



Armstrong House  
3 Bassett Avenue  
Southampton  
SO16 7DP

T: 02380 555 000

**PROPOSED RESIDENTIAL DEVELOPMENT  
AT LOWER ROAD, BEDHAMPTON  
NOISE IMPACT ASSESSMENT**

Technical Report: R8907-1 Rev 1

Date: 20th September 2021

For: Bargate Homes Ltd  
The New Barn,  
Vicarage Farm Business Park  
Winchester Road,  
Fair Oak  
SO50 7HD

**24 Acoustics Document Control Sheet**

**Project Title:** Proposed Residential Development at Lower Road, Bedhampton  
Noise Impact Assessment

**Report Ref:** R8907-1 Rev 1

**Date:** 20th September 2021

|                                       | Name                                   | Position                | Signature | Date       |
|---------------------------------------|----------------------------------------|-------------------------|-----------|------------|
| Prepared by                           | Reuben Peckham<br>BEng MPhil CEng MIOA | Principal<br>Consultant |           | 20/09/2021 |
| Approved by                           | Stephen Gosling<br>BEng MIOA           | Principal<br>Consultant |           | 20/09/2021 |
| For and on behalf of 24 Acoustics Ltd |                                        |                         |           |            |

**Document Status and Approval Schedule**

| <b>Revision</b> | <b>Description</b> | <b>Prepared By</b> | <b>Approved By</b> |
|-----------------|--------------------|--------------------|--------------------|
| 0               | Approved for Issue | Reuben Peckham     | Steve Gosling      |
| 1               | Approved for Issue | Reuben Peckham     | Steve Gosling      |
|                 |                    |                    |                    |
|                 |                    |                    |                    |
|                 |                    |                    |                    |
|                 |                    |                    |                    |

**DISCLAIMER**

This report was completed by 24 Acoustics Ltd on the basis of a defined programme of work and terms and conditions agreed with the Client. The report has been prepared with all reasonable skill, care and diligence within the terms of the Contract with the Client and taking into account the project objectives, the agreed scope of works, prevailing site conditions and the degree of manpower and resources allocated to the project.

24 Acoustics Ltd accepts no responsibility whatsoever, following the issue of the report, for any matters arising outside the agreed scope of the works.

This report is issued in confidence to the Client and 24 Acoustics Ltd has no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

Unless specifically assigned or transferred within the terms of the agreement, 24 Acoustics Ltd retains all copyright and other intellectual property rights, on and over the report and its contents.

© 24 Acoustics Ltd 2021

## **EXECUTIVE SUMMARY**

24 Acoustics Ltd has been instructed by Bargate Homes Ltd to undertake a noise impact assessment at a proposed development site off Lower Road in Bedhampton. It is proposed to submit an outline planning application to develop the site for residential use for up to 43 dwellings.

Environmental noise measurements have been undertaken at the site to establish the prevailing ambient noise levels.

External noise levels in private gardens within the developed site are predicted to be at or below 55 dB  $L_{Aeq, 16 \text{ hour}}$ .

Calculations have been undertaken based upon typical room volumes and glazed areas and these indicate that a satisfactory internal environment in all habitable rooms may be achieved.

On the above basis, it is considered that an appropriate acoustic environment can be provided to the proposed residential properties, both externally and internally relative to the prevailing acoustic environment.

## **CONTENTS**

|     |                                               |    |
|-----|-----------------------------------------------|----|
| 1.0 | INTRODUCTION                                  | 5  |
| 2.0 | SITE DESCRIPTION AND PROPOSED DEVELOPMENT     | 5  |
| 3.0 | STANDARDS AND GUIDANCE                        | 6  |
| 4.0 | AMBIENT NOISE SURVEYS                         | 10 |
| 5.0 | ASSESSMENT                                    | 14 |
| 6.0 | CONCLUSIONS                                   | 15 |
|     | REFERENCES                                    | 16 |
|     | APPENDIX A: NOISE UNITS                       | 21 |
|     | APPENDIX B: AMBIENT NOISE MEASUREMENT RESULTS | 22 |

## **1.0 INTRODUCTION**

- 1.1 24 Acoustics Ltd has been instructed by Bargate Homes Ltd to undertake a noise impact assessment at a proposed development site off Lower Road in Bedhampton. It is proposed to submit an outline planning application to develop the site for residential use for up to 43 dwellings, associated landscaping, open space and allotments with access from Lower Road.
- 1.2 This report has assessed the impact of noise from road and rail traffic and other sources of ambient noise. The A27 dual carriageway is close to the site to the west and south and the site is bounded by a railway to the south.
- 1.3 All noise levels in this report are quoted in dB relative to 20  $\mu$ Pa. A definition of noise and vibration parameters described in this report is provided in Appendix A.

