PROFESSIONAL CONSULT

FUTURE ENVIRONMENTS

# Noise Impact Assessment

Proposed Soil Washing Facility – Burrell Way, Thetford

**Client:** **JMJ Planning Limited**

**Reference:** **22.080.1.R3**

**Issue Date:** **28 October 2022**

| Report Version | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| **Prepared by** | Martyn Parker MIOA | Martyn Parker MIOA | John Goodwin MIOA | |
| **Position** | Senior Consultant | Senior Consultant | Director | |
| **Reviewed by** | John Goodwin MIOA | John Goodwin MIOA | Clara Gioiello | |
| **Position** | Director | Director | Graduate Consultant | |
| **Issue Date** | 12 August 2022 | 12 August 2022 | 28 October 2022 | |
| **Comments** | - | - | - | |

Professional Consult Limited

hello@professionalconsult.co.uk
07704 672683
www.professionalconsult.co.uk

**EXECUTIVE SUMMARY**

This Assessment has shown that the rated level of noise generated by the soil washing plant and crusher does not exceed the typical background sound level at the closest residential receptor during the proposed operating hours.

This Assessment has shown that, following installation of an acoustic fence on the western Site boundary with the SSSI, the change in ambient noise level will not exceed the permissible change of +2.9dB.

The predicted level of noise from the Development is sufficiently low enough at the closest residential dwelling and at the SSSI to accord with the 'No Observed Adverse Effect Level' as detailed in the PPG and as such noise should not be deemed to be a determining factor in the granting of planning permission for this Site.

**TABLE OF CONTENTS**

# 1 INTRODUCTION

## 1.1 Appointment

1.1.1 Professional Consult Limited was instructed by JMJ Planning ('the Applicant'), to prepare a Noise Impact Assessment ('the Assessment') for a proposed soil washing facility with crusher ('the Development') on a parcel of land located at 5C, Burrell Way in Thetford IP24 3RW to be referred to hereafter as 'the Site'.

## 1.2 The Proposal

1.2.1 The Applicant wishes to change the use of an existing skip manufacturing facility into a soil washing facility. Proposed operating times for the Development are as follows:

- Monday – Friday: 07:00 – 18:00; and
- Saturday: 07:00 – 17:00.

## 1.3 The Site, Locality & Existing Soundscape

1.3.1 The Site is located to the southeast of Thetford off Burrell Way. The site is bound by various commercial uses to the north, east and south. The site is bordered by forested land to the west. Thetford Heath National Nature Reserve, which is a Site of Special Scientific Interest (SSSI), lies to the south west of the Site. The closest residential dwelling to the site is located off Ash Close to the southeast of the Site.

1.3.2 The Site is currently operating as a welding yard for skips, however operations are currently reduced (3 welders currently operate instead of 12) and so existing noise emissions from the Site will be lower than they would have been previously.

1.3.3 The soundscape at the closets residential dwelling to the Site is comprised predominantly of distant road traffic noise on the surrounding road network, intermittent gun firing noise from the Thetford Ranges to the west of the Site and aircraft over-flights.

## 1.4 Purpose of Assessment

1.4.1 This Assessment has been undertaken to identify any potentially adverse noise impacts associated with the proposed soil washing facility with crusher and its noise impact upon the closest existing residential dwellings and also the SSSI. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts and these are detailed in Section 2.

1.4.2 This Assessment has relied upon a background sound survey completed in a location considered to be representative of the sound climate at the closest residential dwellings to the Site. This Assessment has also relied upon an ambient noise survey completed on the Site boundary with the SSSI in order to quantify existing levels of commercial noise which any animals close to the Site, within the SSSI may be exposed to.

1.4.3 This Assessment has also relied upon noise measurements taken at an off-site location in order to measure noise levels associated with an existing soil washing plant and library noise level data for the operation of a stone crusher.

## 1.5 Limitations

1.5.1 The limitations of this report are presented in Appendix 1.

## 1.6 Confidentiality

1.6.1 Professional Consult has prepared this report solely for the use of the Client. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Professional Consult; a charge may be levied against such approval.

## 2 POLICY & GUIDANCE

### 2.1 National Planning Policy Framework & National Planning Practice Guidance

2.1.1 The Government updated the National Planning Policy Framework (NPPF) on 20th July 2021 and its associated National Planning Practice Guidance (NPPG) on 24th June 2021. Together, the NPPF and NPPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs, while protecting valuable natural and historic environments.

2.1.2 The NPPG adds further context to the NPPF and it is intended that the two documents should be read together.

2.1.3 Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

2.1.4 Local planning authorities' plan-making and decision making should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether or not a good standard of amenity can be achieved.

2.1.5 In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

2.1.6 The Observed Effect Levels are as follows:

- Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

2.1.7 Table 1 summarises the noise exposure hierarchy, based on the likely average response.

**Table 1. Noise Exposure Hierarchy**

| 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 |
| *Lowest Observed Adverse Effect Level* | | | |
| 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 |
| *Significant Observed Adverse Effect Level* | | | |
| 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 Effect | Avoid |
| Noticeable and very disruptive | Extensive 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 |

2.1.8 The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.

2.1.9 These factors include:

- The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day - this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- the spectral content of the noise and the general character of the noise. The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

2.1.10 More specific factors to consider when relevant:

- where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on

windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations; and

- If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

## 2.2 BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

2.2.1 This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and,
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

2.2.2 The procedure detailed in the standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is 'typical.'

2.2.3 The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- Daytime (07:00 - 23:00): 1 hour; and
- Night-time (23:00 - 07:00): 15 minutes.

2.2.4 There are a number of 'penalties' which can be attributed to the specific sound level, either subjectively or objectively, depending upon the 'acoustic features' of the sound level under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows (with regards to the subject method):

<u>Tonality</u>

- +2dB: where the tonality is just perceptible;
- +4dB: where the tonality is clearly perceptible; and
- +6dB: where the tonality is highly perceptible.

<u>Impulsivity</u>

- +3dB: where the impulsivity is just perceptible;
- +6dB: where the impulsivity is clearly perceptible; and
- +9dB: where the impulsivity is highly perceptible.

Intermittency

- +3dB: where the intermittency is readily distinctive against the acoustic environment.

2.2.5 Where the assessment is carried out using the objective method, the tonality penalty is either 0dB or 6dB and the impulsivity penalty can range from 0dB up to 9dB in increments of 1dB, depending on the level of impulsivity identified.

2.2.6 In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3dB where a sound exhibits characteristics that are neither tonal nor impulsive, though is readily distinctive against the acoustic environment.

2.2.7 BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

2.2.8 Assessment of the rating level relative to the background noise level can yield the following commentary:

- Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact;
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

2.2.9 Whilst the amended 2019 Standard does make various references to it not being intended to assess noise impacts at indoor locations, section 1.1 does state 'The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident'. Example 6 in the Standard states 'In addition to the rating/background sound level comparison shown in Table A.6, the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows. Other guidance, such as BS 8233, might also be applicable in this instance'.

2.2.10 With the above in mind, and for a clear need to ensure that any potential commercial or industrial noise impacts at the building façade do not give rise to internal noise level which causes sleep disturbance in bedrooms, this Assessment will ensure that the predicted rating level (specific sound level including any character corrections) does not exceed 30dB in bedrooms.

