

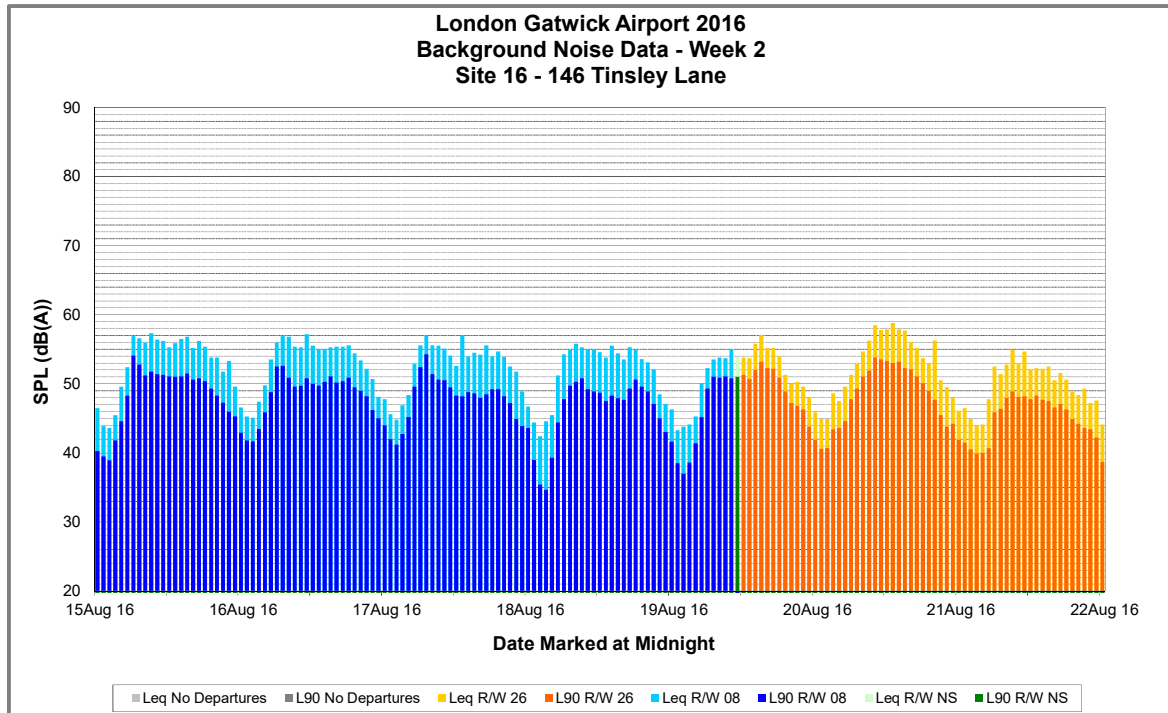


Figure 65 – Site 16 (week 3)