## **2.0 SITE DESCRIPTION AND PROPOSED DEVELOPMENT**

- 2.1 The site is located to the south of Bedhampton. Vehicular access to the site is via Lower Road. The site neighbours the Bargate Homes Bedhampton Phase 1 proposed development to the east which is currently under consideration for planning consent for residential development. The A27 is located just beyond the western boundary with the A3(M) located beyond (further west). The Portsmouth to Bedhampton railway is located to the south
- 2.2 An aerial image showing the location of the site is shown in Figure 1. An indicative site masterplan is shown in Figure 2.
- 2.3 Outline planning consent is sought to develop the site to provide up to 43 residential dwellings. There is potential for the new housing to be affected by noise from the railway and road traffic using the A27 and A3(M). 24 Acoustics' previous work on the Phase 1 site indicated that vibration impact from the proposed railway would be negligible.

### 3.0 STANDARDS AND GUIDANCE

#### National Planning Policy

3.1 Paragraph 180 of the National Planning Policy Framework (NPPF) [Reference 1] states that planning policies and decisions should:

- mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

3.2 The NPPF also refers to the Noise Policy Statement for England (NPSE) [Reference 3] which is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise. The NPSE sets out the Government's long-term vision to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development' which is supported by the following aims:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life;
- Where possible, contribute to the improvement of health and quality of life.

3.3 The NPSE defines the concept of a 'significant observed adverse effect level' (SOAEL) as 'the level above which significant adverse effects on health and quality of life occur'. The following guidance is provided within the NPSE:

*"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*

- 3.4 In March 2014 the Planning Practice Guidance (PPG) [Reference 4] was first published. This is written to support the NPPF with more specific planning guidance. The PPG reflects the NPSE and states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also states that opportunities should be taken, where practicable, to achieve improvements to the acoustic environment. The PPG states that noise can over-ride other planning concerns but should not be considered in isolation from the other economic, social and environmental dimensions of the proposed development.
- 3.5 The PPG expands upon the concept of SOAEL (together with Lowest Observable Adverse Effect Level, LOAEL, and No Observed Effect Level, NOEL) as introduced in the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system. Table 1 is reproduced from the PPG and summarises the noise exposure hierarchy, based on the likely average response.

| Perception                                               | Examples of Outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Increasing Effect Level             | Action                           |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------|
| Not noticeable                                           | No Effect                                                                                                                                                                                                                                                                                                                                                                                                                                                             | No Observed Effect                  | No specific measures required    |
| Noticeable and not intrusive                             | Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life                                                                                                                                                                                                                                                               | No Observed Adverse Effect          | No specific measures required    |
| <b>Lowest Observable Adverse Effect Level (LOAEL)</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                     |                                  |
| Noticeable and intrusive                                 | Noise can be heard and causes small changes in behaviour and/ or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life                                                           | Observed Adverse Effect             | Mitigate and reduce to a minimum |
| <b>Significant Observed Adverse Effect Level (SOAEL)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                     |                                  |
| Noticeable and disruptive                                | The noise causes a material change in behaviour and/ or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area. | Significant Observed Adverse Effect | Avoid                            |
| Noticeable and very disruptive                           | Extension and regular changes in behaviour and/ or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/ awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non auditory                                                                                                                                                                              | Unacceptable Adverse Effect         | Prevent                          |

**Table 1:** PPG Noise Exposure Hierarchy

- 3.6 In general terms it is considered that a noise impact with an effects level which is lower than SOAEL is acceptable (providing the effect is mitigated to a minimum). There is currently, however, a discontinuity between the above guidance and objective technical criteria for use in planning noise impact assessments.

### Internal Noise Levels

- 3.7 For residential developments 24 Acoustics considers that the spirit of the requirements of the NPPF, NPSE and PPG will be complied with if criteria from British Standard 8233:2014 [Reference 5] and World Health Organisation guidelines [Reference 6] are adopted for internal noise within dwellings.
- 3.8 BS 8233 provides desirable internal ambient noise levels for habitable rooms. Table 2 shows a summary of the levels recommended in BS 8233 for living rooms and bedrooms.

| Activity                   | Location    | Daytime<br>07:00 to 23:00 | Night-time<br>23:00 to 07:00 |
|----------------------------|-------------|---------------------------|------------------------------|
| Resting                    | Living Room | 35 dB $L_{Aeq,16hr}$      | --                           |
| Sleeping (daytime resting) | Bedroom     |                           | 30 dB $L_{Aeq,8hr}$          |

**Table 2:** Indoor Ambient Noise Levels as Recommended in BS 8233

- 3.9 The World Health Organisation provides guidance on desirable internal noise levels to minimise the risk of sleep disturbance. The WHO guidelines suggest internal noise levels not exceeding 30 dB  $L_{Aeq}$  or regularly exceeding 45 dB  $L_{Amax,f}$  for 'a good sleep'.