## 2.3 Institute of Environmental Management & Assessment 'Guideline for Environmental Noise Impact Assessment', October 2014

2.3.1 The guidelines address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. The guidelines provide specific support on how noise impact assessment fits within the Environmental Impact Assessment (EIA) process. They cover:

- How to scope a Noise Assessment;
- Issues to be considered when defining the baseline noise environment;

- Prediction of changes in noise levels as a result of implementing development proposals; and
- Definition and evaluation of the significance of the effect of changes in noise levels (for use only where the assessment is undertaken within an EIA).

2.3.2 Although the guidance states that it is only applicable for use in an Environmental Impact Assessment (EIA), in the absence of any other relevant guidance for assessing changes in ambient noise levels, it is the most appropriate document for establishing significance of effect.

2.3.3 Table 2 categorises the change in noise level for a noise sensitive receptor such as a residential dwelling.

**Table 2. Effect Descriptors for Residential Dwellings**

| Effect | Change in Ambient Noise Level (dB) |
|---|---|
| Very substantial | ≥10.0 |
| Substantial | 5.0 – 9.9 |
| Moderate | 3.0 – 4.9 |
| None / not significant | ≤2.9 |

2.3.4 For the purposes of this Assessment, any change in ambient noise level which exceeds 2.9dB (referred to throughout this Assessment as the 'permitted change' in ambient noise level) will be mitigated.

## 2.4 Local Authority Guidance and Criteria – Breckland Council's Environmental Health Department

2.4.1 Consultation was provided to Breckland Council on 20th July 2022 which stated:

> *'We have been appointed by a client to complete a Noise Impact Assessment for a proposed soil washing facility on a parcel of land at 5C, Burrell Way in Thetford IP24 3RW.*
>
> *Professional Consult will undertake a background sound survey will be completed in a location considered to be representative of the background sound climate at the residential dwelling located to the south east of the Site off Ash Close over a full weekday and weekend period.*
>
> *Professional Consult will complete an assessment in line with the guidance presented in BS4142:2014+A1:2019 and the specific noise criteria of 5dB over background presented by Breckland Council. Where any exceedances of criteria are identified, we will recommend noise mitigation measures in to reduce any noise impacts.*
>
> *If you have any comments, then please advise at your earlies convenience.'*

2.4.2 A response was received on the same day which stated:

> *'That sounds acceptable on the understanding that the weekday chosen is typical of the activity of the area however I would be looking at the specific noise criteria as 3dB above background at the boundary*

*of the closest residential property as a maximum, BS4142 advises that a difference of around 5dB is likely to be an indication of an adverse impact.'*

# 3 NOISE SURVEYS

## 3.1 Existing Soil Washing Plant

3.1.1 Professional Consult has completed noise measurements at another Site with an existing soil washing plant of the same specification at the proposed Development:

- **Noise Measurement Position 1**: Located at an existing quarry in Gainsborough. Noise measurements were taken, in free-field conditions, between 10:39 – 11:00 on 3rd August 2020. Measurements were undertaken close to the soil washing plant in order to identify the main noise source, which was the sorting area towards the end of the machinery. Noise sources consisted of continues engine noise and rattling due to the impact of stones moving in the machine.

3.1.2 Table 3 presents the measured noise levels from the spoil washing plant:

**Table 3. Measured Noise Levels**

| Plant | Measured Specific Noise Level, $L_{Aeq,t}$ (dB) | Source Noise On-time Duration / Hour (hh:mm:ss) | Measurement Distance (m) | Notes |
|---|---|---|---|---|
| End of Sorting Area | 86.4 | 01:00:00 | 5 | Continuous machinery noise consisting of engine noise and rattling |

## 3.2 Background Sound Survey

3.2.1 Professional Consult has completed a background sound survey in a location considered to be representative of the sound climate at the closest existing residential dwellings to the Site, as follows:

- **Noise Measurement Position 2**: Located 80m to the west of the residential dwellings on Ash Close between 12:30 on 14th July – 10:30 on 18th July 2022 in free-field conditions thus covering a full weekday and weekend period. Noise sources at the measurement location comprised of noise from road traffic on the distant surrounding road network and intermittent sound of gunfire from Thetford ranges to the west.

3.2.2 Table 4 details the measured background sound levels for the period when the Site can operate, which is understood to be 07:00 – 18:00 Monday to Friday and 07:00 – 17:00 Saturday. The full measured background sound levels are presented in Appendix 6.

**Table 4. Summary of Measured Background Sound Levels**

| Period | Measured Background Sound Level, $L_{A90,15mins}$ (dB) | |
|---|---|---|
| | Range | Typical (Mode Average) |
| Daytime (07:00 – 18:00) | 32 – 47 | 44 |

## 3.3 Ambient Sound Survey

3.3.1 Professional Consult has completed an ambient sound survey on the western boundary of the Site with the SSSI. This survey was completed in order to accurately measure the level of noise which animals in the SSSI, close to the Site, are exposed to from existing commercial and industrial noise from the Site as it exists. It should be noted that existing noise levels from the Site are lower than they would have been previously as only 3 welders are currently operating, instead of 12 previously.

- **Noise Measurement Position 3**: Located on the western Site boundary between 14:00 on 20th October – 13:00 on 27th October 2022 in order to capture the range of different levels of noise associated with existing operations at the Site.

3.3.2 Table 5 details the measured ambient sound levels for when the Site can operate in its existing capacity. The full measured ambient sound levels are presented in Appendix 7.

**Table 5. Summary of Measured Ambient Sound Levels from Existing Operations on Site**

| Period | Measured Ambient Sound Level, $L_{Aeq,1hr}$ (dB) | |
|---|---|---|
| | Range | Typical (Mode Average) |
| Daytime (07:00 – 18:00) | 53 - 72 | 55 |

## 3.4 Noise & Survey Equipment

3.4.1 The following equipment was used for the noise surveys.

**Table 6. Noise Measurement Equipment**

| Measurement Position | Equipment Description | Manufacturer & Type No | Serial No. | Calibration Due Date |
|---|---|---|---|---|
| NMP1 + NMP2 | Sound Level Meter | 01dB Fusion | 12211 | 19 January 2024 |
| | Pre-amplifier | 01dB PRE22 | 1915082 | |
| | Microphone | GRAS 40CD | 331766 | |
| | Calibrator | 01dB CAL-31 | 89095 | 29 June 2023 |
| NMP3 | Sound Level Meter | 01dB Fusion | 11755 | 29 June 2024 |
| | Pre-amplifier | 01dB PRE22 | 1707173 | |
| | Microphone | GRAS 40CE | 291693 | |
| | Calibrator | 01dB CAL-31 | 84086 | 29 June 2023 |

3.4.2 The sound level meters were field calibrated prior to and following the noise surveys and there was no drift beyond the allowable limit of 1dB.