### External Noise Levels

- 3.10 The World Health Organisation provides guidance on the relationship between annoyance and noise levels in external amenity areas (gardens, terraces, balconies etc.). The guidance defines noise levels of 55 dB  $L_{Aeq, 16 hour}$  as the onset of significant community annoyance for these areas during daytime hours (07:00 and 23:00 hours). It should be noted that these values are aspirational and BS 8233:2014 refers to these levels as 'not achievable in all circumstances where development might be desirable'. In such situations development should be designed to achieve the lowest levels practicable in external amenity spaces but development should not be prohibited.

### Summary of Proposed Criteria

- 3.11 Based upon the review of standards described above, noise has been assessed in accordance with the following approach:

- BS 8233 for recommended internal noise levels inside the properties. It is considered that an upper internal daytime level of 35 dB  $L_{Aeq,16hr}$  for lounges or living rooms and a night-time level for bedrooms of 30 dB  $L_{Aeq,8hr}$  should apply. Similarly, a maximum night-time internal level of 45 dB  $L_{Amax,f}$  should apply in bedrooms for regular events;
- Noise levels in external amenity areas to be as low as practically possible given the constraints of the scheme.

## 4.0 AMBIENT NOISE SURVEYS

### Methodology

4.1 Environmental noise measurements were undertaken at the undeveloped site in order to establish existing ambient noise levels across the site. Noise measurements were undertaken between 10th and 16th February 2020. The measurement locations are shown in Figure and described below:

- Location 1: Northern boundary with housing off Lower Common Road;
- Location 2: Western boundary;
- Location 3: Southern boundary with railway.

4.2 Noise and vibration measurements were undertaken using the following equipment:

|                                    |            |
|------------------------------------|------------|
| 3*Rion class 1 sound level meter   | Type NL52; |
| Brüel and Kjær acoustic calibrator | Type 4231. |

4.3 All noise measurements were undertaken at approximately 2.5 m above local grade level in free field conditions and with direct line of sight to the railway. Environmental windshields were fitted to the microphones and instrumentation was configured to measure and store overall A-weighted statistical parameters such as  $L_{Aeq}$ ,  $L_{Amax}$  and  $L_{A90}$  (all measured on fast response) in 5 minute intervals. Measurements were made in accordance with BS 7445: 1991 "Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use" [Reference 8].

4.4 Weather conditions during the survey period were mostly fine and dry with wind speeds typically lower than 5 m/s. Periods with weather conditions outside of this have been disregarded from the analysis.

## Results

4.5 The unattended noise survey results are shown graphically in Appendix B. The graphs in Appendix B show the noise survey data as measured. It should be noted that the surveys were undertaken during the January- March 2021 Covid-19 'Lockdown'. As a result of this road traffic and railway levels were lower than normal. The measured noise survey data has been corrected to account for this using the following methodology:

- Road traffic: Apple Mobility data. This indicates that for the survey period road traffic levels were reduced by about 35%. Consequently measured noise levels have been adjusted by + 3 dB (representing a correction of 1.8 dB relating to the reduction in traffic levels plus a 1.2 dB error/ tolerance function);
- Rail traffic: A historic passenger rail timetable (relating to 2019) has been compared to the current timetable (both relating to all passenger trains passing through Bedhampton). This indicates the following rail numbers

|                   | Time of Day and No of Train Movements |                            |
|-------------------|---------------------------------------|----------------------------|
|                   | Daytime<br>07:00- 23:00               | Night time<br>23:00- 07:00 |
| Historic- 2019    | 100                                   | 20                         |
| Current- Feb 2021 | 64                                    | 13                         |

**Table 3:** Analysis of Daily Train Movements (Monday to Friday)

As a result the noise survey location (Location 3) dominated by rail traffic has also been corrected by + 3dB (representing a 1.9 dB correction for the difference in rail movements and 1.1 dB error function).

4.6 Tables 4 to 6 below summarise the corrected noise survey data.

| Day and Date                       | Time Period and Noise Level dB |                             |                             |                              |                             |
|------------------------------------|--------------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|
|                                    | Day<br>07:00- 23:00 hours      |                             | Night<br>07:00- 23:00 hours |                              |                             |
|                                    | L <sub>Aeq</sub><br>Average    | L <sub>A90</sub><br>Typical | L <sub>Aeq</sub><br>Average | L <sub>Amax</sub><br>Typical | L <sub>A90</sub><br>Typical |
| Wednesday<br>10/2/2021             | 57                             | 51                          | 54                          | 65                           | 42                          |
| Thursday<br>11/2/2021              | 63                             | 55                          | 55                          | 66                           | 43                          |
| Friday<br>12/2/2021                | 60                             | 54                          | 54                          | 74                           | 43                          |
| Monday<br>15/2/2021                | 65                             | 60                          | 60                          | 71                           | 48                          |
| Tuesday<br>16/2/2021               | 70                             | 64                          |                             |                              |                             |
| <b>Average/<br/>representative</b> | <b>63</b>                      | <b>54</b>                   | <b>56</b>                   | <b>74</b>                    | <b>42</b>                   |
| Saturday<br>13/2/2021              | 62                             | 57                          | 57                          | 71                           | 50                          |
| Sunday<br>14/2/2021                | 62                             | 57                          | 60                          | 70                           | 48                          |
| <b>Average/<br/>representative</b> |                                | <b>54</b>                   |                             |                              | <b>42</b>                   |

**Table 4:** Summary of Noise Survey Results at Location 1 (Northern Boundary)

| Day and Date                       | Time Period and Noise Level dB |                             |                             |                              |                             |
|------------------------------------|--------------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|
|                                    | Day<br>07:00- 23:00 hours      |                             | Night<br>07:00- 23:00 hours |                              |                             |
|                                    | L <sub>Aeq</sub><br>Average    | L <sub>A90</sub><br>Typical | L <sub>Aeq</sub><br>Average | L <sub>Amax</sub><br>Typical | L <sub>A90</sub><br>Typical |
| Wednesday<br>10/2/2021             | 62                             | 54                          | 57                          | 70                           | 43                          |
| Thursday<br>11/2/2021              | 66                             | 56                          | 58                          | 70                           | 45                          |
| Friday<br>12/2/2021                | 63                             | 56                          | 56                          | 73                           | 44                          |
| Monday<br>15/2/2021                | 65                             | 57                          | 60                          | 73                           | 45                          |
| Tuesday<br>16/2/2021               | 74                             | 62                          |                             |                              |                             |
| <b>Average/<br/>representative</b> | <b>65</b>                      | <b>56</b>                   | <b>58</b>                   | <b>73</b>                    | <b>44</b>                   |
| Saturday<br>13/2/2021              | 63                             | 57                          | 56                          | 72                           | 49                          |
| Sunday<br>14/2/2021                | 62                             | 56                          | 59                          | 71                           | 46                          |
| <b>Average/<br/>representative</b> |                                | <b>56</b>                   |                             |                              | <b>44</b>                   |

**Table 5:** Summary of Noise Survey Results at Location 2 (Northern-western Boundary)

| Day and Date                       | Time Period and Noise Level dB |                             |                             |                              |                             |
|------------------------------------|--------------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|
|                                    | Day<br>07:00- 23:00 hours      |                             | Night<br>07:00- 23:00 hours |                              |                             |
|                                    | L <sub>Aeq</sub><br>Average    | L <sub>A90</sub><br>Typical | L <sub>Aeq</sub><br>Average | L <sub>Amax</sub><br>Typical | L <sub>A90</sub><br>Typical |
| Wednesday<br>10/2/2021             | 65                             | 53                          | 61                          | 83                           | 42                          |
| Thursday<br>11/2/2021              | 68                             | 55                          | 61                          | 83                           | 42                          |
| Friday<br>12/2/2021                | 68                             | 55                          | 62                          | 88                           | 42                          |
| Monday<br>15/2/2021                | 69                             | 59                          | 64                          | 86                           | 47                          |
| Tuesday<br>16/2/2021               | 71                             | 63                          |                             |                              |                             |
| <b>Average/<br/>representative</b> | <b>69</b>                      | <b>55</b>                   | <b>64</b>                   | <b>86</b>                    | <b>42</b>                   |
| Saturday<br>13/2/2021              | 70                             | 60                          | 67                          | 87                           | 57                          |
| Sunday<br>14/2/2021                | 65                             | 59                          | 62                          | 85                           | 46                          |
| <b>Average/<br/>representative</b> |                                | <b>55</b>                   |                             |                              | <b>42</b>                   |

**Table 6:** Summary of Noise Survey Results at Location 3 (Southern Boundary)

#### Noise Propagation Model

4.7 Noise measurements have been used to calibrate an acoustic model of the site, using IMMI v2017 noise-mapping software, to determine the noise levels at the proposed site from the road and railway. This has used the propagation methodology of ISO 9613 [Reference 9] taking into account the effects of geometric divergence, atmospheric and ground absorption and acoustic screening. The following parameters were used in the model:

- Ambient temperature: 10 degrees centigrade;
- Relative humidity: 70%;
- Ground effects: G=0 ('hard' ground);
- Light downwind propagation conditions. 54

4.8 The acoustic model has considered the proposed site layout including topography of the site for receptor heights at both ground floor and first floor level (1.5 m and 4 m receptor heights) and takes into account the recessed nature of the railway in its cutting. The acoustic model results are shown as noise contours site in Figures 3 and 4.