3.4.3 Table 7 indicates a summary of the measured weather conditions.

**Table 7. Range of Measured Wind Speeds**

| Period | Range of Measured Wind Speeds (m/s) | Rainfall Recorded? |
|---|---|---|

| | | |
|---|---|---|
| All periods | 0 – 0.8 | No |

# 4 NOISE IMPACT ASSESSMENT

## 4.1 Assessment Information

4.1.1 The following noise-sensitive areas have been identified and accounted for in this Assessment.

**Table 8. Identified Receptors**

| Receptor | Identifier | Type | Noise Model Receiver Location |
|---|---|---|---|
| Residential Dwelling on Ash Close | R1 | Residential | Daytime – 1.5m above ground level in garden |
| Thetford Heath National Nature Reserve (SSSI) | R2 | Fauna | Daytime – 0.5m above ground level |

4.1.2 Proposals include for the use of a jaw crusher (Terex Finlay J 1160) however there is no noise level data available for this plant item and so reliance has been placed on library noise level data for a recently measured stone crusher and the noise levels are detailed in Table 9.

**Table 9. Stone Crusher – Library Noise Level Data**

| Measured Noise Level, $L_{Aeq,T}$ (dB) | Measurement Distance (m) |
|---|---|
| 92.1 | 3 |
| Note: Source noise height is 3m above local ground level | |

## 4.2 Calculation of Specific Noise Levels at Residential Receptor R1

4.2.1 Professional Consult has calculated the sound power levels for the various items of plant which are detailed in Table 10.

**Table 10. Calculated Sound Power Levels**

| Plant / Noise Source | Period | Measured Noise Level, $L_{Aeq,T}$ (dB) | Noise Measurement Distance (m) | Height of Noise Source (m) | Calculated Sound Power Level, $L_{WA}$ (dB) |
|---|---|---|---|---|---|
| End of Sorting Area | Day | 86.4 | 5 | 3 | 101.4 |
| Crusher | | 92.1 | 3 | 3 | 105.0 |

4.2.2 In order to calculate an accurate overall specific sound pressure level at the closest residential receptors, a noise model has been built using CadnaA and the following inputs have been included in the model:

- Proposed Scheme Layout;
- Site elevations have been taken as existing;

- A point source has been used for the plant operating on Site at 3m above ground level at the centre of the Site;
- A reflection order of 2 has been used in all calculations; and
- Noise levels generated using ISO 9613-1 and ISO 9613-2 "Acoustics - Attenuation of sound during propagation outdoors" as incorporated into CadnaA software.

4.2.3 Figure 1 in Appendix 4 details the grid noise map for operation of the Development. Analysis of the grid noise maps indicates the following calculated specific sound pressure levels at the closest receptors to the Site detailed in Table 11.

**Table 11. Calculated Specific Sound Pressure Level at Receptor R1**

| Receptor | Period | Calculated Sound Pressure Level, $L_{Aeq,T}$ (dB) |
|---|---|---|
| R1 | Daytime | 36.2 |

4.2.4 The following has been considered in determining if any acoustic features exist in the predicted noise level at the closest residential receptor:

- Tonality: In determining if any tones exist in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the subjective method;
- Impulsivity: In determining if any impulsiveness is evident in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the subjective method;
- Intermittency: Whether or not the measured operations turn on or off during the assessment reference periods; and
- Other sound characteristics: Where no penalties are allocated for the above features, but there will be an audible noise at the closest receptor.

4.2.5 Table 12 allocates the applicable character corrections.

**Table 12. Applicable Character Corrections**

| Noise Source | Tonality Correction (dB) | Impulsivity Correction (dB) | Intermittency Correction (dB) | Other Sound Characteristics Correction (dB) | Comments |
|---|---|---|---|---|---|
| All Plant | 2 | 0 | 3 | 0 | Intermittent tonal noise may be audible at the closest receptors |
| **Highest Correction for Assessment Period** | **+2** | **+3** | **+3** | **0** | |
| **Overall Correction to be added to Specific Noise at Receptors** | **+8** | | | | |

4.2.6 Table 13 completes the BS4142 Assessment.

**Table 13. BS4142 Assessment**

| Period | Receptor | Overall Worst-case Calculated Specific Noise Level at Receptor, $L_{Aeq,T}$ (dB) | Total Overall Character Correction (dB) | Calculated Rated Level (dB) | Criteria Noise Level (Background Sound Level) (dB) | Difference +/- (dB) |
|---|---|---|---|---|---|---|
| Daytime | R1 | 36.2 | 8 | 44 | 44 | 0 |

4.2.7 A review of Table 13 indicates that for the daytime period at the identified residential dwellings, the rated level of noise falls below the typical background sound level (the criteria noise level). Accordingly, BS4142:2014+A1:2019 provides the following advice for this outcome:

> *'Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.'*

## 4.3 Calculation of Specific Noise Levels at Fauna Receptor R2

4.3.1 In order to calculate an accurate overall specific sound pressure level at Receptor R2 a noise model has been built using CadnaA and the following inputs have been included in the model:

- Proposed Scheme Layout;
- Site elevations have been taken as existing;
- A point source has been used for the plant operating on Site at 3m above ground level at the centre of the Site;
- A reflection order of 2 has been used in all calculations; and
- Noise levels generated using ISO 9613-1 and ISO 9613-2 "Acoustics - Attenuation of sound during propagation outdoors" as incorporated into CadnaA software.

4.3.2 Figure 1 in Appendix 4 details the grid noise map for operation of the Development. Analysis of the grid noise maps indicates the following calculated specific sound pressure levels at the closest receptors to the Site detailed in Table 14.

**Table 14. Calculated Specific Sound Pressure Level at Receptor R2**

| Receptor | Period | Calculated Sound Pressure Level, $L_{Aeq,T}$ (dB) |
|---|---|---|
| R2 | Daytime | 62.9 |

4.3.3 Table 15 calculates the change in ambient noise level at the boundary of the Site with the SSSI.

**Table 15. Calculation of Change in Ambient Noise Level at R2**

| Receptor | Typical Measured Existing Ambient Noise Level $L_{Aeq,1hr}$ (dB) | Calculated Sound Pressure Level from Development, $L_{Aeq,T}$ (dB) | Combined Ambient Noise Level, $L_{Aeq,1hr}$ (dB) | Change in Ambient Noise Level, $L_{Aeq,1hr}$ (dB) |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| R2 | 55 | 62.9 | 63.6 | +8.6 |

4.3.4 Using the typical measured existing ambient noise level, Table 15 indicates that the change in ambient noise level is +8.6dB which exceeds the maximum permissible change in ambient noise level of +2.9dB and so the following section considers noise mitigation.

## 5 MITIGATION

5.1.1 Table 16 calculates the change in ambient noise level at the boundary of the Site with the SSSI following installation of an acoustic fence on the Site boundary at a height of 1.8m.

**Table 16. Calculation of Change in Ambient Noise Level at R2 – With Acoustic Fence**

| Receptor | Typical Measured Existing Ambient Noise Level $L_{Aeq,1hr}$ (dB) | Calculated Sound Pressure Level from Development with Acoustic Fence, $L_{Aeq,T}$ (dB) | Combined Ambient Noise Level, $L_{Aeq,1hr}$ (dB) | Change in Ambient Noise Level, $L_{Aeq,1hr}$ (dB) |
|---|---|---|---|---|
| R2 | 55 | 54.6 | 57.8 | +2.8 |

5.1.2 Table 16 indicates that with a 1.8m high acoustic fence, the change in ambient noise level is +2.8dB which falls below the permissible change in ambient noise level of +2.9dB.