## 5.0 ASSESSMENT

- 5.1 This assessment has considered noise levels in proposed habitable rooms across the proposed development site as well as external noise levels in amenity spaces. As discussed above vibration on the site is insignificant and has not been considered further.

### External Noise Levels

- 5.2 Noise measurement and propagation model results (as shown in Figure 3) show that, based on proposed layout plans, external noise levels in the majority of the areas of private gardens will be no greater than 55 dB  $L_{Aeq, 16 \text{ hour}}$ .
- 5.3 On this basis it is considered that providing the relevant development needs can be met, the proposals, as presented, are acceptable on noise grounds.

### Internal Noise Levels

- 5.4 Indicative calculations to determine internal noise levels have been undertaken for proposed properties at the site. Calculations have been undertaken in outline based on typical room volumes and elevations. These calculations should therefore be updated at reserved matters/ post planning once a final site scheme is agreed.
- 5.5 The calculations are based on the assumption of a masonry (cavity wall) construction with a tiled or slate roof and have been undertaken using measurement and acoustic model results as described in Section 4 to determine the glazing and ventilation requirements for the proposed residential scheme which will ensure that the noise levels inside the properties does not exceed 35 dB  $L_{Aeq, 16 \text{ hour}}$  during the day and 30 dB  $L_{Aeq, 8 \text{ hour}}$  at night (and also not regularly exceed 45 dB  $L_{Amax, f}$  at night).
- 5.6 The calculations indicate that all habitable rooms within the proposed scheme are capable of complying with the acoustic standards described above, however, in order to achieve them it will be necessary for some properties (notably those on the site perimeter) to be occupied with windows closed. Some will also require upgraded (acoustically rated) glazing. Where it is necessary for windows to be kept closed alternative means of background ventilation will need to be provided (some acoustically rated) and measures also considered to prevent excess heat build up in the proposed dwellings.

## **6.0 CONCLUSIONS**

- 6.1 24 Acoustics Ltd has been instructed by Bargate Homes Ltd to undertake a noise impact assessment at a proposed development site off Lower Road in Bedhampton. It is proposed to submit an outline planning application to develop the site for residential use for up to 43 dwellings.
- 6.2 Environmental noise measurements have been undertaken at the site to establish the prevailing ambient noise levels.
- 6.3 External noise levels in private gardens within the developed site are predicted to be at or below 55 dB  $L_{Aeq, 16 \text{ hour}}$ .
- 6.5 Calculations have been undertaken based upon typical room volumes and glazed areas and these indicate that a satisfactory internal environment in all habitable rooms may be achieved.
- 6.6 On the above basis, it is considered that an appropriate acoustic environment can be provided to the proposed residential properties, both externally and internally relative to the prevailing acoustic environment.

## REFERENCES

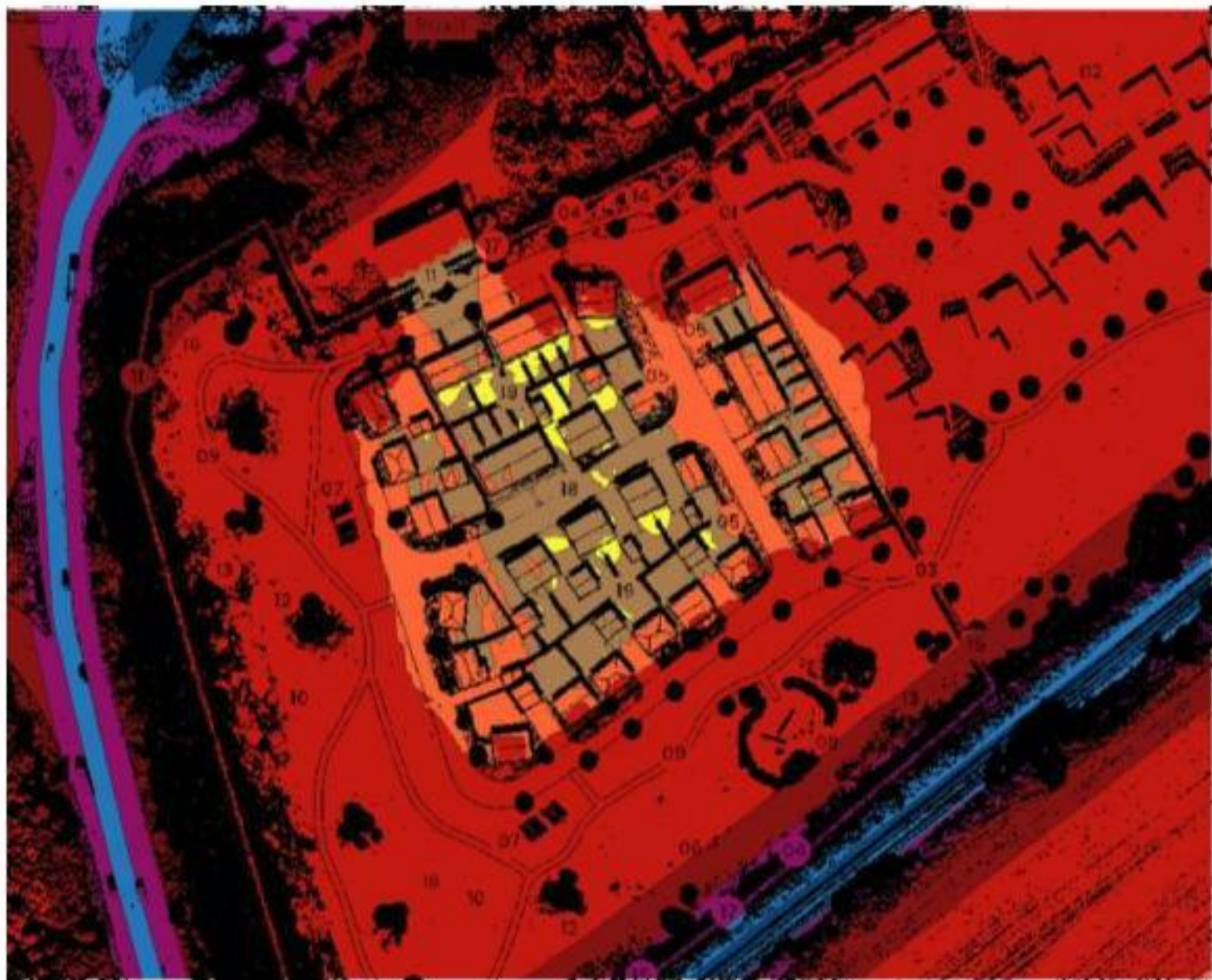
1. Department for Communities and Local Government. National Planning Policy Framework, 2019.
2. DEFRA. Noise Policy Statement for England, 2010.
3. Department of Communities and Local Government. Planning Practice Guidance, March 2014.
4. British Standards Institution. British Standard 8233: Guidance on sound insulation and noise reduction for buildings, 2014.
5. World Health Organisation. Guidelines for Community Noise, 2000.
6. British Standards Institution. British Standard 6472: Guide to Evaluation of Human Exposure to Vibration in Buildings, Part 1: Vibration Sources Other than Blasting: 2008.
7. British Standards Institution. British Standard 7445: 1991 Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use.
8. International Standards Organisation. ISO 9613, Acoustics - Attenuation of Sound During Propagation Outdoors, 1993.
9. Building Regulations. Approved Document F - Ventilation, 2010.



|                                                       |                                                             |                       |                                                                                                      |
|-------------------------------------------------------|-------------------------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------|
| <b>Project:</b><br>Land off Lower Road,<br>Bedhampton | <b>Title:</b><br>Site Location Plan/ Noise Survey Locations |                       | <br>24Acoustics |
| <b>DWG No:</b> Figure 1                               | <b>Scale:</b> N.T.S.                                        | <b>Rev:</b> -         |                                                                                                      |
| <b>Date:</b> March 2021                               | <b>Drawn By:</b> RP                                         | <b>Job No:</b> 8907-1 |                                                                                                      |



|                                                       |                                              |                       |                                                                                                      |
|-------------------------------------------------------|----------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------|
| <b>Project:</b><br>Land off Lower Road,<br>Bedhampton | <b>Title:</b><br>Proposed Development Scheme |                       | <br>24Acoustics |
| <b>DWG No:</b> Figure 2                               | <b>Scale:</b> N.T.S.                         | <b>Rev:</b> -         |                                                                                                      |
| <b>Date:</b> Sept 2021                                | <b>Drawn By:</b> RP                          | <b>Job No:</b> 8907-1 |                                                                                                      |