5.1.3 The acoustic fence should be free from holes and have a minimum mass of 15kg/$m^2$.

## 6 CONCLUSION

6.1.1 Professional Consult Limited was instructed by JMJ Planning to prepare a Noise Impact Assessment for a proposed soil washing facility with crusher on a parcel of land located at 5C, Burrell Way in Thetford IP24 3RW.

6.1.2 The Applicant wishes to change the use of an existing skip manufacturing facility into a soil washing facility. Proposed operating times for the Development are as follows:

- Monday – Friday: 07:00 – 18:00; and
- Saturday: 07:00 – 17:00.

6.1.3 The Site is located to the southeast of Thetford off Burrell Way. The site is bound by various commercial uses to the north, east and south. The site is bordered by forested land to the west. The closest residential dwelling to the site is located off Ash Close to the southeast of the Site.

6.1.4 The Site is currently operating as a welding yard for skips, however operations are currently reduced (3 welders currently operate instead of 12) and so existing noise emissions from the Site will be lower than they would have been previously. As such, this will lead to the existing ambient noise climate being lower than previous which has made for a worst-case assessment.

6.1.5 The soundscape at the closets residential dwelling to the Site is comprised predominantly of distant road traffic noise on the surrounding road network, intermittent gun firing noise from the Thetford Ranges to the west of the Site and aircraft over-flights.

6.1.6 This Assessment has been undertaken to identify any potentially adverse noise impacts associated with the proposed soil washing facility with crusher and its noise impact upon the closest existing residential dwellings. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts.

6.1.7 This Assessment has relied upon a background sound survey completed in a location considered to be representative of the sound climate at the closest residential dwellings to the Site. This Assessment has also relied upon an ambient noise survey completed on the Site boundary with the SSSI in order to quantify existing levels of commercial noise which any animals close to the Site, within the SSSI may be exposed to.

6.1.8 This Assessment has also relied upon noise measurements taken at an off-site location in order to measure noise levels associated with an existing soil washing plant and library noise level data for the operation of a stone crusher.

6.1.9 This Assessment has shown that the rated level of noise generated by the soil washing plant and crusher does not exceed the typical background sound level at the closest residential receptor during the proposed operating hours.

6.1.10 This Assessment has shown that, following installation of an acoustic fence on the western Site boundary with the SSSI, the change in ambient noise level will not exceed the permissible change of +2.9dB.

6.1.11 The predicted level of noise from the Development is sufficiently low enough at the closest residential dwelling and at the SSSI to accord with the 'No Observed Adverse Effect Level' as detailed in the PPG and as such noise should not be deemed to be a determining factor in the granting of planning permission for this Site.

## APPENDIX 1: LIMITATIONS

This report and its findings should be considered in relation to the terms of reference and objectives agreed between Professional Consult Limited and the Client.

The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

Professional Consult cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by Professional Consult is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by Professional Consult in this connection without their explicit written agreement there to by Professional Consult.

## APPENDIX 2: GLOSSARY OF ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or $L_{Aeq}$, $L_{A90}$ etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

**Table 1: Typical Sound Pressure Levels**

| Sound Pressure Level (dB) | Location/Example |
|---|---|
| 0 | Threshold of hearing |
| 20 - 30 | Quiet bedroom at night |
| 30 - 40 | Living room during the day |
| 40 - 50 | Typical office |
| 50 - 60 | Inside a car |
| 60 - 70 | Typical high street |
| 70 - 90 | Inside factory |
| 100 - 110 | Burglar alarm at 1m away |
| 110 - 130 | Jet aircraft on take off |
| 140 | Threshold of pain |

**Table 2: Terminology**

| Descriptor | Explanation |
|---|---|
| dB (decibel) | The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10-5Pa). |
| dB(A) | A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies. |
| $L_{Aeq, T}$ | $L_{Aeq}$ is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period. |
| $L_{Amax}$ | $L_{Amax}$ is the maximum A - weighted sound pressure level recorded over the period stated. $L_{Amax}$ is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response. |
| $L_{10}$ & $L_{90}$ | If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence $L_{10}$ is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, $L_{90}$ is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the $L_{10}$ index to describe traffic noise. |
| Free-field Level | 2A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings. |
| Fast | A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant. |
| Slow | A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant. |