|                                                       |                                                           |                       |                                                                                                      |
|-------------------------------------------------------|-----------------------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------|
| <b>Project:</b><br>Land off Lower Road,<br>Bedhampton | <b>Title:</b><br>Daytime Noise Contours, dB LAeq, 16 hour |                       | <br>24Acoustics |
| <b>DWG No:</b> Figure 3                               | <b>Scale:</b> N.T.S.                                      | <b>Rev:</b> -         |                                                                                                      |
| <b>Date:</b> March 2021                               | <b>Drawn By:</b> RP                                       | <b>Job No:</b> 8907-1 |                                                                                                      |



|                                                       |                                                             |                       |                                                                                                   |
|-------------------------------------------------------|-------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------|
| <b>Project:</b><br>Land off Lower Road,<br>Bedhampton | <b>Title:</b><br>Night time noise contours, dB LAeq, 8 hour |                       |  24Acoustics |
| <b>DWG No:</b> Figure 4                               | <b>Scale:</b> N.T.S.                                        | <b>Rev:</b> -         |                                                                                                   |
| <b>Date:</b> March 2021                               | <b>Drawn By:</b> RP                                         | <b>Job No:</b> 8907-1 |                                                                                                   |

## APPENDIX A: NOISE UNITS

### Noise

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dB(A) is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB(A). The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dB(A) corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

- i) The  $L_{Amax}$  noise level

This is the maximum noise level recorded over the measurement period.