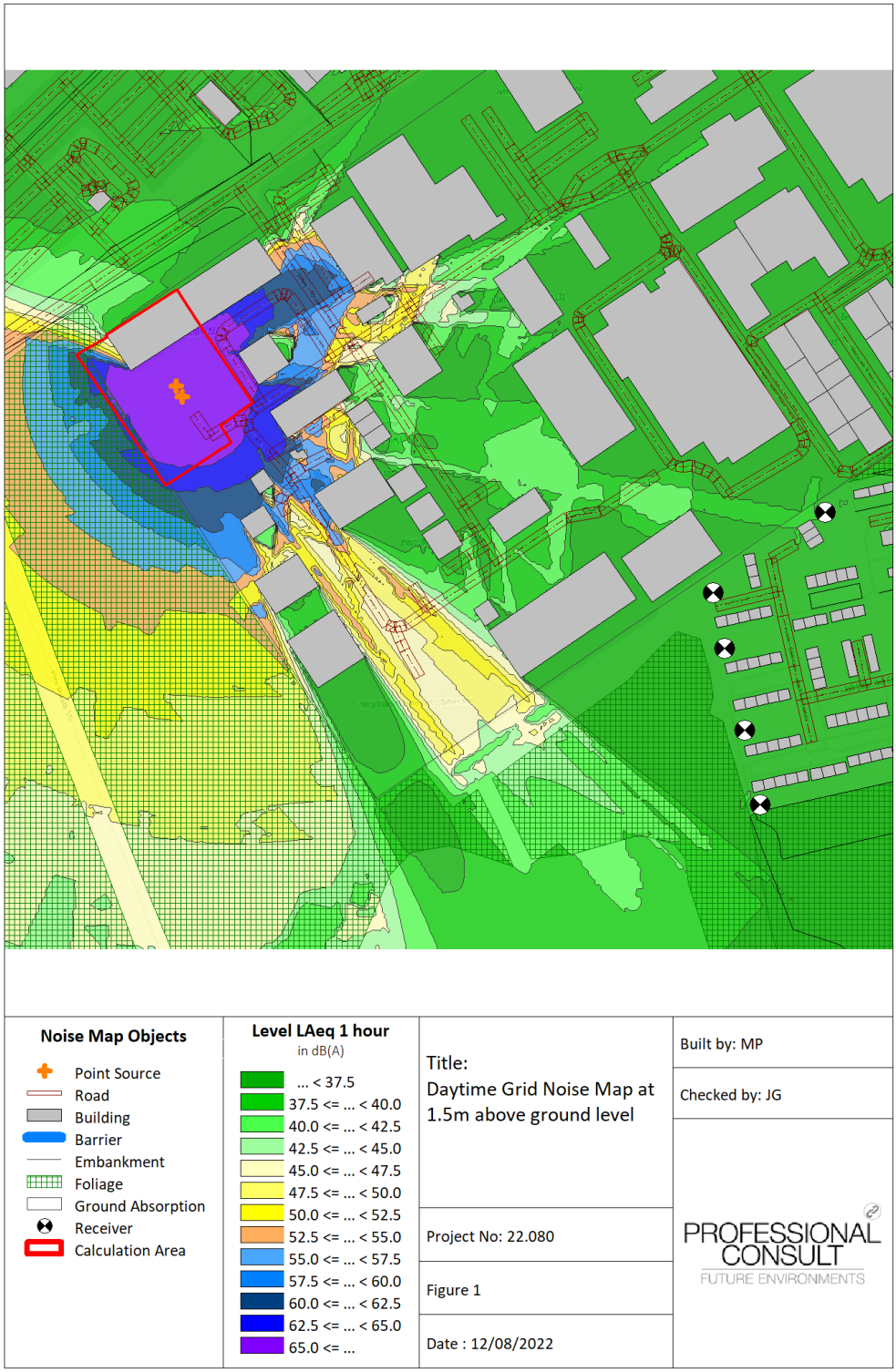
## APPENDIX 3: SITE LOCATION PLAN & NOISE MEASUREMENT POSITION

**Figure 1** **Site Plan**


| | | | |
|---|---|---|---|
| Title : Site Location Plan and Noise Measurement Position | Project No: 22.080 | Built by: MP | PROFESSIONAL CONSULT FUTURE ENVIRONMENTS |
| | Figure 1 | | |
| | Date : 28/10/2022 | Checked by: JG | |

## APPENDIX 4: DAYTIME GRID NOISE MAP

**Figure 1** **Daytime Grid Noise Map**



## APPENDIX 6: MEASURED BACKGROUND SOUND LEVELS

| Period Start Time | Measured Sound Pressure Level (dB) |
|---|---|
| | $L_{A90,T}$ |
| 14/07/2022 12:44 | 45 |
| 14/07/2022 12:59 | 47 |
| 14/07/2022 13:14 | 44.2 |
| 14/07/2022 13:29 | 43.1 |
| 14/07/2022 13:44 | 40.2 |
| 14/07/2022 13:59 | 44.8 |
| 14/07/2022 14:14 | 44.1 |
| 14/07/2022 14:29 | 44.6 |
| 14/07/2022 14:44 | 42.4 |
| 14/07/2022 14:59 | 41.9 |
| 14/07/2022 15:14 | 43.8 |
| 14/07/2022 15:29 | 43.8 |
| 14/07/2022 15:44 | 42.9 |
| 14/07/2022 15:59 | 46 |
| 14/07/2022 16:14 | 45.5 |
| 14/07/2022 16:29 | 45 |
| 14/07/2022 16:44 | 41.9 |
| 14/07/2022 16:59 | 43.7 |
| 14/07/2022 17:14 | 43 |
| 14/07/2022 17:29 | 42.6 |
| 14/07/2022 17:44 | 43 |
| 14/07/2022 17:59 | 43.7 |
| 14/07/2022 18:14 | 42.2 |
| 14/07/2022 18:29 | 40.7 |
| 14/07/2022 18:44 | 41.1 |
| 14/07/2022 18:59 | 40 |
| 14/07/2022 19:14 | 40.6 |
| 14/07/2022 19:29 | 39.8 |
| 14/07/2022 19:44 | 39.5 |
| 14/07/2022 19:59 | 39.4 |
| 14/07/2022 20:14 | 38.8 |
| 14/07/2022 20:29 | 39 |
| 14/07/2022 20:44 | 39.7 |
| 14/07/2022 20:59 | 40 |
| 14/07/2022 21:14 | 39.2 |
| 14/07/2022 21:29 | 38.8 |
| 14/07/2022 21:44 | 38.4 |
| 14/07/2022 21:59 | 37.1 |
| 14/07/2022 22:14 | 37.1 |
| 14/07/2022 22:29 | 37 |
| 14/07/2022 22:44 | 37 |
| 14/07/2022 22:59 | 36.3 |
| 14/07/2022 23:14 | 36.3 |

| | |
|---|---|
| 14/07/2022 23:29 | 37.5 |
| 14/07/2022 23:44 | 35.6 |
| 14/07/2022 23:59 | 35.3 |
| 15/07/2022 00:14 | 35 |
| 15/07/2022 00:29 | 35.8 |
| 15/07/2022 00:44 | 34.7 |
| 15/07/2022 00:59 | 36.3 |
| 15/07/2022 01:14 | 39 |
| 15/07/2022 01:29 | 39.3 |
| 15/07/2022 01:44 | 39.1 |
| 15/07/2022 01:59 | 38.7 |
| 15/07/2022 02:14 | 38.1 |
| 15/07/2022 02:29 | 39.1 |
| 15/07/2022 02:44 | 40 |
| 15/07/2022 02:59 | 40 |
| 15/07/2022 03:14 | 38.4 |
| 15/07/2022 03:29 | 42.3 |
| 15/07/2022 03:44 | 40.5 |
| 15/07/2022 03:59 | 42.2 |
| 15/07/2022 04:14 | 43.3 |
| 15/07/2022 04:29 | 43.3 |
| 15/07/2022 04:44 | 44.7 |
| 15/07/2022 04:59 | 44.6 |
| 15/07/2022 05:14 | 46.2 |
| 15/07/2022 05:29 | 45.9 |
| 15/07/2022 05:44 | 45.6 |
| 15/07/2022 05:59 | 46.5 |
| 15/07/2022 06:14 | 47.2 |
| 15/07/2022 06:29 | 45.9 |
| 15/07/2022 06:44 | 44.5 |
| 15/07/2022 06:59 | 43.2 |
| 15/07/2022 07:14 | 43.1 |
| 15/07/2022 07:29 | 43.3 |
| 15/07/2022 07:44 | 43.1 |
| 15/07/2022 07:59 | 42.1 |
| 15/07/2022 08:14 | 40.9 |
| 15/07/2022 08:29 | 41.2 |
| 15/07/2022 08:44 | 40.4 |
| 15/07/2022 08:59 | 40 |
| 15/07/2022 09:14 | 41.3 |
| 15/07/2022 09:29 | 42 |
| 15/07/2022 09:44 | 44.5 |
| 15/07/2022 09:59 | 43.5 |
| 15/07/2022 10:14 | 42.7 |
| 15/07/2022 10:29 | 42.4 |
| 15/07/2022 10:44 | 42.1 |