- ii) The  $L_{Aeq}$  noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

APPENDIX B: AMBIENT NOISE MEASUREMENT RESULTS

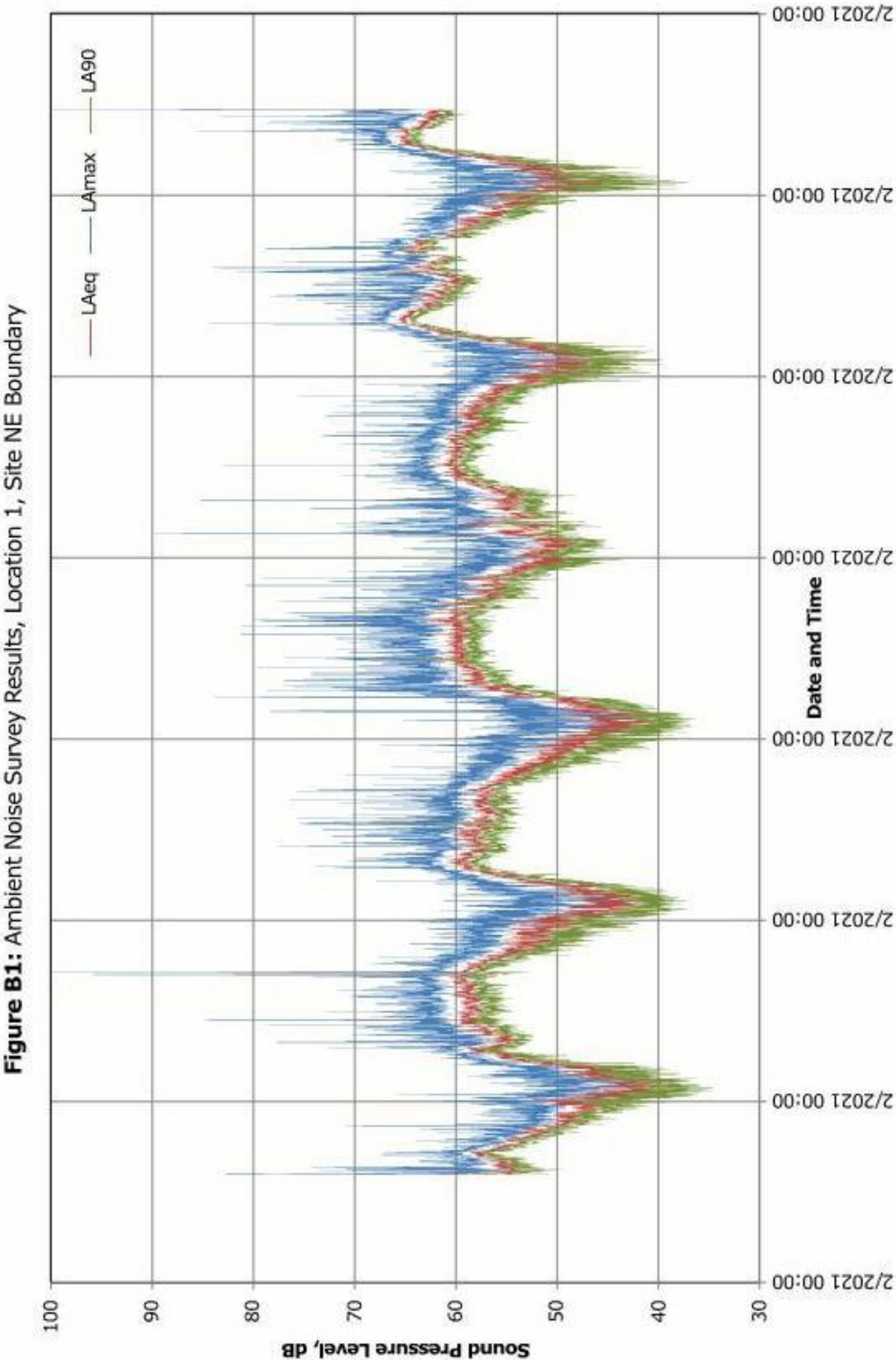


**Figure B2:** Ambient Noise Survey Results, Location 2, Western Boundary

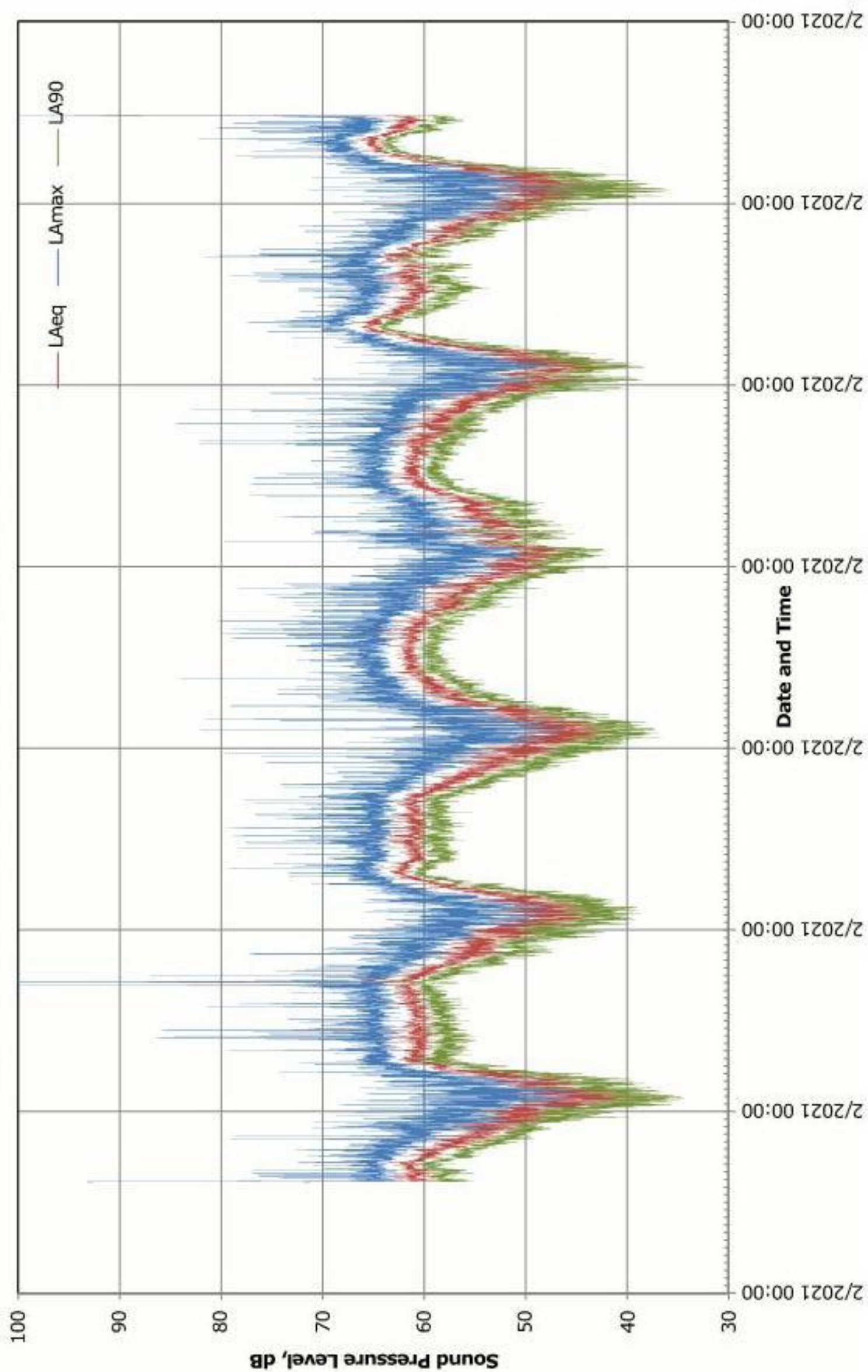


**Figure B3:** Ambient Noise Survey Results, Location 3, Southern Boundary