| | |
|---|---|
| 15/07/2022 10:59 | 42.3 |
| 15/07/2022 11:14 | 41.5 |
| 15/07/2022 11:29 | 42.2 |
| 15/07/2022 11:44 | 44 |
| 15/07/2022 11:59 | 43.2 |
| 15/07/2022 12:14 | 44.1 |
| 15/07/2022 12:29 | 42 |
| 15/07/2022 12:44 | 43.2 |
| 15/07/2022 12:59 | 43.9 |
| 15/07/2022 13:14 | 43.8 |
| 15/07/2022 13:29 | 43.9 |
| 15/07/2022 13:44 | 43.5 |
| 15/07/2022 13:59 | 44.7 |
| 15/07/2022 14:14 | 43.9 |
| 15/07/2022 14:29 | 44.3 |
| 15/07/2022 14:44 | 43.6 |
| 15/07/2022 14:59 | 43.6 |
| 15/07/2022 15:14 | 44.4 |
| 15/07/2022 15:29 | 43.5 |
| 15/07/2022 15:44 | 44.2 |
| 15/07/2022 15:59 | 45.3 |
| 15/07/2022 16:14 | 44.4 |
| 15/07/2022 16:29 | 46.1 |
| 15/07/2022 16:44 | 45.6 |
| 15/07/2022 16:59 | 44.5 |
| 15/07/2022 17:14 | 45.3 |
| 15/07/2022 17:29 | 46 |
| 15/07/2022 17:44 | 45.7 |
| 15/07/2022 17:59 | 44.4 |
| 15/07/2022 18:14 | 45.3 |
| 15/07/2022 18:29 | 44.8 |
| 15/07/2022 18:44 | 45 |
| 15/07/2022 18:59 | 45.5 |
| 15/07/2022 19:14 | 45.1 |
| 15/07/2022 19:29 | 45.3 |
| 15/07/2022 19:44 | 44.5 |
| 15/07/2022 19:59 | 44.6 |
| 15/07/2022 20:14 | 46.1 |
| 15/07/2022 20:29 | 45.7 |
| 15/07/2022 20:44 | 44.9 |
| 15/07/2022 20:59 | 43.6 |
| 15/07/2022 21:14 | 43.3 |
| 15/07/2022 21:29 | 42.1 |
| 15/07/2022 21:44 | 41.6 |
| 15/07/2022 21:59 | 40.4 |
| 15/07/2022 22:14 | 40 |

| | |
|---|---|
| 15/07/2022 22:29 | 40.2 |
| 15/07/2022 22:44 | 40.4 |
| 15/07/2022 22:59 | 41.2 |
| 15/07/2022 23:14 | 40.4 |
| 15/07/2022 23:29 | 41.3 |
| 15/07/2022 23:44 | 40.7 |
| 15/07/2022 23:59 | 40.9 |
| 16/07/2022 00:14 | 40.9 |
| 16/07/2022 00:29 | 39.4 |
| 16/07/2022 00:44 | 39.9 |
| 16/07/2022 00:59 | 38.8 |
| 16/07/2022 01:14 | 39.3 |
| 16/07/2022 01:29 | 38.8 |
| 16/07/2022 01:44 | 39.9 |
| 16/07/2022 01:59 | 38.6 |
| 16/07/2022 02:14 | 38.1 |
| 16/07/2022 02:29 | 39.2 |
| 16/07/2022 02:44 | 39 |
| 16/07/2022 02:59 | 39.3 |
| 16/07/2022 03:14 | 37.8 |
| 16/07/2022 03:29 | 37.9 |
| 16/07/2022 03:44 | 39.4 |
| 16/07/2022 03:59 | 39.8 |
| 16/07/2022 04:14 | 39.6 |
| 16/07/2022 04:29 | 41.6 |
| 16/07/2022 04:44 | 41.8 |
| 16/07/2022 04:59 | 41 |
| 16/07/2022 05:14 | 42.2 |
| 16/07/2022 05:29 | 43 |
| 16/07/2022 05:44 | 40.5 |
| 16/07/2022 05:59 | 40 |
| 16/07/2022 06:14 | 39.5 |
| 16/07/2022 06:29 | 38.6 |
| 16/07/2022 06:44 | 38.3 |
| 16/07/2022 06:59 | 37.3 |
| 16/07/2022 07:14 | 36.2 |
| 16/07/2022 07:29 | 37 |
| 16/07/2022 07:44 | 36 |
| 16/07/2022 07:59 | 34.5 |
| 16/07/2022 08:14 | 34.8 |
| 16/07/2022 08:29 | 35 |
| 16/07/2022 08:44 | 35.1 |
| 16/07/2022 08:59 | 35.1 |
| 16/07/2022 09:14 | 34.4 |
| 16/07/2022 09:29 | 34.2 |
| 16/07/2022 09:44 | 35 |

| | |
|---|---|
| 16/07/2022 09:59 | 35.9 |
| 16/07/2022 10:14 | 34.8 |
| 16/07/2022 10:29 | 37.4 |
| 16/07/2022 10:44 | 36 |
| 16/07/2022 10:59 | 37 |
| 16/07/2022 11:14 | 37 |
| 16/07/2022 11:29 | 37.7 |
| 16/07/2022 11:44 | 35.5 |
| 16/07/2022 11:59 | 34.4 |
| 16/07/2022 12:14 | 36.2 |
| 16/07/2022 12:29 | 37.7 |
| 16/07/2022 12:44 | 36.7 |
| 16/07/2022 12:59 | 34.9 |
| 16/07/2022 13:14 | 33.6 |
| 16/07/2022 13:29 | 35.2 |
| 16/07/2022 13:44 | 35 |
| 16/07/2022 13:59 | 33.2 |
| 16/07/2022 14:14 | 37 |
| 16/07/2022 14:29 | 33.1 |
| 16/07/2022 14:44 | 32.6 |
| 16/07/2022 14:59 | 33.9 |
| 16/07/2022 15:14 | 33.2 |
| 16/07/2022 15:29 | 31.6 |
| 16/07/2022 15:44 | 32.2 |
| 16/07/2022 15:59 | 35.5 |
| 16/07/2022 16:14 | 35.9 |
| 16/07/2022 16:29 | 37.4 |
| 16/07/2022 16:44 | 38.4 |
| 16/07/2022 16:59 | 37.3 |
| 16/07/2022 17:14 | 38.3 |
| 16/07/2022 17:29 | 36.7 |
| 16/07/2022 17:44 | 37.1 |
| 16/07/2022 17:59 | 37.3 |
| 16/07/2022 18:14 | 37.5 |
| 16/07/2022 18:29 | 37.2 |
| 16/07/2022 18:44 | 36.7 |
| 16/07/2022 18:59 | 37 |
| 16/07/2022 19:14 | 37.6 |
| 16/07/2022 19:29 | 37 |
| 16/07/2022 19:44 | 36.4 |
| 16/07/2022 19:59 | 36.4 |
| 16/07/2022 20:14 | 35 |
| 16/07/2022 20:29 | 36.6 |
| 16/07/2022 20:44 | 35.3 |
| 16/07/2022 20:59 | 32.6 |
| 16/07/2022 21:14 | 32.9 |

| | |
|---|---|
| 16/07/2022 21:29 | 32.1 |
| 16/07/2022 21:44 | 33 |
| 16/07/2022 21:59 | 33.1 |
| 16/07/2022 22:14 | 31.8 |
| 16/07/2022 22:29 | 31.4 |
| 16/07/2022 22:44 | 31 |
| 16/07/2022 22:59 | 31.4 |
| 16/07/2022 23:14 | 30.7 |
| 16/07/2022 23:29 | 30.5 |
| 16/07/2022 23:44 | 30.1 |
| 16/07/2022 23:59 | 29.9 |
| 17/07/2022 00:14 | 29.6 |
| 17/07/2022 00:29 | 30.1 |
| 17/07/2022 00:44 | 28 |
| 17/07/2022 00:59 | 28.2 |
| 17/07/2022 01:14 | 28.7 |
| 17/07/2022 01:29 | 27.5 |
| 17/07/2022 01:44 | 28.6 |
| 17/07/2022 01:59 | 28.7 |
| 17/07/2022 02:14 | 28.4 |
| 17/07/2022 02:29 | 28.7 |
| 17/07/2022 02:44 | 27.6 |
| 17/07/2022 02:59 | 27 |
| 17/07/2022 03:14 | 30.1 |
| 17/07/2022 03:29 | 29 |
| 17/07/2022 03:44 | 31.2 |
| 17/07/2022 03:59 | 31.5 |
| 17/07/2022 04:14 | 32 |
| 17/07/2022 04:29 | 35.8 |
| 17/07/2022 04:44 | 36.3 |
| 17/07/2022 04:59 | 37.3 |
| 17/07/2022 05:14 | 38.9 |
| 17/07/2022 05:29 | 40 |
| 17/07/2022 05:44 | 38.5 |
| 17/07/2022 05:59 | 39.4 |
| 17/07/2022 06:14 | 38.9 |
| 17/07/2022 06:29 | 38.3 |
| 17/07/2022 06:44 | 37.1 |
| 17/07/2022 06:59 | 37.6 |
| 17/07/2022 07:14 | 36.9 |
| 17/07/2022 07:29 | 37.9 |
| 17/07/2022 07:44 | 36.8 |
| 17/07/2022 07:59 | 35.8 |
| 17/07/2022 08:14 | 37.7 |
| 17/07/2022 08:29 | 38.1 |
| 17/07/2022 08:44 | 37.6 |

| | |
|---|---|
| 17/07/2022 08:59 | 37.5 |
| 17/07/2022 09:14 | 37.6 |
| 17/07/2022 09:29 | 37.5 |
| 17/07/2022 09:44 | 37.8 |
| 17/07/2022 09:59 | 37.9 |
| 17/07/2022 10:14 | 40 |
| 17/07/2022 10:29 | 39.1 |
| 17/07/2022 10:44 | 35.7 |
| 17/07/2022 10:59 | 35.2 |
| 17/07/2022 11:14 | 37 |
| 17/07/2022 11:29 | 37.7 |
| 17/07/2022 11:44 | 38.3 |
| 17/07/2022 11:59 | 34 |
| 17/07/2022 12:14 | 35 |
| 17/07/2022 12:29 | 34.5 |
| 17/07/2022 12:44 | 34.6 |
| 17/07/2022 12:59 | 36 |
| 17/07/2022 13:14 | 34.7 |
| 17/07/2022 13:29 | 35.5 |
| 17/07/2022 13:44 | 33.4 |
| 17/07/2022 13:59 | 33.7 |
| 17/07/2022 14:14 | 34.7 |
| 17/07/2022 14:29 | 36.8 |
| 17/07/2022 14:44 | 34.8 |
| 17/07/2022 14:59 | 36.2 |
| 17/07/2022 15:14 | 36.4 |
| 17/07/2022 15:29 | 36 |
| 17/07/2022 15:44 | 37.1 |
| 17/07/2022 15:59 | 39.1 |
| 17/07/2022 16:14 | 38.3 |
| 17/07/2022 16:29 | 39.9 |
| 17/07/2022 16:44 | 39.1 |
| 17/07/2022 16:59 | 37.4 |
| 17/07/2022 17:14 | 38.5 |
| 17/07/2022 17:29 | 37.6 |
| 17/07/2022 17:44 | 38.3 |
| 17/07/2022 17:59 | 38.5 |
| 17/07/2022 18:14 | 37.2 |
| 17/07/2022 18:29 | 37.5 |
| 17/07/2022 18:44 | 38.1 |
| 17/07/2022 18:59 | 37.4 |
| 17/07/2022 19:14 | 36.1 |
| 17/07/2022 19:29 | 35.1 |
| 17/07/2022 19:44 | 35.3 |
| 17/07/2022 19:59 | 36.6 |
| 17/07/2022 20:14 | 34.3 |

| | |
|---|---|
| 17/07/2022 20:29 | 34.3 |
| 17/07/2022 20:44 | 34.5 |
| 17/07/2022 20:59 | 34 |
| 17/07/2022 21:14 | 32.6 |
| 17/07/2022 21:29 | 31.3 |
| 17/07/2022 21:44 | 31.1 |
| 17/07/2022 21:59 | 30.3 |
| 17/07/2022 22:14 | 30.4 |
| 17/07/2022 22:29 | 30.9 |
| 17/07/2022 22:44 | 29.7 |
| 17/07/2022 22:59 | 30.1 |
| 17/07/2022 23:14 | 29.4 |
| 17/07/2022 23:29 | 29.3 |
| 17/07/2022 23:44 | 28.3 |
| 17/07/2022 23:59 | 28.8 |
| 18/07/2022 00:14 | 29 |
| 18/07/2022 00:29 | 27.8 |
| 18/07/2022 00:44 | 27.5 |
| 18/07/2022 00:59 | 27.5 |
| 18/07/2022 01:14 | 26.6 |
| 18/07/2022 01:29 | 28.1 |
| 18/07/2022 01:44 | 28.2 |
| 18/07/2022 01:59 | 28.7 |
| 18/07/2022 02:14 | 31.1 |
| 18/07/2022 02:29 | 30.8 |
| 18/07/2022 02:44 | 32 |
| 18/07/2022 02:59 | 32.5 |
| 18/07/2022 03:14 | 32.4 |
| 18/07/2022 03:29 | 32.6 |
| 18/07/2022 03:44 | 35.4 |
| 18/07/2022 03:59 | 35.8 |
| 18/07/2022 04:14 | 38.2 |
| 18/07/2022 04:29 | 39.6 |
| 18/07/2022 04:44 | 41.2 |
| 18/07/2022 04:59 | 41.8 |
| 18/07/2022 05:14 | 42.3 |
| 18/07/2022 05:29 | 43.6 |
| 18/07/2022 05:44 | 44 |
| 18/07/2022 05:59 | 44 |
| 18/07/2022 06:14 | 45.3 |
| 18/07/2022 06:29 | 46.3 |
| 18/07/2022 06:44 | 46.2 |
| 18/07/2022 06:59 | 46.5 |
| 18/07/2022 07:14 | 45.3 |
| 18/07/2022 07:29 | 43.5 |
| 18/07/2022 07:44 | 42.2 |

| | |
|---|---|
| 18/07/2022 07:59 | 41.6 |
| 18/07/2022 08:14 | 40.8 |
| 18/07/2022 08:29 | 40.7 |
| 18/07/2022 08:44 | 40 |
| 18/07/2022 08:59 | 39 |
| 18/07/2022 09:14 | 38.8 |
| 18/07/2022 09:29 | 39.2 |
| 18/07/2022 09:44 | 40 |

## APPENDIX 7: MEASURED AMBIENT SOUND LEVELS

| Period Start Time | Measured Sound Pressure Level (dB) |
|---|---|
| | $L_{Aeq,1hr}$ |
| 20/10/2022 13:59 | 58 |
| 20/10/2022 14:59 | 57 |
| 20/10/2022 15:59 | 55 |
| 20/10/2022 16:59 | 58 |
| 20/10/2022 17:59 | 54 |
| 20/10/2022 18:59 | 53 |
| 20/10/2022 19:59 | 51 |
| 20/10/2022 20:59 | 50 |
| 20/10/2022 21:59 | 52 |
| 20/10/2022 22:59 | 49 |
| 20/10/2022 23:59 | 45 |
| 21/10/2022 00:59 | 46 |
| 21/10/2022 01:59 | 47 |
| 21/10/2022 02:59 | 48 |
| 21/10/2022 03:59 | 51 |
| 21/10/2022 04:59 | 52 |
| 21/10/2022 05:59 | 53 |
| 21/10/2022 06:59 | 60 |
| 21/10/2022 07:59 | 60 |
| 21/10/2022 08:59 | 57 |
| 21/10/2022 09:59 | 60 |
| 21/10/2022 10:59 | 66 |
| 21/10/2022 11:59 | 59 |
| 21/10/2022 12:59 | 57 |
| 21/10/2022 13:59 | 57 |
| 21/10/2022 14:59 | 56 |
| 21/10/2022 15:59 | 56 |
| 21/10/2022 16:59 | 55 |
| 21/10/2022 17:59 | 54 |
| 21/10/2022 18:59 | 53 |
| 21/10/2022 19:59 | 53 |
| 21/10/2022 20:59 | 51 |
| 21/10/2022 21:59 | 52 |
| 21/10/2022 22:59 | 48 |
| 21/10/2022 23:59 | 47 |
| 22/10/2022 00:59 | 49 |
| 22/10/2022 01:59 | 46 |
| 22/10/2022 02:59 | 46 |
| 22/10/2022 03:59 | 47 |
| 22/10/2022 04:59 | 49 |
| 22/10/2022 05:59 | 50 |
| 22/10/2022 06:59 | 61 |
| 22/10/2022 07:59 | 55 |

| | |
|---|---|
| 22/10/2022 08:59 | 55 |
| 22/10/2022 09:59 | 61 |
| 22/10/2022 10:59 | 56 |
| 22/10/2022 11:59 | 68 |
| 22/10/2022 12:59 | 59 |
| 22/10/2022 13:59 | 60 |
| 22/10/2022 14:59 | 54 |
| 22/10/2022 15:59 | 55 |
| 22/10/2022 16:59 | 54 |
| 22/10/2022 17:59 | 52 |
| 22/10/2022 18:59 | 52 |
| 22/10/2022 19:59 | 50 |
| 22/10/2022 20:59 | 49 |
| 22/10/2022 21:59 | 48 |
| 22/10/2022 22:59 | 46 |
| 22/10/2022 23:59 | 44 |
| 23/10/2022 00:59 | 44 |
| 23/10/2022 01:59 | 43 |
| 23/10/2022 02:59 | 42 |
| 23/10/2022 03:59 | 43 |
| 23/10/2022 04:59 | 46 |
| 23/10/2022 05:59 | 48 |
| 23/10/2022 06:59 | 54 |
| 23/10/2022 07:59 | 52 |
| 23/10/2022 08:59 | 55 |
| 23/10/2022 09:59 | 58 |
| 23/10/2022 10:59 | 54 |
| 23/10/2022 11:59 | 57 |
| 23/10/2022 12:59 | 55 |
| 23/10/2022 13:59 | 54 |
| 23/10/2022 14:59 | 54 |
| 23/10/2022 15:59 | 52 |
| 23/10/2022 16:59 | 53 |
| 23/10/2022 17:59 | 58 |
| 23/10/2022 18:59 | 53 |
| 23/10/2022 19:59 | 49 |
| 23/10/2022 20:59 | 48 |
| 23/10/2022 21:59 | 47 |
| 23/10/2022 22:59 | 57 |
| 23/10/2022 23:59 | 54 |
| 24/10/2022 00:59 | 51 |
| 24/10/2022 01:59 | 47 |
| 24/10/2022 02:59 | 53 |
| 24/10/2022 03:59 | 56 |
| 24/10/2022 04:59 | 54 |
| 24/10/2022 05:59 | 54 |

| | |
|---|---|
| 24/10/2022 06:59 | 57 |
| 24/10/2022 07:59 | 58 |
| 24/10/2022 08:59 | 58 |
| 24/10/2022 09:59 | 61 |
| 24/10/2022 10:59 | 62 |
| 24/10/2022 11:59 | 59 |
| 24/10/2022 12:59 | 59 |
| 24/10/2022 13:59 | 61 |
| 24/10/2022 14:59 | 64 |
| 24/10/2022 15:59 | 64 |
| 24/10/2022 16:59 | 57 |
| 24/10/2022 17:59 | 55 |
| 24/10/2022 18:59 | 53 |
| 24/10/2022 19:59 | 52 |
| 24/10/2022 20:59 | 51 |
| 24/10/2022 21:59 | 49 |
| 24/10/2022 22:59 | 46 |
| 24/10/2022 23:59 | 46 |
| 25/10/2022 00:59 | 45 |
| 25/10/2022 01:59 | 45 |
| 25/10/2022 02:59 | 46 |
| 25/10/2022 03:59 | 50 |
| 25/10/2022 04:59 | 52 |
| 25/10/2022 05:59 | 55 |
| 25/10/2022 06:59 | 63 |
| 25/10/2022 07:59 | 62 |
| 25/10/2022 08:59 | 62 |
| 25/10/2022 09:59 | 63 |
| 25/10/2022 10:59 | 63 |
| 25/10/2022 11:59 | 64 |
| 25/10/2022 12:59 | 60 |
| 25/10/2022 13:59 | 67 |
| 25/10/2022 14:59 | 60 |
| 25/10/2022 15:59 | 59 |
| 25/10/2022 16:59 | 55 |
| 25/10/2022 17:59 | 53 |
| 25/10/2022 18:59 | 51 |
| 25/10/2022 19:59 | 50 |
| 25/10/2022 20:59 | 48 |
| 25/10/2022 21:59 | 47 |
| 25/10/2022 22:59 | 47 |
| 25/10/2022 23:59 | 45 |
| 26/10/2022 00:59 | 44 |
| 26/10/2022 01:59 | 44 |
| 26/10/2022 02:59 | 45 |
| 26/10/2022 03:59 | 46 |

| | |
|---|---|
| 26/10/2022 04:59 | 51 |
| 26/10/2022 05:59 | 54 |
| 26/10/2022 06:59 | 60 |
| 26/10/2022 07:59 | 70 |
| 26/10/2022 08:59 | 70 |
| 26/10/2022 09:59 | 62 |
| 26/10/2022 10:59 | 66 |
| 26/10/2022 11:59 | 60 |
| 26/10/2022 12:59 | 71 |
| 26/10/2022 13:59 | 64 |
| 26/10/2022 14:59 | 63 |
| 26/10/2022 15:59 | 58 |
| 26/10/2022 16:59 | 69 |
| 26/10/2022 17:59 | 55 |
| 26/10/2022 18:59 | 53 |
| 26/10/2022 19:59 | 51 |
| 26/10/2022 20:59 | 50 |
| 26/10/2022 21:59 | 48 |
| 26/10/2022 22:59 | 46 |
| 26/10/2022 23:59 | 45 |
| 27/10/2022 00:59 | 44 |
| 27/10/2022 01:59 | 46 |
| 27/10/2022 02:59 | 45 |
| 27/10/2022 03:59 | 47 |
| 27/10/2022 04:59 | 51 |
| 27/10/2022 05:59 | 53 |
| 27/10/2022 06:59 | 65 |
| 27/10/2022 07:59 | 72 |
| 27/10/2022 08:59 | 60 |
| 27/10/2022 09:59 | 66 |
| 27/10/2022 10:59 | 63 |
| 27/10/2022 11:59 | 67 |